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This week: CCESD Course

Day / Topic

1. Climate change learning for sustainable development
2. A Futures Learning approach
3. Adaptation & Mitigation
4. A Local Focus
5. A Global Focus
6. Empowerment & Action

**UNESCO COURSE FOR SECONDARY TEACHERS ON  
CLIMATE CHANGE EDUCATION FOR SUSTAINABLE DEVELOPMENT**

# CLIMATE CHANGE IN THE CLASSROOM



UNESCO gratefully acknowledges the time and effort spent by those involved in producing and commenting on the *Climate Change in the Classroom: UNESCO Course for Secondary Teachers on Climate Change Education for Sustainable Development*.

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# CLIMATE CHANGE IN THE CLASSROOM

## Welcome!

Welcome to the **UNESCO Course for Secondary Teachers on Climate Change Education for Sustainable Development (CCESD)**. This course has been created with the goal of bringing climate change education outside the science classroom into the many other subject areas upon which climate change now has an impact, or will impact in the future, such as ethics, social studies, economics, political science, among others.

The course materials are organized into four parts:

1. Course Framework and Overview
2. Teachers' Education Course daily materials
3. Regional Resource Packs
4. Daily Classroom Materials for teachers

These materials are all described in more detail and can be accessed from the Start Menu found on the following pages.

## About the Flipbook format

These course materials are designed to be accessed online only using a Flash-based software available for any web browser. The Flipbook format provides an authentic on-screen textbook experience, while also offering the functionality of weblinks to quickly access other pages within the document, or other files with supporting information (e.g. PowerPoint slides). In addition, the user can insert and label notes and bookmarks, download pdf versions of the materials, and print pages when needed. To discover all the functionalities offered by this online publication format, simply explore the diverse interface icons.

The materials can even be accessed by mobile devices, though with a more limited functionality.

## About this Start Menu

This Start Menu provides links to all the UNESCO “Climate Change in the Classroom” course materials. A new window will open each time a new section of the course material is accessed.

## Course Framework and Overview

 [Click to consult the Course Framework and Overview](#)

The Course Framework and Overview sets the stage for the course, providing background on Climate Change Education for Sustainable Development (CCESD), course rationale, module overviews, and practical hints and tips for organising and giving the course.

## Daily Course Materials for Teacher Educators

### Day One. Climate Change Learning for Sustainable Development

 [Click to consult the materials for Day One](#)

This module explores Education for Sustainable Development (ESD) and Climate Change Education (CCE) in theory and practice and their mutually reinforcing characteristics. Key concepts and dimensions of Climate Change Education for Sustainable Development (CCESD) are introduced. Participants pool understandings, perceptions and personal experiences of climate change before being introduced to the basic science. This is followed by an examination of the diverse human factors driving climate change, the interrelationship between those factors, and the impacts of climate change on people’s lives.

The programme then brings climate change and sustainable development together and examines the implications of present and future climate change for achieving sustainable development. Participants are introduced to the knowledge, skills and dispositions to be developed in learners. They also acquire a sense of the interactive, participatory and experiential learning processes that CCESD calls for and how such learning should be facilitated. The day closes with a sharing of initial ideas on opportunities for CCESD across the curriculum.

### Day Two. Climate Change: A Futures Learning Approach

 [Click to consult the materials for Day Two](#)

This module explores teaching and learning about climate change across time, especially the present and the future. This module introduces the concept that just as previous generations shaped the past and life today, the current generation shapes the present and the future. Participants envision the future within a context of climate change, creating a variety of scenarios—some desirable and others undesirable. Themes such as intergenerational justice and accountability are woven into this day and throughout the module. Desirable and undesirable futures are used as entry points for practical community based engagement. The module ends with an examination of the practical considerations of methods to insert reflections and projections of the future into the secondary curriculum.

### Day Three. Learning for Climate Change Mitigation and Adaptation

 [Click to consult the materials for Day Three](#)

This module begins by delving deeper into climate change mitigation and adaptation and the overlaps and relationships between the two. Mitigation strategies are introduced and adaptation is illustrated through stories from around the world. Participants explore disaster risk reduction through descriptive examples and learn about the concepts of resilience and vulnerability. Special attention is given to the contribution of schools and young people to community disaster risk reduction strategies. The day closes with a role-play in which groups describe their plans for whole-school and school-in-community responses to climate change to a Ministry of Education official.

### Day Four. Climate Change Learning: A Local Focus

 [Click to consult the materials for Day Four](#)

This module focuses on local community and school-based climate change learning. It begins by revisiting resilience and vulnerability in greater depth, including an exploration of how schools and communities can work to build a ‘culture of safety and resilience’. Participants prepare for a field trip in the local community. The afternoon is largely dedicated to the field trip itself.

Back at the training centre, participants exchange and discuss their experiences before taking time to reflect on lessons learned about organizing and facilitating climate change-related school field trips. An alternative to the field trip activity would be to bring in guest lecturers or speakers from the community who work in climate change related activities.

## Day Five. Climate Change Learning: A Global Focus

This module takes a global perspective, exploring climate change as a complex global phenomenon and weaving together cross-cutting issues such as gender, health, human rights, peace and social justice. A cartoon interpretation activity reveals a range of issues, in particular, climate justice. Climate change is then explored from, first, a human rights perspective and, second, the perspective of the achievement of the Millennium Development Goals. The complex issue of what does or does not constitute legitimate action and activism when the sustainability and well-being of humanity and the planet are at stake is opened up for discussion. The day closes with participants proposing their ideas for CCESD across the curriculum and across their disciplines.

Click to consult  
the materials  
for Day Five 

## Day Six. Confronting Climate Change: Towards Empowerment and Action

This module begins by giving participants experience in eliciting their students' concerns about the future, in having students engage with feelings of despair and powerlessness in the face of climate change, and in translating those feelings into feelings of purposefulness and empowerment. A dramatic play provides the means to practice confronting climate change denial and contradictory responses. The skills and learning processes appropriate to CCESD are overviewed by drawing upon participants' experiences over the six days. A planning tool for CCESD-oriented whole school change is introduced. The course closes by consolidating ideas for whole-school and school-in-community approaches to CCESD and having participants commit to practical short, medium and long term plans for CCESD in their schools and communities.

Click to consult  
the materials  
for Day Six 

## Regional Resource Packs

The Regional Resource Packs provide both information on the predicted global impacts of climate change, as well as region-specific information. Regional policies are described, and several case studies are provided which include personal and community-level climate change observations and adaptation activities.

Click to consult  
the Regional  
Resource Guide for: 

- **Africa**
- **Asia**
- **Europe & North America**
- **Small Island States**

Africa  
Asia  
Europe &  
North America  
Small Island  
States

## Daily Classroom Materials for Teachers

The daily classroom materials provide support for teachers in their classrooms. They run parallel to and build upon the activities of the Teachers' Education Course.

Click to consult  
the Classroom  
Materials for: 

### Day One. Climate Change Learning for Sustainable Development

Day One

### Day Two. Climate Change: A Futures Learning Approach

Day Two

### Day Three. Learning for Climate Change Mitigation and Adaptation

Day Three

### Day Four. Climate Change Learning: A Local Focus

Day Four

### Day Five. Climate Change Learning: A Global Focus

Day Five

### Day Six. Confronting Climate Change: Towards Empowerment and Action

Day Six



# Course Framework and Overview

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

**CLIMATE  
CHANGE**  
IN THE  
CLASSROOM



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# 1. Introduction

This course is designed to enable teachers at the secondary level from diverse subject areas to introduce climate change education for sustainable development (CCESD) across the curriculum.

Teachers face a demanding task. They need to understand what and how to teach about the complex forces driving climate change as well as its impacts on culture, security, well-being and development prospects. They need to show young people how they and their communities can respond to the threat and play a part in reducing the scope and severity of climate change. In so doing, it is important to build upon the participatory learning approaches called for by education for sustainable development, taking learning out of the classroom and into the community. Teachers also need to play their part in taking forward a whole-school response to climate change that includes addressing climate and sustainability across the curriculum. A strong and clear futures orientation in the curriculum is vital in this regard. They need to support learners in coming to terms with climate change and climate changed futures.

## Professional development for teachers on climate change

UNESCO has identified the professional development of teachers in education for sustainable development as the top priority in recognition of the transformative role that teachers and teacher educators need to play in re-orienting education to help realize a sustainable future (UNESCO, 2005, p. 19). But good intentions for the professional development of teachers have fallen short in practice. Although taken up by enthusiasts, teacher education for sustainable development has rarely been mainstreamed, and, where there are courses, is often approached within a disciplinary as opposed to an interdisciplinary frame (Wals, A., 2009).

If professional development in education for sustainable development is at an adolescent stage, teacher education in climate change education for sustainable development is in its infancy. For instance, according to a 2009 international comparative study on climate change education and sustainable development in ten countries, climate change education has peripheral status in educational research and practice, and when it is addressed it is only within science education (Læssøe, J., Schnack, K., Breiting, S. & Rolls, S., 2009). There is a clear and present need to respond to climate change challenges through systematic teacher education programmes that are not restricted to a single subject area.

This teacher education course is an attempt to fill the current gap and is in line with one of UNESCO's key objectives for climate change education for sustainable development, that is, to support teacher training on climate change for sustainable development (UNESCO, 2010, p. 9).

The programme has four distinctive features:

1. It helps teachers to understand the causes, dynamics and impacts of climate change through a holistic approach.
2. Teachers are exposed to, and experience, a range of pedagogical approaches and techniques, that they can use in their own school environment. This includes engagement of themselves and their students in whole school and school-in-community approaches.
3. Teachers will develop their capacities to facilitate students' community based learning.
4. Teachers will develop future-oriented and transformative capacities in facilitating climate change mitigation, adaptation, and disaster risk reduction learning.

## 2. Rationale and Conceptual Framework

### Why Climate Change Education?

In 2008, climate change was proclaimed by the UN Secretary-General, Ban Ki Moon, to be the defining challenge of our time (UNESCO, 2010, p. 2). Not long ago, it was treated more lightly. As recently as 2001 the UN Intergovernmental Panel on Climate Change (IPCC) more or less assumed, on evidence available at the time, that climate change would be gradual and incremental, and therefore manageable through progressive adjustments (IPCC, 2001). The Panel’s tone was tentative. By 2007, as further scientific data accumulated including evidence of positive feedback mechanisms that would amplify the warming of the planet and of abrupt, irreversible climate ‘tipping points’, IPCC was adopting a firmly unequivocal and more urgent tone (IPCC, 2007). As one observer put it: ‘Climate change is coming faster and rougher than scientists have expected’ (Romm, J.J., 2007). The 2007 IPCC report also reflected the emerging global consensus amongst scientists that climate change is predominantly human-induced (IPCC, 2007. p. 1). It signalled the need for urgent and transformative action, local through global, to address the threat of potentially runaway climate change. Since then, our understanding of the threat has become much clearer with some scientists already concerned as to whether the global community can act decisively and quickly enough to stabilize the global surface temperature rise at 2.00C above pre-industrial levels which is generally regarded as being a liveable increase (Oxfam International, 2009).

“It is alarming to admit that if the community of nations is unable to fully stabilize climate change, it will threaten where we can live, where and how we grow food and where we can find water.... In other words, it will threaten the basic foundation — the very stability on which humanity has built its existence.”

- Christiana Figueres, Executive Secretary of the United Nations Framework Convention on Climate Change  
Excerpt from an article in The New York Times, 15 February 2011.

In this difficult task, education has a crucial part to play. Its role is threefold (Figure 1). First, it has to play its part in building social and individual capacities and attitudes for climate change **mitigation** so as to pre-empt worst case climate change scenarios in the future. Second, it has the task of developing the skills, capacities and attitudes for **adaptation** in the face of already evident and looming climate impacts. Third, it has an on-going role to play in stimulating and reinforcing **understanding of and attentiveness** to the realities of climate change.

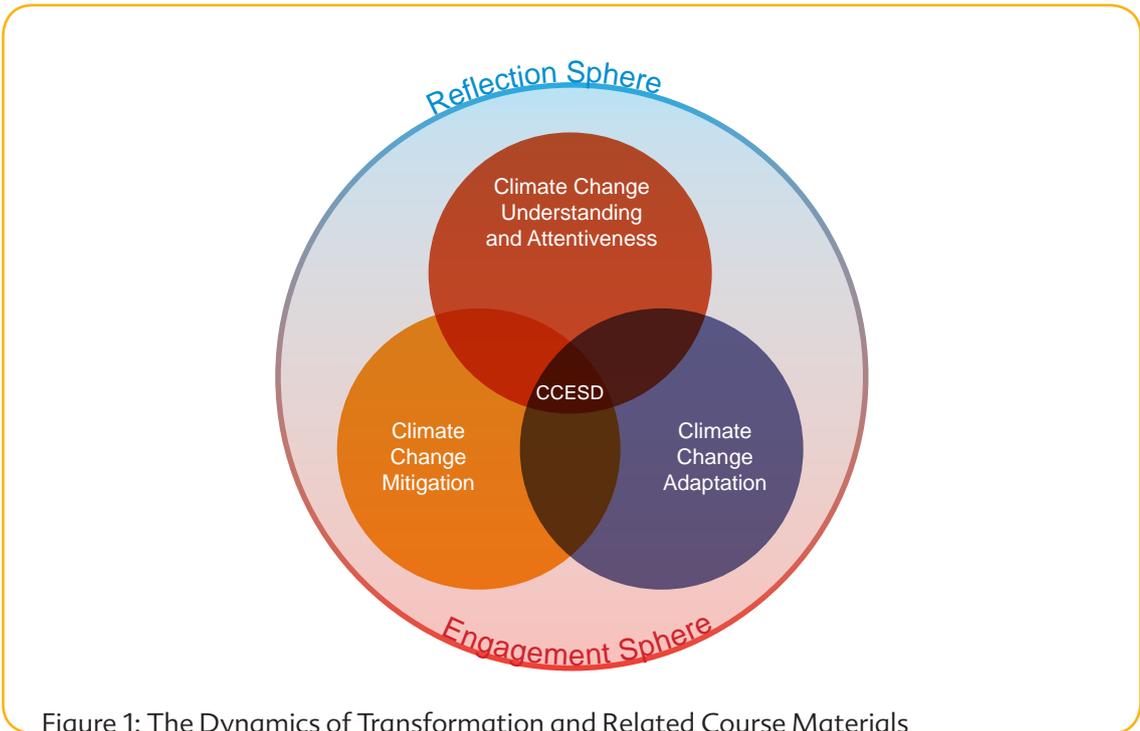


Figure 1: The Dynamics of Transformation and Related Course Materials

## Emphasis on self-transformation

These three dimensions of climate change education need to underscore **self-transformation**, in recognition of the fact that neither the ‘business as usual’ approach nor scientific and technological solutions will help global society avoid the worst effects of the warming of the planet. Each and every person has his or her own role to play. The three dimensions are complementary and as the learner works with and through them, they allow for the continued engagement and recurring reflection that is fundamental to transformation.

## Focus on mitigation

Identifying climate change as human-induced begs the question: Which individual and collective behaviours and social and economic structures are causing the problem? The **mitigation dimension of climate change education** is about identifying the causes of climate change and developing the knowledge, skills and dispositions required for individual and societal change to rectify those causes. Taken at its most basic level, the root cause of climate change is greenhouse gas emissions. At this level, education for climate change mitigation covers the various levels and types of energy consumption, the shift to non-polluting, renewable energy sources, energy conservation, environmental conservation, reforestation and afforestation. Going deeper, mitigation education involves examining economic systems, social structures, cultural patterns, lifestyle expectations, consumerism, wealth distribution, aspirations and value systems and their causal relationships with greenhouse gas emissions.

## Focus on adaptation

The **adaptation dimension of climate change education** relates to building resilience and reducing **vulnerability** in the face of climate change impacts that are already happening or are soon to happen. The learning may be of a technical nature, such as learning about drought resistant farming practices or flood management behaviours. It may go beyond the technical aspects to a profound re-thinking of cultural practices and traditions. The adaptation dimension aligns climate change education with **disaster risk reduction education** (education to build a **culture of safety and resilience** in the face of potential cataclysm).

## Focus on understanding and attentiveness

The **understanding and attentiveness dimension** is about understanding what is happening to the climate, understanding the driving forces behind climate change, and creating a mind-set of alertness and mindfulness to changes that are already occurring. The climate change threat is huge and all-pervasive but, at the same time, stealthy and invisible, and is consequently easily put aside under day-to-day pressures of life. There are also widespread misconceptions about climate change circulating continually and, especially amongst populations of affluent societies, manifestations of ‘eyes wide shut’ denial and avoidance that need to be challenged (Hillman, M., Fawcett, T & Rajan, S.C., 2007).

## Towards overall societal change

Learning programmes are required to help learners engage with the full seriousness of the climate change threat, search for new meanings and values, and move into personal and collective empowerment and action.

In sum, there is an underlying goal of self-transformation to climate change education for sustainable development. It is about affecting deep personal change within and through this, an overall societal transformation towards new ways of seeing the world, finding or rediscovering a sense of what we value, reshaping and reorienting aspirations and purposes, and envisioning markedly different futures. It is holistic education as a precursor to a new world view, and a securer and more sustainable future (Kagawa, F. & Selby, D. (Eds), 2010).

## Why Integrate Climate Change Education with Education for Sustainable Development?

UNESCO has established the **Climate Change Education for Sustainable Development (CCESD) Programme**, recognizing the crucial part that education and awareness raising have to play in rolling back the threat to a sustainable future that climate change represents.

The priorities of the CCESD Programme are to:

1. Strengthen the capacity of countries to provide quality climate change education for sustainable development at secondary school level.
2. Encourage and enhance innovative teaching approaches to integrate quality climate change education for sustainable development in school.
3. Raise awareness about climate change and enhance non-formal education programmes through media, networking and partnerships (UNESCO, 2010, p. 5).

“...climate change is not solely environmental in terms of its root causes (economic development models, industrialization, urbanization, consumption and lifestyle patterns, etc), nor in terms of its actual and anticipated effects (increased scarcity of resources, flows of refutes, etc), nor in terms of the means through which it may be mitigated and adapted to (international conventions on carbon emissions, national green taxes, awareness raising programmes, etc). **This is why UNESCO promotes ESD as the best framework for addressing climate change issues through education.**”

- UNESCO Strategy for the Second Half of the United Nations Decade of Education for Sustainable Development, 2010.

### A holistic framework

Education for Sustainable Development itself offers a holistic framework for considering and integrating issues of environmental, economic, social and cultural sustainability in the name of realizing a sustainable future. It addresses the complexity and interconnectedness of global issues. It sets learning within a framework of ‘underlying values’ including:

- respect for the dignity and human rights of all;
- a commitment to social and economic justice for all;
- respect for the human rights of future generations;
- respect for the greater community of (other-than-human) life and protection of ecosystems;
- respect for cultural diversity and commitment to building a culture of tolerance, non-violence and peace (UNESCO, 2005, p. 7-8).

Education for Sustainable Development calls for the envisioning of change by looking at past, present and future in tandem. Its vision is one of cross-curricular and interdisciplinary treatment of sustainability precepts and principles. It advocates a multi-method and participatory pedagogy that integrates critical thinking and reflection with concrete and practical engagement with sustainability in the community (UNESCO, 2005, p. 30-31).

### Taking climate change learning outside the science classroom

Integrating Climate Change Education with Education for Sustainable Development carries the distinct advantage of breaking climate change learning out of the science classroom and into other relevant subject areas. The emphasis within education for sustainable development on examining the dynamic connections between environmental, economic, social and cultural factors better allow for thorough consideration of the underlying driving forces behind climate change such as economic development models, lifestyle patterns and a growing consumer society. Consideration of the different dimensions of sustainability also provides a framework for a fuller understanding of climate change mitigation and adaptation.

### Rethinking ‘development’

Climate change education asks that sustainable development educators continue their constant questioning of what ‘development’ means. If current ‘western’ economic models,

lifestyle patterns, aspirations and purposes, value systems and worldviews are suspected as fuelling climate change, then what are appropriate development directions? If we are unable to halt the onset of runaway climate change, then what does 'development' involve and 'progress' mean when faced with the likelihood of reduced prospects for future generations? Climate change education also asks sustainability education to more thoroughly engage with disaster risk reduction than has been the case so far.

## Building emotional intelligence

The prospect of a future marked by the consequences of climate change, such as loss of biodiversity, degradation of ecosystems and social consequences also suggests a more significant role for emotional intelligence in education for sustainable development than has so far been the case. Education for sustainable development educators have moved forward with fostering critical thinking, problem solving, solution-centred learning and change competencies, but they have made less progress on nurturing the emotional learning that connects with the beauty and diversity of the earth, its people and creatures and helps the learner feel the loss of diversity. Such learning can provide an emotional basis for purposeful social action to preserve what is valued into the future.

## Through what Curriculum Frameworks is Climate Change best taught and learned?

### Multi-disciplinary and interdisciplinary frameworks

Concerned with helping learners understand the interplay between environmental, economic and social sustainability, Education for Sustainable Development has from the outset called for **multi-disciplinary and interdisciplinary frameworks** for programme delivery. The holistic concept of sustainable development is not helpfully contained within the confines of a particular subject or discipline. No one subject or specialist area can illustrate all the dimensions that are likely to come into play as learners consider sustainability concepts. Exploring environmental, economic and social dimensions will inevitably lead into consideration of cultural, ethical, philosophical, political, scientific, spiritual and technological factors. The breadth of the sustainability agenda presents real, but achievable, challenges to teachers.

### Going beyond the science

How should sustainability issues be integrated into the curriculum in concrete terms? One commonly employed approach is to seek out opportunities to infuse sustainability-related concepts, issues and cases into discipline-based programmes (Selby, 2006, p. 57-59). While it is clear that science has the lead role in helping explain the climatology and physical science of global warming, a re-balancing away from the biophysical science curriculum and towards the social sciences is needed if the breadth and depth of the climate change threat are to be understood by learners. For example, a science teacher might explore the chemistry of the impact, clean up and disposal of oil spills at sea at an appropriate point in the curriculum while the social studies teacher might address the ethics of oil-based consumerism as the opportunity presents itself. The infusion of sustainability across the curriculum at each grade level can be charted and the cumulative student exposure to sustainability understanding and ethics can be monitored. The more thoroughly this is done, the closer the approach comes to an interdisciplinary approach whereby all subjects are contributing insights on sustainability through their own disciplinary lens.

Presenting the physical causes of climate change, including the accumulation of CO<sub>2</sub> and other heat trapping gases in the atmosphere, as well as how to reduce greenhouse gas emissions are topics primarily for the science (and technology) curriculum. Other forces implicated in the climate change crisis, such as the predominant economic paradigm, current development models, and the view that nature exists to be exploited in the interest of human consumption and consumerism, call for climate change to be addressed in curriculum spaces where ethical issues are treated, including social sciences, languages, and creative arts.

The wide-ranging impacts of climate change also call for cross-curricular treatment: new threats to the health of people, animals and plants as diseases migrate; the threat to cultural heritage and indigenous lifestyles through sea incursions, seasonally recurring wildfire and desertification; increasing hunger and malnutrition as the land becomes arid; massive internal and external population displacement with the threat of discrimination towards incoming

people; destabilization of economies; threats to peace and security; increasing climate injustice globally; differential impacts on males and females thereby deepening existing gender inequalities, to name only a few.

### Why does Climate Change Learning need a Local Dimension?

Real, hands-on experience brings learning alive. That is reason enough for including a **local focus** in climate change learning for sustainable development. But there is a broader case to be made.

#### Motivating action through local learning

First, fostering attachment to place through learning programmes can foster a ‘feel for the soil and history (Lopez, 1998, p. 132) that can be important in promoting an ethical response to climate change. For instance, developing knowledge of local seasonally based cultural and farming practices or of local flora and fauna and how these have fed into cultural and religious story and symbolism, and further exploration of how these might be lost as a consequence of climate change can give root to feelings of responsibility and action in the local setting.

#### Motivating learners through real life experience

Second, the locality and local community provide concrete, real life contexts for exploring and experimenting with alternative lifestyles, economies and forms of social organization in response to climate change. By taking sustainability learning out of the classroom and into the community, students can work alongside community members in thinking through and implementing local initiatives for climate change mitigation, adaptation, and disaster risk reduction.

Strategies for enriched student learning through active engagement are informed by the concept of local participatory democracy, which recognizes that local people are most familiar with their immediate environment and hence well placed to make good decisions on sustainable livelihoods. Such strategies also recognize that students need real-life opportunities for practice-centred and participatory learning, for real engagement and experimentation with social transformation processes. Climate Change Education for Sustainable Development should not be contained within the confines of the classroom but calls for apprenticeship in direct community engagement and, as will be discussed shortly, engagement with the school itself can be an important part of that apprenticeship.

### Why is a Global Dimension also Essential?

#### Local decisions have global implications

Climate change does not stop at national borders. It offers a vivid example of the interconnected global system in which we live. The energy and lifestyle decisions and behaviours of one part of the world can have serious implications for most if not all other parts of the world. For this reason climate change education for sustainable development includes a strong global dimension.

- Students everywhere need to know what other societies are doing (or not doing) that is exacerbating the warming of the planet.
- Students everywhere need to understand the global economic, social and political forces that drive the problem.
- Students everywhere need the inspirational stories of successful actions by groups and communities to mitigate or adapt to climate change.
- Students everywhere need to know what other young people are thinking and doing. This speaks for curricula, teaching and learning materials and media that enable a global and intercultural dialog to take place on climate change (Lotz-Sisitka, 2010, p. 71-88). The many voices and experiences of people from around the world need to be heard in the classroom.

#### Understanding the ethical perspective

According to the Global Humanitarian Forum report of 2009, the ‘silent crisis’ of climate change is already causing on average, 300,000 deaths per year, seriously affecting 325 million

people with a further 4 billion people vulnerable (Global Humanitarian Forum, 2009, p. 1). Learning about climate justice encompasses the issues and ethical dilemmas surrounding the injustice of climate change impacts, which fall disproportionately on the people in the developing countries even though they are least responsible for the GHG emissions contributing to climate change. It also calls for debate and discussion on the questions of whether, to what extent, to whom, and in what ways the developed countries should offer restitution and compensation for their polluting of the atmosphere – a global resource that all countries share. As climate change migration increasingly happens, learning about climate justice extends to the consideration of climate refugees and their rights and privileges within host countries.

Ultimately, ‘local’ and ‘global’ are faulty categorizations because global events or trends by definition affect all localities, and a local event can feed into global developments. The distinction is nonetheless a useful one to maintain. Locally focused climate change education allows for engagement with practical, concrete issues and initiatives. A global focus guards against a tunnel-vision approach to climate change education that would, for example, have students in the North not being taught about climate justice issues in the South.

### Why a Strong Futures Dimension to Climate Change Learning?

Sustainable development has long been defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their needs (World Commission on Environment and Development, 1987, p. 43). In the definition is a clear recognition of the responsibilities of those alive today to generations to come through what is referred to as intergenerational accountability or intergenerational justice. The ‘sustainable’ element of ‘sustainable development’ is about ensuring that future generations can enjoy at least the same level of opportunity for a fulfilling life as present generations.

“The startling conclusion is that continued exploitation of all fossil fuels on Earth threatens not only the other millions of species on the planet but also the survival of humanity itself –and the timetable is shorter than we thought.”

- James Hansen, *Storms of My Grandchildren*, 2009.

### Applying current knowledge to steer toward a sustainable future

From its inception Education for Sustainable Development has asked that the three-way dynamic between past, present and future be given full representation in learning programmes. Implicit in this call has been a critique of a traditional ‘rear view mirror’ curriculum in which learners are encouraged to look backwards into the past as the best way of making sense of the present without ever studying the present in any depth and with little or no consideration of the likely impact of the present on the future. In contrast, a sustainability-oriented curriculum focuses upon the co-creating and co-evolving dynamic that exists between past, present and future. The past lights up our understanding of the present and of possible future directions. The choices, decisions and priorities of the present shape the future and also influence what we take from the past and teach as ‘history’. Images and visions of the future shape what we do and decide now, and also how we view the past (Pike & Selby, 1988).

As understanding of climate change has deepened, so has appreciation of the importance of addressing sustainable futures. We have become aware of the closing window of opportunity to limit climate change before the amplifying and uncontrollable effects of climate tipping points set in. We recognize now that the effects of global climate change we are now experiencing are the deferred impact of CO<sub>2</sub> emissions from some time in the past, and that our present-day emissions will have delayed but mounting consequences for future generations. We must also recognize that to choose the convenience of doing nothing or making ineffectual gestures goes against the grain of the intuitive desire to build for a better future.

Futures-oriented learning involves exploring **probable, feasible and preferred futures** (respectively, futures that are likely to come about given present trends, futures that might conceivably come about, and futures that we would like to see realized given our values and priorities). It is also about identifying and seeking to achieve desired futures while identifying and acting to avoid undesired futures (Pike & Selby, 1988).

## Why is Climate Change Learning best approached within a Whole-school Framework?

A whole-school (or whole-institution) approach has been widely advocated for education for sustainable development involving the entire school community - students, teachers, administrators, parents, and local community members.

A whole-school approach is also considered vital for effectively addressing climate change challenges and demonstrating the urgent need for practical action. The characteristics of a whole-institutional framework for climate change education for sustainable development are captured in a **holistic 4C model comprising curriculum, campus (physical environment), community and (institutional) culture**. The 4C model is designed to create synergies and energy flows between different change initiatives in the respective spheres (see Figure 2).

In terms of **curriculum**, as discussed earlier, various aspects of climate change, personal through global, are infused into existing subjects and/or integrated within cross-curricular spaces. To these can be added new curricular elements drawn from school climate change actions and student involvement under the campus, community and culture headings.

Under **campus** are various initiatives towards making the school carbon neutral, greening and landscaping initiatives (e.g. tree planting) and transforming unsustainable institutional practices (in building design and use, energy use, resource use and procurement, catering and transport). Students are encouraged to directly engage with climate change adaptation and mitigation initiatives within their school as part of their non-formal learning - that is fed back into formal learning. Alternatively campus can become part of formal curriculum with, for instance, students involved in food growing, designing and installing water conservation measures, designing and managing a preventative health garden, developing a nature conservation area, researching the school's level of commitment to 'reduce, re-use, recycle', and researching ways of cutting down the school's fossil fuel dependency before mounting change initiatives.

School/community action partnerships fall under the **community** heading. Some might focus on mitigation efforts, say, through growing food locally, while others might focus on climate change adaptation and disaster risk reduction by creating a community hazard map and conducting evacuation drills to make the community more resilient in the face of extreme weather events. Students' community based project experiences are also fed back into the formal curricula or are undertaken as formal curriculum.

The sphere of **culture** is about transforming the 'hidden curriculum' of the institution itself, including its 'business as usual' nature and style of school management and decision-making mechanisms. Democratic leadership and participatory decision-making processes are encouraged in planning, implementing, monitoring and evaluating initiatives in school. For example, the students can play a key role, in an internal consultation process towards developing a climate change and sustainable development school mission statement. This is nothing short of creating a Climate Change Education for Sustainable Development 'learning organization'.

The integration of curriculum, campus, community and culture offers learners hands-on opportunities for an exciting, practical and safe apprenticeship in transformative action.

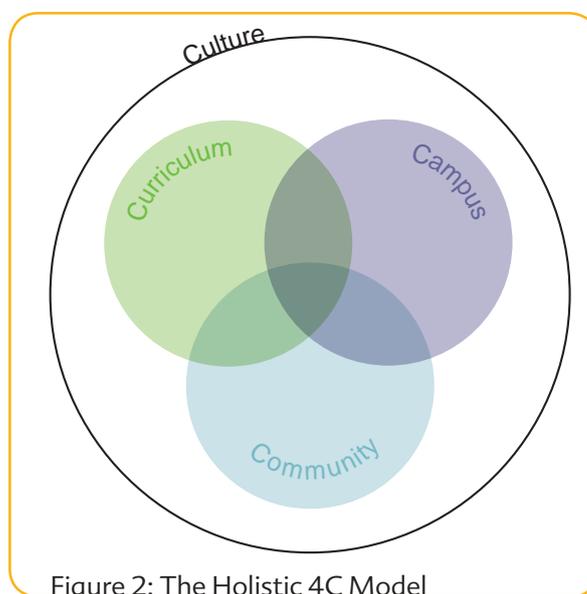


Figure 2: The Holistic 4C Model

## What Kind of Learning and Teaching Approaches does Climate Change Education for Sustainable Development call for?

Climate change is a matter of great complexity and uncertainty, involving interplay between climate, biophysical, environmental economic, social, cultural and political systems at all levels, personal through global, within past, present and future timeframes. Climate change education requires the learner to critically review their own and others' assumptions, perspectives and worldviews. Its pedagogy is, therefore to prepare learners to deal with uncertainty within complexity.

Inherent in the uncertainty is the idea of learning as open-ended process. There is no fixed and final destination to our learning - only learning that adjusts what we think before new learning comes along to bring a further shift in perception and understanding. Solutions are, thus, provisional adjustments in an ever-changing world (Pike & Selby, 1988, p. 35). Guidelines for facilitating such learning follow in Section 6 of this document.

“...from a pedagogical viewpoint, climate change is uniquely challenging...climate change tests the capacity of education to organize learning around problems characterized by complex social dynamics, uncertain knowledge and risks.”

- Læssøe, J. et al. Climate Change and Sustainable Development: The Response from Education. 2009.

### Skills for open-ended learning

The skills learners need for open-ended learning that addresses climate change in relation to sustainable development fall under six headings:

- **Skills of information management:** receiving, expressing and presenting information; organizing and processing information, evaluating information.
- **Skills of critical thinking:** critically evaluating data; creative thinking; problem solving; making ethical judgments; decoding and deconstructing media messages; decision making; systemic/relational thinking; seeing the particular as part of the whole.
- **Skills of action:** change agency/advocacy; campaigning; involvement literacy (critical evaluation of action choices); adaptation/risk avoidance.
- **Skills of interaction:** consensus building and negotiation; assertiveness; listening; cooperation; conflict management; empathizing and demonstrating solidarity.
- **Futures-oriented skills:** envisioning; extrapolating; forecasting; backcasting (the ability to think backwards from a point in a desirable future).
- **Personal skills:** congruence (the ability to discern and act on inconsistencies between attitudes/values and actual behaviour); emotional coping; centring (harmonizing emotional, intellectual, physical and spiritual aspects of self); living simply.

The claim is not being made that these skills are original or particular to climate change education for sustainable development but rather that, brought together, they represent the skills that are essential to achieving its learning purposes.

### Practical and diverse learning approaches

Climate change education for sustainable development has a strong practical orientation. It calls for hands-on engagement by the community in schools. Adult members of the community are often on campus and in the building helping with sustainability-related initiatives to enhance sustainability and better guard against future climate-induced hazard.

Climate change education for sustainable development is also marked by diversity of teaching and learning approaches. Teachers experiencing the Climate Change Teacher Education Course will find themselves working in many different ways that will draw upon and combine their intellectual, emotional and practical intelligence. Underpinning the course – and the classroom activities that will be presented – is the conviction that the interplay of intelligences offers the most potent springboard for transformative action (Pike & Selby, 1988, p. 47-60).

Climate Change Education for Sustainable Development also embraces systemic learning, in which understanding relationships is crucially important. Phenomena and events are not best understood by treating them separately but by seeing them in relationship to each other.

The complexity and uncertainty of climate change cannot be approached very easily, save through systems thinking in which learners constantly ask ‘What are the interconnections and interrelationships at play?’ (Selby, 2007).

### 3. Course Objectives

- To develop an appreciation of the nature, scope, purposes and workings of CCESD.
- To demonstrate how CCESD can be introduced across all subjects in the curriculum and also within interdisciplinary learning contexts.
- To develop teachers’ confidence and abilities in facilitating futures-oriented learning.
- To enable and encourage teachers to teach climate change within environmental, economic, social and cultural frameworks.
- To enable teachers to teach key dimensions of climate change such as mitigation, adaptation, denial, vulnerability, resilience, disaster risk reduction, climate justice, and to give teachers the skills to facilitate discussion and reflection on each dimension in the classroom and practical engagement outside the classroom.
- To show to teachers how to build a significant local and community partnership dimension into CCESD.
- To explain and consider whole-school approaches to CCESD.
- To demonstrate to teachers how to bring the voices and perspectives of people from around the world, especially young people, into classroom climate change discourse, especially on the issue of achieving climate justice.
- To develop teacher confidence and ability in working with pessimism, cynicism and a sense of hopelessness regarding climate change and in fostering skills and dispositions for empowerment and resilience.
- To enhance teacher skills and confidence in facilitating interactive and participatory learning that engages with complexity and uncertainty, employs systems and critical thinking and practical problem solving, and draws upon learners’ cognitive (thinking and reasoning) and affective (emotional) and action (practical) potentials both inside and outside the classroom.

### 4. Module Themes

Each day of this six-day teacher education course has a theme. Crosscutting themes (e.g. the human/nature relationship, human rights, gender, health, disaster risk reduction, environmental migration, lifestyle/consumerism, cultural identity/intercultural dialogue, poverty/hunger, conflict, prejudice/discrimination/oppression) are woven through the programme every day.

#### Day One. Climate Change Learning for Sustainable Development

 Click to consult the materials for Day One

This module explores Education for Sustainable Development (ESD) and Climate Change Education (CCE) in theory and practice and their mutually reinforcing characteristics. Key concepts and dimensions of Climate Change Education for Sustainable Development (CCESD) are introduced. Participants pool understandings, perceptions and personal experiences of climate change before being introduced to the basic science. They go on to examine diverse explanations of human factors driving climate change and the interrelationship between those factors and then to consider the impacts of climate change on people’s lives. The programme then brings climate change and sustainable development together and examines the implications of present and future climate change for progress towards sustainable development. Participants learn of the knowledge, skills and dispositions to be developed in learners and, through engaging in activities and the role modelling of the facilitator, acquire an initial sense of the interactive, participatory and experiential learning processes that CCESD calls for and how such learning should be facilitated. The day closes with a sharing of initial ideas on opportunities for CCESD across the curriculum.

## Day Two. Climate Change: A Futures Learning Approach

This module explores teaching and learning about climate change across time, especially the present and the future. This module introduces the concept that just as previous generations shaped the past and life today, the current generation shapes the present and the future. Participants envision the future within a context of climate change, creating a variety of scenarios—some desirable and others undesirable. Themes such as intergenerational justice and accountability are woven into this day and throughout the module. Desirable and undesirable futures are used as entry points for practical community based engagement. The module ends with practical consideration of inserting reflections and projection of the future into the secondary curriculum.

[Click to consult the materials for Day Two](#) 

## Day Three. Learning for Climate Change Mitigation and Adaptation

This module begins by delving deeper into climate change mitigation and adaptation and the overlaps and relationships between the two. The idea of immediate or existing driving forces that need to be addressed through mitigation actions as well as more fundamental driving forces to be confronted is explored in some detail. Adaptation is illustrated through stories from around the world. Time is then allocated to explore disaster risk reduction through descriptive examples and lays the foundation for the concepts of resilience and vulnerability. Special attention is given to the contribution of schools and young people to community disaster risk reduction strategies. The day closes with a role-play in which groups describe their plans for a whole school and school-in-community responses to climate change to a Ministry of Education official.

[Click to consult the materials for Day Three](#) 

## Day Four. Climate Change Learning: A Local Focus

This module focuses on local community and school-based climate change learning. It begins by revisiting resilience and vulnerability in greater depth including an exploration of how schools and communities can work to build a 'culture of safety and resilience'. Time is then allocated for participants to prepare for a field trip in the local community. The afternoon is largely dedicated to the field trip itself. Back at the training centre, participants exchange and discuss their experiences before taking time to reflect on lessons learned about organizing and facilitating climate change-related school field trips. An alternative to the field trip activity would be to bring in guest lecturers or speakers from the community that work or are engaged in climate change related activities.

[Click to consult the materials for Day Four](#) 

## Day Five. Climate Change Learning: A Global Focus

This module takes a global perspective, exploring climate change as a complex global phenomenon and weaving together cross-cutting issues such as gender, health, human rights, peace and social justice. A cartoon interpretation activity reveals a range of issues, in particular, climate justice. Climate change is then explored from, first, a human rights perspective and, second, the perspective of the achievement of the Millennium Development Goals. The complex issue of what does or does not constitute legitimate action and activism when the sustainability and well-being of humanity and the planet are at stake is opened up for discussion. The day closes with participants proposing their ideas for CCESD across the curriculum and across their disciplines.

[Click to consult the materials for Day Five](#) 

## Day Six. Confronting Climate Change: Towards Empowerment and Action

This module begins by giving participants experience in eliciting their students' concerns about the future, in having students engage with feelings of despair and powerlessness in the face of climate change, and in translating those feelings into feelings of purposefulness and empowerment. A dramatic play provides the means to practice confronting climate change denial and contradictory responses. The skills and learning processes appropriate to Climate Change Education for Sustainable Development are overviewed by drawing upon participants' experiences over the six days. A planning tool for CCESD-oriented whole school change is then introduced. The course closes by consolidating ideas for whole school and school-in-community approaches to CCESD and having participants commit to practical short, medium and long term plans for CCESD in their schools and communities.

[Click to consult the materials for Day Six](#) 

## 5. Scheduling Course Modules

The course has been designed to be flexible. The modules can be taught on six consecutive days in the order laid out for optimum impact and maximum group cohesion and engagement. Alternatively, the modules can be taught with gaps between days and/or in a different order. For instance, Day 3 of the programme, Learning for Climate Change Mitigation and Adaptation, could be taught first followed by Day 1, Climate Change Learning for Sustainable Development. Day 4, Climate Change Learning: A Local Focus, would not make a good starting module in that the field trip involved relies on understanding climate change mitigation, adaptation and risk reduction (Day 3). If the day order is changed, it is advisable to keep the curriculum and whole school activities that close Days 1, 2, 4, and 5 in their present ordering since these draw upon the cumulative learning of the course. It is also possible to create a customized one- or two-day course that draws upon activities from different days, depending on the time available and the emphasis / outcomes desired.

Generally speaking, users are invited to select sections and exercises and adapt the materials to their specific geographical social and cultural context.

## 6. Guidelines for Facilitating Participatory Learning

### Congruence and Role Modelling

Woven through the course is an emphasis on values, ways of being and ways of relating that are key to climate change education for sustainable development. Throughout the course participants are being encouraged to facilitate learner engagement and empowerment, to promote critical and creative thinking, active problem solving, unfettered expression of hopes and fears, and practical learning. Underpinning this are core values such as human rights, peace, wellbeing and participatory democracy. To reinforce the key messages of the course, it is vital that the teacher educator demonstrates the values, ways of being and ways of relating in his/her own teaching. This implies the use of a humane, horizontal style involving open dialog and the sharing of a range of perspectives. The 'medium' is also the 'message'. Changing the climate of the classroom is important for climate change education.

### Strength in Diversity

A participatory classroom calls for the use of a diverse range of carefully contrasted learning approaches and modalities. In the interests of fairness and motivation, diversity is necessary since approaches that appeal to some students will not appeal to others. Following one kind of activity with a very different kind of activity brings fresh energy to the learning process, as does a structuring of the learning process so that fast-paced high-energy learning phases are followed by phases of slow, reflective learning. The rhythm of each day of learning should be marked by regular changes in pace.

### Fluctuating Group Size and Membership

Participatory learning calls for frequent changes of group size as different tasks are addressed. In any learning session, participants might be working individually, in pairs, small groups (3/4), large groups (7/8), as a whole group moving around and exchanging ideas one on one (what is called 'milling'), or as a whole group engaged in plenary discussion. From time to time, small or large groups might join members of other groups to share ideas and perspectives. Fluctuating membership is also important. There is a tendency for participants to consistently sit with people or colleagues they know. This is fine in creating an initial sense of comfort but the teacher educator should encourage participants to mix with colleagues they do not know. If Climate Change Education for Sustainable Development is about meeting a great challenge, one of the first challenges faced by participants should be that of a face-to-face encounter with the views and perspectives of other participants in the learning process.

### Whole Person Learning

The course being offered calls for 'whole person' learning, the rationale being that cognitive dimensions of participatory learning, such as critical thinking and problem solving, are

themselves insufficient to effect transformation in the learner and to motivate the learner to seek transformation in the world around them. For that to happen, a bringing together of cognitive and affective (emotional) forms of learning is necessary. Indeed, evidence shows that an initial emotional response to learning stimuli, carefully facilitated, often heightens subsequent higher order cognitive learning and more internalized learning. While participatory learning of any kind can be a challenge in traditional learning contexts, affective forms of learning can feel countercultural and overly risky for the teacher. Learning through a guided visualization of the future, learning through role play, drama, simulation and contemplative art, embodied and somatic learning (in which the learner physically feels or physically responds to a learning stimulus) are examples of affective learning. They can be very powerful and motivational. It is important that the teacher educator becomes comfortable in using such modalities, and comfortable in demonstrating their importance and modelling their use, in teacher education contexts.

## Debriefing

Experience shows that teachers introduced to participatory learning can fairly quickly become adept at preparing for and facilitating activities, but that it takes much longer to become assured in debriefing the learning experience so that learning is optimized. Careful, structured facilitation of class discussion and reflection is, perhaps, the hardest skill of all. The teacher educator needs to role model good debriefing practice and bring participant attention to how and why they are debriefing in particular ways.

## The Reflective Practitioner

Good facilitation of participatory learning demands of the teacher that they reflect on their facilitation, identifying what went well and what improvements could be integrated into their facilitation in the future. It is a very good practice for the teacher educator to be seen to personify a reflective practitioner and to give participants practice in what is involved. Part of being reflective is the creation of an open and enabling atmosphere for eliciting and receiving feedback from participants.

## 7. Notes on Course Facilitation

Guidelines for preparing for and facilitating all activities are included with each day programme. The teacher educator should pay special attention to what is written under the Facilitation Guidance heading in each activity description so they are able to optimize learning and properly debrief the activity. Together with each day's programme are the related handouts for activities. A number of activities require cutting up some sheets of paper before the session.

**Materials for the course** are identified in the Materials Needed section of each activity. Advice is given from time to time on specific local materials and resources that can be utilized. Teacher educators are encouraged to add regionally and locally relevant materials (e.g. case studies and photographs) as appropriate.

**PowerPoint slides** support each day's programme. In the absence of projection equipment, they can be used simply as notes for the teacher educator's inputs. The slides can be amended, added to, or reduced to better fit with local circumstances as appropriate.

Additional support for preparation and facilitation is provided in four **Regional Resource Packs**. Each pack contains global climate change information with a focus on regionally specific information. Specific items are also integrated into training and school classroom activities (see below). The pack is for sharing with participants.

Throughout the course participants learn about **participatory learning by experiencing it**. Only towards the end of the course does the teacher educator offer a rationale for the learning approaches employed. To reinforce the participatory ethos of the course, it is vital that the teacher educator models participatory values, ways of being and ways of relating through his/her facilitation. Except for the occasional short inputs, open dialog and sharing of views and perspectives should be used. The teacher educator should join the participants from time to time! The 'medium' is also the 'message'!

Experience shows that teachers introduced to participatory learning can become adept at preparing for and facilitating activities fairly quickly, but that it takes much longer to become assured in debriefing the learning experience so that learning is optimized. **Careful, structured facilitation of class discussion and reflection** is, perhaps, the hardest skill of all. The teacher educator needs to demonstrate good debriefing practice and, from time to time, bring participants' attention to how and why they are debriefing in particular ways.

Good facilitation of participatory learning also demands of the teacher educator that they **reflect on their facilitation**, identifying what went well and what improvements could be folded into their facilitation in future. The teacher educator should be seen to demonstrate being a reflective practitioner by engaging in **self-reflection** in front of the group and should also give participants practice in what is involved. Part of being reflective is the creation of an open and enabling atmosphere for eliciting and receiving feedback from participants. This is why there is a feedback form to be completed and handed in for each training day and why opportunity is provided at the beginning of each day to review the previous day's module. At this point in the programme there will be openings for the teacher educator to be seen to reflect on his/her own facilitation and ask participants to contribute their ideas and opinions from their self-reflective diaries.

At the end of each day, participants are asked to read through the classroom activities of the following day. They are then given an opportunity to discuss their thoughts and questions on that day's activities at the beginning of the following day.

## 8. Human Resources

Experts, people with particular roles in the community and other community members who could be invited to join the training sessions or make themselves available for field trip interviews or guest lecturers / speakers include:

- Climate change scientists (e.g. academics, officers from meteorological stations, agricultural/forestry/marine scientists);
- Persons involved in climate change mitigation, adaptation, risk reduction and resilience building initiatives, such as: local government officers, environmental officers, members of environmental, development and sustainability non-governmental organizations, community leaders, youth leaders, religious leaders, local head teachers and school teachers, emergency officers, health workers, media representatives; and
- Persons with direct experience of climate change impacts, such as: older people, farmers, fishermen, women's groups, inwardly migrant minorities in the area.

Teacher educators should decide upon and invite volunteer interviewees and ensure that necessary travel arrangements are in place for the field visits well in advance of the course.

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## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE

IN THE  
CLASSROOM



## Day One At-A-Glance

Sample Schedule (Duration)	Session	Materials Needed
9:00 - 9:20 (20 minutes)	Introduction	<ul style="list-style-type: none"> <li>• PowerPoint slides 2-9</li> <li>• Handout 6</li> </ul>
9:20 - 9:55 (35 minutes)	Activity: Climate Change People Search	<ul style="list-style-type: none"> <li>• Handout 1</li> <li>• One flipchart and marker</li> </ul>
9:55 - 10:35 (40 minutes)	Activity: Climate Change Art Gallery	<ul style="list-style-type: none"> <li>• PowerPoint slide 9</li> <li>• Sheet of chart paper and one marker per participant</li> <li>• Pins (or adhesive tape)</li> <li>• Flipchart and marker</li> </ul>
10:35 - 10:50 (15 minutes)	Break	
10:50 - 11:05 (15 minutes)	Input: The Basic Science of Climate Change	<ul style="list-style-type: none"> <li>• Handout 2</li> <li>• PowerPoint slides 10-13</li> </ul>
11:05 - 12:00 (55 minutes)	Activity: Climate Change Webs	<ul style="list-style-type: none"> <li>• One cut-up set of Climate Change Explanations statements (Handout 3) per group of three participants.</li> <li>• One sheet of chart paper, one glue stick and two markers, (different colours), per group of three participants</li> </ul>
12:00 - 13:00 (60 minutes)	Lunch	
13:00 - 13:50 (50 minutes)	Activity: Climate Change Stories	<ul style="list-style-type: none"> <li>• Flip chart and marker (or board and chalk)</li> <li>• A few copies of each of the Climate Change Stories (Handout 4)</li> <li>• One sheet of chart paper and one marker per group</li> </ul>
13:50 - 15:05 (75 minutes)	Activity: Sustainable Development and Climate Change Collages	<ul style="list-style-type: none"> <li>• Four slips of blank paper per participant</li> <li>• One large sheet of chart paper per group of 4 participants</li> <li>• One glue stick</li> <li>• Three markers per group (different colours)</li> <li>• One cut-up set of statements from Perspectives on Sustainable Development (Handout 5) per group</li> <li>• One copy of Handout 5 per participant</li> </ul>
15:05 - 15:20 (15 minutes)	Break	
15:20 - 15:30 (10 minutes)	Input: Climate Change Education for Sustainable Development	<ul style="list-style-type: none"> <li>• PowerPoint slides 14-16</li> </ul>
15:30 - 16:00 (30 minutes)	Activity: CCESD across the Curriculum (1)	<ul style="list-style-type: none"> <li>• One sheet of chart paper and marker per group of four participants</li> <li>• Pins and/or adhesive tape for hanging charts on pin boards or walls</li> </ul>
16:00	Close	<ul style="list-style-type: none"> <li>• Handout 6</li> <li>• Day One classroom activities</li> </ul>

## Day One Facilitation Guide

This module explores Education for Sustainable Development (ESD) and Climate Change Education (CCE) in theory and practice, and their mutually reinforcing characteristics. Key concepts and dimensions of Climate Change Education for Sustainable Development (CCESD) are introduced, as is the underlying transformative nature of the approach. Participants pool understandings, perceptions and personal experiences of climate change before being introduced to the basic science. They go on to examine diverse explanations of human factors driving climate change and the interrelationship between those factors and then to consider the impacts of climate change on people's lives. The programme then brings climate change and sustainable development together and looks at the implications of present and future climate change for progress towards sustainable development. Participants learn of the knowledge, skills and dispositions to be developed in learners and, through engaging in activities and the role modelling of the facilitator, acquire an initial sense of the interactive, participatory and experiential learning processes that CCESD calls for and how such learning should be facilitated. The day closes with a sharing of initial ideas on opportunities for CCESD across the curriculum.

[Click to consult the Summary of what is learned on Day One](#) 

### 9:00-9:20 Introduction

- With slide 2 showing, welcome participants; introduce yourself as facilitator; invite participants to briefly introduce themselves (who they are; where they teach)
- Introduce the overall workshop theme and purpose (using slide 3)
- Overview the themes to be covered on each workshop day (slide 4)
- Explain the plan for Day 1 and the objectives of the day's training (slide 5)
- Explain the learning approaches to be employed during the workshop and why they are important for effective CCESD (slides 6 and 7)
- Introduce and distribute the appropriate regional information pack
- Explain the daily feedback process (Handout 6) and daily homework tasks (slide 8).
- Invite participants to engage in the first activity

[Click to consult the Powerpoint slides for Day One](#) 

[Click to download the Powerpoint slides in pptx format for Day One](#) 

### 9:20-9:55 Activity: Climate Change People Search

#### Time Needed

- 35-40 minutes (15-20 minutes of activity; 20 minutes of discussion)

#### Objectives/Explanation

- To help participants get to know each other
- To enable participants to share personal experiences, knowledge and feelings concerning climate change
- To look for what is common across those experiences and feelings
- To bring out participants' collective experience and level of understanding of climate change and pool any initial questions they may have

#### Materials Needed

- One Climate Change People Search sheet (Handout 1) per participant
- One Flip chart and marker

#### Procedure

- Invite participants to move around the open area and join up with someone who meets one of the criteria set out in the handout.

#### Facilitation Guidance

This is a busy activity. A 'busy' classroom mood should be encouraged but not so busy that participants are bent on completing the sheet rather than really listening to each other. Possible discussion questions:

- Did you learn anything from anybody that really surprised you?
- Did you find you had experiences in common with others? What were those experiences?
- What feelings were commonly expressed?
- Did you argue? About what?
- What has the activity shown that we know about climate change?
- What has it shown that we don't know or are uncertain about? What questions has it raised in your mind?
- Any thoughts on using this activity on the classroom?

[Click to consult Handout 1](#) 

- Ask them to write the name of the person into the space on the sheet and ask questions of their partner so as to encourage sharing of detail of their experiences and/or feelings.
- Let the group know that they can only have one positive response from any one person. They must move on to other people to fill in other lines on the handout.
- Encourage them to complete as much of the handout as possible in the time available but without rushing so they benefit from listening to each other's stories.
- Lead the group in discussion and reflection on stories they have encountered and write the group's questions about climate change on the flip chart.

### 9:55-10:35 Activity: Climate Change Art Gallery

#### Time Needed

- 40 minutes (10 minutes to draw; 15 minutes to circulate; 15 minutes for sharing)

#### Objectives/Explanation

- To continue the process of getting acquainted
- To enable participants to share their experiences and knowledge of climate change more broadly and in some depth
- To alert the facilitator and the group to participants' hopes and expectations for the course at an early stage
- To build an early sense of group ownership of the learning space by having the room decorated with participants' own work

#### Materials Needed

- Sheet of chart paper and marker per participant
- Pins (or adhesive tape)
- Flipchart and marker

#### Procedure

- Hand out a sheet of paper and marker to each participant. Ask them to fold the sheet into four quarters and draw lines along the folds as in slide 9.
- Ask participants to write some notes and sketch images of their experiences of a changing climate in the upper left quadrant (those experience should preferably be first hand but can include things they know about from others or the media).
- Ask participants to use the upper right quadrant to write notes and draw sketches on what they see as the causes of climate change.
- Ask participants to write down current or likely future effects of climate change in the bottom right quadrant, adding sketches as they wish.
- Finally, ask them to use the bottom left quadrant to note down their hopes and expectations for the workshop so they leave equipped to teach CCESD. They should add a end-workshop cartoon image with word bubbles of themselves as the 'CCESD teacher.'
- Invite everyone to pin their sheet on the wall and to take a walk round the 'climate change art gallery' to view the 'works of art', engaging in conversation as they go.
- After the viewing is finished, ask participants to stand by their artwork. Ask them to take turns to introduce themselves and briefly speak about one item they included in the bottom left quadrant of their own sheet and one item that they found particularly important in the bottom left quadrant of colleagues' artworks. Summarize the hopes and expectations emphasized by participants on the flipchart as they are shared. Beyond that, avoid further debriefing of the exercise.
- Leave the 'art gallery' on the walls for the remainder of the event for further viewing and revisiting in other activities.

#### Facilitation Guidance

This activity helps build further a sense of community across the workshop group and enables individuals to lay before the group the experiences and understandings they bring to the event. After giving guidelines for the artwork, the facilitator should join in the activity (preparing a 'work of art', viewing all the work, chatting with participants). In light of participants' hopes and expectations, the facilitator should think of any necessary adjustments to the programme and training process that might be advisable. The titles on the PowerPoint slides can be regionally adjusted. To close the activity, it is a good idea to ask for participants' views on how the activity might be used in classroom.



Click to consult slide 9

**10:35-10:50 Break****10:50-11:05 Input: The Basic Science of Climate Change**

- Distribute a copy of Basic Science of Climate Change (Handout 2) to each participant
- Speak about slides 10-13
- Take any questions or observations

Click to consult  
Powerpoint  
slides 10-13 

Click to consult  
Handout 2 

**11:05-12:00 Activity: Climate Change Webs****Time Needed**

- 55 minutes (15 to critically review the statements in Handout 3; 15 to work on interconnections between statements; 10 minutes to consider the challenge presented by each statement; 15 minutes whole group discussion)

**Objectives/Explanation**

- To critically examine a diverse range of explanations of human factors driving climate change
- To explore interrelationships between the explanations
- To reflect upon the nature and degree of the challenge that each explanation presents

**Materials Needed**

- One cut-up set of Climate Change Explanations statements (Handout 3) per group of three participants
- One sheet of chart paper, a paste stick and two markers, each of a different colour, per group of three participants [Preferably, all groups should have markers of the same two colours.]

**Procedure**

- Ask participants to form groups of three composed, if possible, of people who did not know each other before the workshop.
- Distribute a set of Climate Change Explanations statements to each group.
- Ask the group to read and critically reflect on the significance of each of the ten statements, and encourage members to share their personal views on each statement.
- Ask groups to arrange the statements on their sheet of chart paper according to a system of their mutual choice (e.g. most significant in centre, least significant to the edges), and to stick them down. Go on to ask them to look for interconnections between all the statements and to indicate them on their chart by drawing in two-way arrows using one of their markers. Explanations of an interconnection should be written along each two-way arrow.
- Now invite groups to consider each of the statements in terms of how challenging it would be to tackle the problem described in each statement and so reduce the severity of climate change. Using their second marker, they write a number against each statement according to the following: 4 = hugely challenging; 3 = very challenging; 2 = somewhat challenging; 1 = not very challenging.

**Facilitation Guidance**

- This activity takes the climate change debate beyond science and into social, economic and cultural domains. All statements have serious implications for human society, some perhaps more profound and far-reaching than others. The statements themselves are likely to trigger keen debate but consideration of the challenges they face even more so. Questions to take the discussion forward:
  - Which statement did you find the most provocative (convincing, significant), and why?
  - Which statement had the most emotional effect on you, and why?
  - What interconnections between statements did you find that made you think about climate change in new ways?
  - Did you find that significant statements were also 'hugely challenging' statements? What does that suggest?
  - Do you think climate change is mainly a scientific issue?
  - What has the activity suggested to you about where climate change should appear in the curriculum?
  - Any thoughts on using this activity in the classroom?

Click to consult  
Handout 3 

- One by one invite groups to briefly explain the main things they have learnt out of the exercise before widening into general discussion.

**12:00-13:00 Lunch**

**13:00-13:50 Activity: Climate Change Stories**

#### Time Needed

- 50 minutes (10 minutes, brainstorm; 20 minutes, considering stories in groups; 20 minutes, sharing and discussion)

#### Objectives/Explanation

- To consider the impact of climate change on peoples' lives by considering stories from around the world
- To consider where responsibility lies for helping those afflicted by climate change

#### Materials Needed

- Flip chart and marker or board and chalk
- A few copies of each of the Climate Change Stories (Handout 4) so that each participant gets a story and so that groups of three/ four can be formed of members having the same story
- One sheet of chart paper and marker per group

#### Procedure

1. Begin by inviting participants to brainstorm the effects climate change is having on their own lives or the lives of others. Write all ideas down on the flipchart or board without comment. Close the brainstorm session when ideas dry up.
2. Distribute the story copies randomly amongst participants. Then ask for groups of three or four to be formed by people holding the same story.
3. Ask individual group members to quietly read their story. Invite them to divide their chart paper into three sections titled Effects, Feelings, Who Should Do What? Following discussion, ask groups to list the effects of climate change they see in the story in the first column, the feelings they experienced on reading the story in the second, their ideas on who should take responsibility for putting things right in the third.
4. Have groups in turn summarize the story they have read before going on to identify the climate change effects they identified and to share emotions felt on reading the story.
5. Open the general issue of responsibility to the whole group, encouraging participants to share ideas from their own charts.

#### Facilitation Guidance

The facilitator should be prepared for an emotional response to the task and significant identification with those afflicted. It is important to allow for emotional release through quiet reflection, hugging, deep breathing or other modalities, as appropriate.

In facilitating the closing discussion on responsibility, the following questions can be used:

- Where does responsibility lie for the plight of people in the stories?
- Are your communities experiencing similar challenges to the people in the stories?
- Who should be helping out? The community? Regional authorities? National governments? International organizations? Wealthy nations? All, but in different ways?
- How can story be used in CCESD teaching?
- What are the implications of the stories for the prospect of sustainable communities?

 Click to consult Handout 4

## 13:50-15:05 Activity: Sustainable Development and Climate Change Collages

### Time Needed

- 75 minutes (30 minutes Stage 1; 20 minutes Stage 2; 25 minutes Stage 3)

### Objectives/Explanation

- To provide a springboard for participants for considering the nature of sustainable development
- To share participants' perceptions and understandings of sustainable development and to challenge them by introducing other perceptions and understandings
- To surface first ideas on the implications of present and future climate change for progress towards sustainable development

### Materials Needed

- 4 slips of blank paper per participant
- One large sheet of chart paper per group of 4 participants
- One paste or glue stick
- Three markers per group, each of a different colour
- One cut-up set of statements from Perspectives on Sustainable Development (Handout 5) per group
- One copy of Handout 5 per participant

### Procedure

#### Stage 1

- Ask participants to work individually, avoiding discussion, as they write four statements each beginning 'Sustainable development is...' There should be one statement on each of the four slips of paper. The four statements should capture their own understandings of what 'sustainable development' means and involves.
- Invite participants to form groups of four to share and discuss what each has written. Then ask them to create a 'sustainable development' collage by laying out their 16 slips on a large sheet of chart paper, pasting them down, writing in comments and further explanations, and adding graphics (e.g. two-way arrows, cartoons). All this should be done using a marker of one colour. They should also agree on and write down a one-sentence summary definition of 'sustainable development'.
- Ask each group to share their collage, closing their presentation with their one-sentence definition of 'sustainable development'.
- After each presentation encourage feedback and comment from the whole group on what has been said.

#### Stage 2

- Distribute a set of Perspectives on Sustainable Development statements to each group.
- Ask them to reconsider their collage in the light of the statements and in response to feedback to their Stage 1 presentation. They should add new ideas and insights they had previously overlooked, pasting in any of the statements that they wish and adding comments. For this stage, ask them to use a marker of a second colour.
- Invite each group to report back briefly on what they have added.

### Facilitation Guidance

This activity again works on the principle of encouraging a sharing of what is known amongst participants — in this case about sustainable development -before challenging participants with new information and asking them to reflect and reconsider. Potential impacts of climate change on sustainable development are then considered, the facilitator moving attention towards how climate change action is crucial for sustainability prospects. Possible general questions to conclude Stage 3 are:

- How are different aspects of sustainable development likely to be affected by climate change?
- Will understandings of sustainable development need to be re-thought as climate change impacts worsen?
- What climate change actions should we take to ensure that sustainable development is something we can continue to work with and towards?
- What are the curriculum, learning and teaching implications of what we have discussed?
- Any thoughts on using the activity in this or simplified form in classroom?

Click to consult  
Handout 5 

### Stage 3

- Ask groups to consider the implications for sustainable development of what they have learned about climate change during the day.
- Invite them to add notes to their chart in a marker of a third colour suggesting how present and future climate change is likely to affect prospects for sustainable development as variously interpreted on their chart. Also invite them to write in initial ideas on what might be done to limit or prevent negative impacts on future sustainability.
- Lead a reporting back and discussion session.

#### 15:05-15:20 Break

#### 15:20-15:30 Input: Climate Change Education for Sustainable Development

 Click to consult Powerpoint slides 14-16

- Summarize what has been said about climate change and sustainable development in the previous activity
- Draw upon what has been said to summarize the educational task, using slides 14 – 16
- Take a few questions

#### 15:30-16:00 Activity: CCESD across the Curriculum (1)

##### Time Needed

- 30 minutes (15 in groups; 15 for reporting back and discussion)

##### Objectives/Explanation

- To share and record initial ideas on opportunities for CCESD across the curriculum in the light of the day's learning

##### Materials Needed

- Sheet of chart paper and marker per group of four participants
- Pins and/or adhesive tape for hanging charts on pin boards or walls

##### Procedure

- Have participants form groups according to the subject(s) they teach.
- Ask groups to review the day through the eyes of a subject teacher and note down on the chart paper provided some initial ideas on ways in which CCESD might be introduced into the teaching of the subject(s) in question.
- Invite a brief reporting back by each group and follow the reports with a general discussion.
- Have groups display their chart on a wall or pin board.

##### Facilitation Guidance

This last activity of the day focuses attention for the first time on opportunities for CCESD across the curriculum. [It should be signalled that time will be given over on subsequent days to exploring whole school approaches to CCESD that go beyond curriculum] At this stage groups composed of teachers of a particular subject is advisable but, if not, teachers of adjacent subjects can be grouped together (e.g. science and technology teachers; teachers of social studies subjects).

In the debriefing it is important to ask if participants have so far introduced what they think of as CCESD in their classrooms and to share something of their experience.

In concluding the debriefing, it is important to encourage participants to be on the look out for curriculum opportunities for CCESD on subsequent days as the topic of disciplinary approaches to CCE will be revisited and inter-disciplinary approaches also explored.

#### 16:00 Close

 Click to consult Handout 6

- Ask participants to complete a feedback sheet (Handout 6).
- Distribute the classroom activity file and remind participants to read through classroom activities for the day, bringing any questions to the next day workshop.
- Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day 2.



United Nations  
Educational, Scientific and  
Cultural Organization



## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY ONE HANDOUTS

## Handout 1. Climate Change People Search

Find someone who:		Name	Notes from your discussion
1	Has joined in climate change community action		
2	Is worried about what the future might bring		
3	Has heard that a warming climate will bring new diseases		
4	Is not sure what the difference is between climate and weather		
5	Feels the normal rhythm of the seasons is changing		
6	Knows of people who have had to move because of the effects of climate change		
7	Can think of changes being made to stop climate change getting worse		
8	Blames wealthy nations for climate change		
9	Can share a recent climate change story		
10	Is trying to be 'green' by cutting down on energy use		
11	Believes that climate change is not that serious		

[↩ back to Facilitation Guide: Climate Change People Search](#)

12	Knows of a farmer who is worried about climate change		
13	Feels that their lifestyle and culture are under threat from climate change		
14	Thinks that girls and women will suffer most as the climate heats up		
15	Has seen the effects of climate change where they live		
16	Can think of changes being made to adapt to climate change		
17	Feels very emotional about climate change		
18	Has heard or read of awful climate change predictions		
19	Has learned of species going extinct because of climate change		
20	Thinks that their children will not be able to live as they have		

## Handout 2. Basic Science of Climate Change

Click to consult the factsheet on climate change science for more comprehensive information.

### What is climate change?

The Earth's climate has changed many times in response to natural causes. The term climate change usually refers to man-made changes that have occurred since the early 1900s.

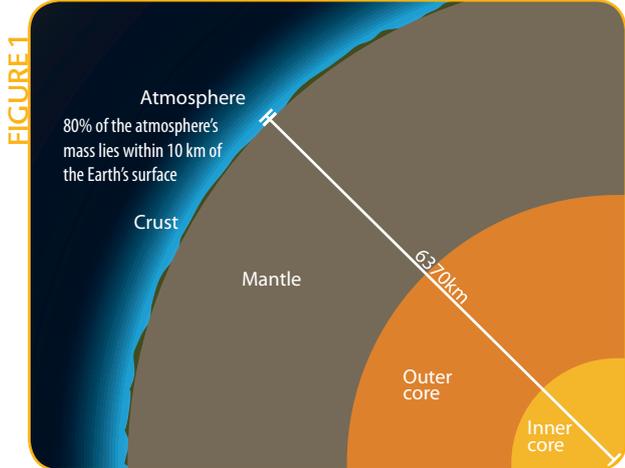
### What is the difference between weather and climate?

To understand climate change, it's important to recognise the difference between weather and climate. Weather is the temperature, precipitation (rain, hail, sleet and snow) and wind, which change hour by hour and day by day. Climate is the average weather and the rhythmical nature of its variations that we experience over time.

The Earth's climate is affected by a myriad of drivers that operate over different time scales and result in different changes over various geographical scales and geological eras. The movement of heat around the Earth is accomplished via the global climate system, which comprises the atmosphere, the oceans, the ice sheets, the biosphere (all living organisms) and soils, sediments and rocks. The climate system is made up of numerous subsystems with many processes occurring within and between each subsystem. These complex interactions result in intermittent and constantly changing phenomena (e.g. El Niño and the North Atlantic Oscillation).

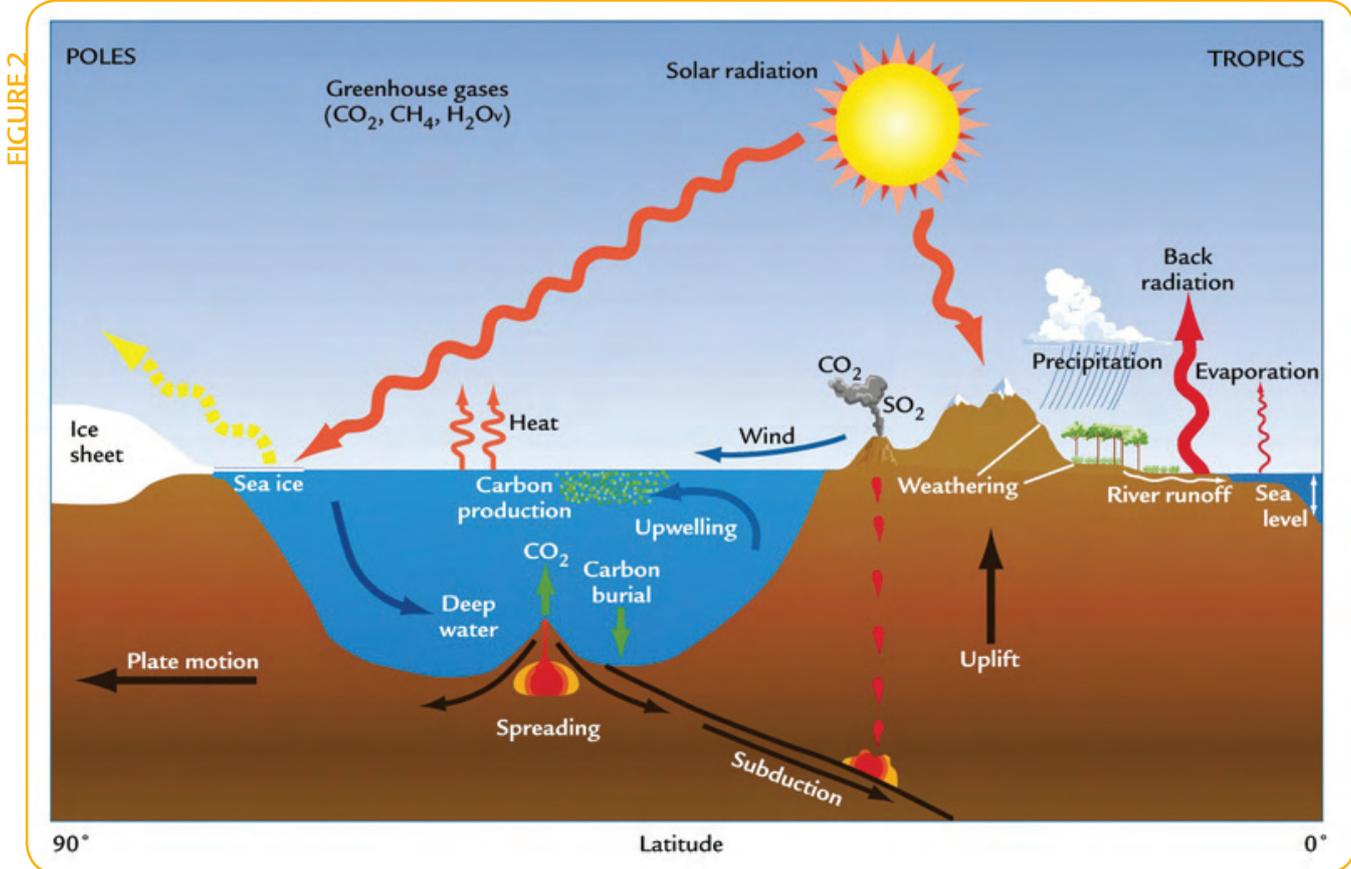
The atmosphere is a comparatively thin layer of gases which fades rapidly away with altitude and does not have a definite top. About 80% of the mass of the atmosphere is contained below 10 km of altitude (see Figure 1). Compared with the Earth's radius (6370 km) the atmosphere is just one sixth of one percent. Yet it is an extremely important multifunctional layer composed of

### LAYERS OF THE ATMOSPHERE



If one considers the size of a standard classroom globe, the atmosphere would be approximately as thick as a coat of paint on its surface.

### THE EARTH'S CLIMATE SYSTEM COMPONENTS



Clark College, 2003.

numerous gases in varying proportions in different regions, and which serve different functions. It is predominantly made up of nitrogen (78%) and oxygen (21%). Besides water vapour, several other gases are also present in much smaller amounts (Carbon monoxide (CO), Carbon dioxide (CO<sub>2</sub>), Neon (Ne), Oxides of nitrogen, Methane (CH<sub>4</sub>), Krypton (Kr), and Ozone (O<sub>3</sub>)).

### What is the greenhouse effect?

The greenhouse effect is the natural process of the atmosphere letting in some of the energy we receive from the Sun (ultraviolet and visible light) and stopping it being transmitted back out into space (infrared radiation or heat). This makes the Earth warm enough for life.

For several thousands of years the atmosphere has been delicately balanced, with relatively stable levels of greenhouse gases. Human influence has now upset that balance and, as a result, we are seeing climate change.

- Ultraviolet (UV) sunlight hits the Earth — some is reflected by the atmosphere and some UV passes through and hits the Earth's surface.
- Areas of the Earth which are covered in snow and ice reflect most UV back into space. UV that is not reflected hits the Earth and is transformed into Infrared Radiation (IR) or heat energy that is then given off by the Earth. Most IR escapes the atmosphere into outer space and has no warming effect.
- But greenhouse gases in the atmosphere trap some IR and this warms the air, water and land. The more greenhouse gases in the atmosphere, the larger the warming effect.

### How are we causing climate change?

Human activities, such as burning coal, oil and gas, have led to an increase in greenhouse gases in the atmosphere causing an enhanced greenhouse effect and extra warming. As a result, over the past century there has been an on-going increase in average temperatures. Globally, the ten hottest years on record have all been since 1997.

### What will happen if we don't reduce emissions?

If emissions continue to grow at present rates, carbon dioxide (CO<sub>2</sub>) concentration in the atmosphere is likely to reach twice that of pre-industrial levels by around 2050. Unless we limit emissions, global temperature could rise as much as 7 °C above pre-industrial temperature by the end of the century and push many of the world's great ecosystems, such as coral reefs and rainforests, to irreversible decline.

Even if global temperatures rise by only 2 °C it would mean that 20–30% of species could face extinction. We can expect to see serious effects on our environment, food and water supplies, and health.

### Which gases are causing the most change?

The main greenhouse gas responsible for recent climate change is CO<sub>2</sub>. This gas has been released in huge

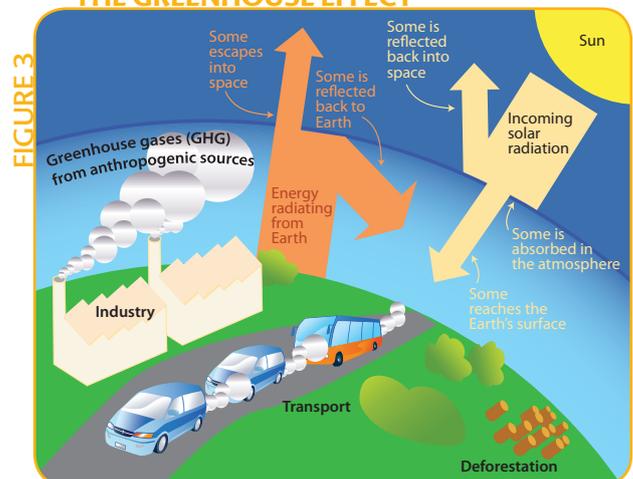
## El Niño / La Niña (ENSO) and the North Atlantic Oscillation

El Niño/La Niña-Southern Oscillation, or **ENSO**, is a climate pattern that occurs across the tropical Pacific Ocean roughly every five years. It is characterized by variations in the temperature of the surface of the tropical eastern Pacific Ocean—warming or cooling known as El Niño and La Niña respectively—and air surface pressure in the tropical western Pacific—the Southern Oscillation. Mechanisms that cause the oscillation remain under study.

ENSO causes extreme weather (such as floods and droughts) in many regions of the world. The frequency and intensity of ENSO are potentially subject to dramatic changes as a result of global warming, and is a target for research in this regard.

**North Atlantic Oscillation:** A permanent low-pressure system over Iceland (the Icelandic Low) and a permanent high-pressure system over the Azores (the Azores High) control the direction and strength of westerly winds into Europe. The relative strengths and positions of these systems vary from year to year and this variation is known as the North Atlantic Oscillation.

### THE GREENHOUSE EFFECT



### CORAL BLEACHING



**RELATIVE CONTRIBUTIONS OF MAJOR GHGS TO THE GREENHOUSE EFFECT AND ATMOSPHERIC LIFETIMES**

TABLE 1

GHG	Contribution (%)	Mean lifetime
Water vapour	36% to 66%	9 days
Carbon dioxide	9% to 26%	Tens of thousands of years
Methane	4% to 9%	12 years
Ozone	3% to 7%	9–11 days

Note: 'The determination of CO<sub>2</sub>'s atmospheric lifetime is often grossly underestimated because it incorrectly ignores the balancing fluxes of CO<sub>2</sub> from the atmosphere to other reservoirs — as it is removed by mixing into the ocean, photosynthesis, or other processes. It is the net concentration changes of the various GHG by all sources and sinks that determines atmospheric lifetime and not simply the removal processes.' From: D. Archer, 'Fate of fossil fuel CO<sub>2</sub> in geologic time', Journal of Geophysical Research 110(C9): C09S05.1–5.6, 2005.

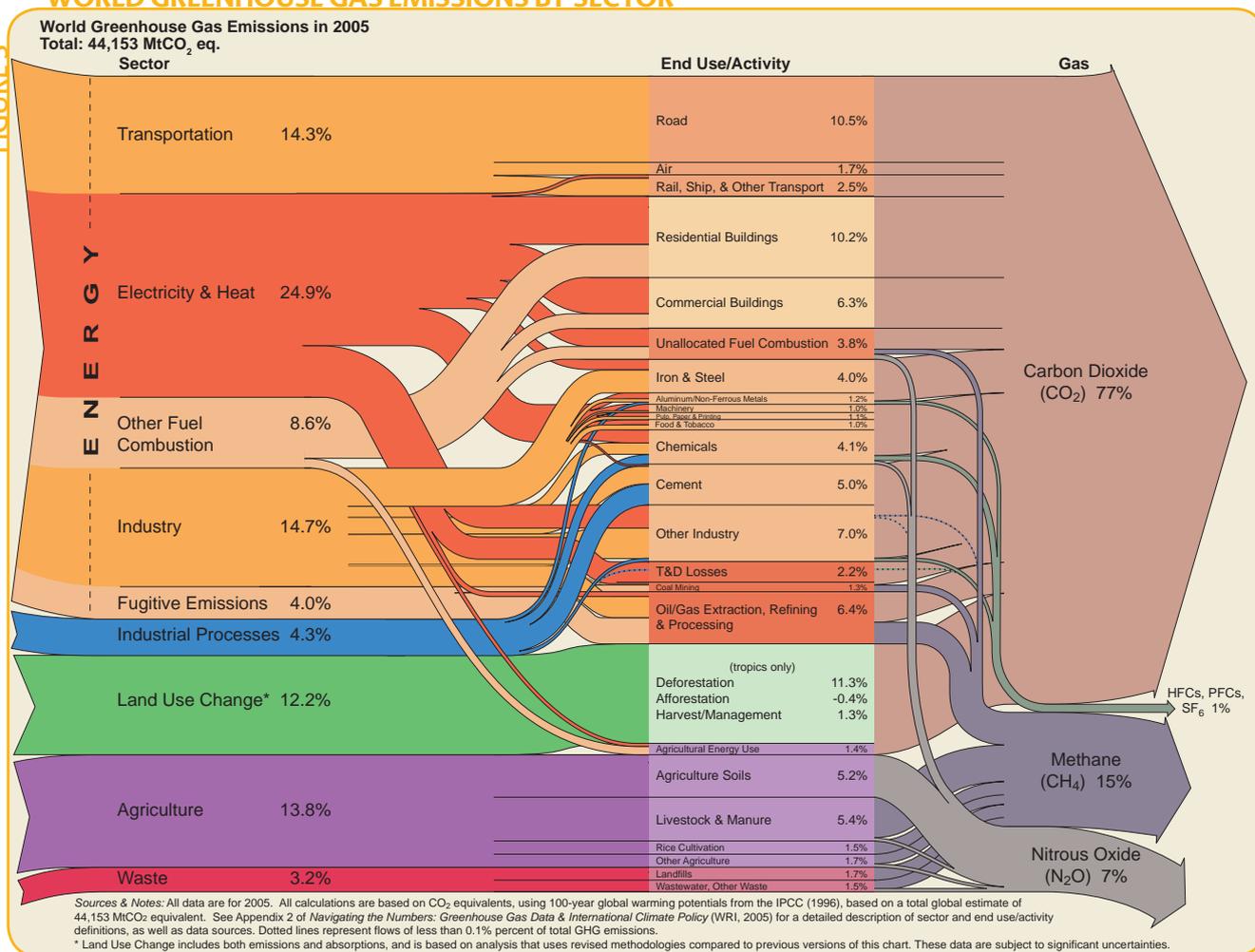
quantities by our modern way of life. Levels have also increased due to the destruction of rainforests, which play an important role in absorbing and storing CO<sub>2</sub>.

Human activities are increasing atmospheric concentrations of other greenhouse gases too, such as methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Methane is produced by bacteria that live in places like landfill sites, peat bogs and in the guts of animals like cows and sheep. Nitrous oxide is increased by the use of nitrogen fertiliser in agriculture.

Both these gases have a powerful greenhouse effect and also contribute to climate change. However, they have not been released in such large quantities as CO<sub>2</sub>, and methane does not last for as long in the atmosphere. So, while they make a significant contribution to climate change, it is man-made CO<sub>2</sub> that has by far the greatest influence.

**WORLD GREENHOUSE GAS EMISSIONS BY SECTOR**

FIGURES 5



World Resources Institute, 2005.

**Handout 2 text and images have been sourced from the following documents:**

Met Office (2009) *Warming: Climate Change – The Facts* (pp. 1-3). Full document available from: [http://www.metoffice.gov.uk/media/pdf/p/a/quick\\_guide.pdf](http://www.metoffice.gov.uk/media/pdf/p/a/quick_guide.pdf) © British Crown Copyright 2011, the Met Office.

UNESCO/UNEP (2011) *Climate Change Starter's Guidebook*. Full document available at: <http://unesdoc.unesco.org/images/0021/002111/211136e.pdf>

[↩ back to Facilitation Guide: The Basic Science of Climate Change](#)

## Handout 3. Climate Change Explanations

### 1. Transport

Transport currently causes 14% of global greenhouse gas emissions. Part of the problem is that wealth and carbon-based transport have tended to go hand in hand. When a nation gets richer, its citizens change from walking and cycling, through buses and local trains, to cars, high-speed trains and air travel.

### 3. Population growth

Population growth typically means increased greenhouse gas emissions. The world's population is expected to grow from today's 7 billion to between 8.0 and 10.5 billion by 2050. The majority of this growth is likely to be concentrated in areas and among populations — poor, urban and coastal — that are already highly vulnerable to climate change impacts.

### 5. Agriculture

Industrial agriculture is a major contributor to climate change, and a significant portion of the greenhouse gas emissions created by industrial agriculture are generated by agricultural pesticides and chemicals, deforestation and the burning of biomass.

### 7. Urban areas

With half of the global population living in urban areas, cities are already consuming 75 per cent of the world's energy and are contributing to a similar proportion of all waste, including greenhouse gas emissions.

### 9. About people

Population growth typically means increased greenhouse gas emissions. But unsustainable consumption and per capita emissions are generally much higher in rich, industrialized countries. So it is important to remember that population is not just about numbers, it's about people, their choices and lifestyles.

### 2. Disconnection from Nature

Climate change arises from separating ourselves from nature. Urbanization and technology have isolated people from the effects of nature, especially weather. With 'progress' we have also become psychologically separated from nature, feel 'above' nature, and treat it as a 'resource' to exploit.

### 4. Deforestation

Deforestation and forest degradation, through agricultural expansion, conversion to pastureland, infrastructure development, destructive logging, and fires, account for nearly 20% of global greenhouse gas emissions, more than the entire global transportation sector and second only to the energy sector.

### 6. Consumerism

Climate change is a symptom of a larger issue — consumerism — that is to say, consumption beyond the level of dignified sufficiency. It is fuelled by human wants not needs. Advertising manufactures desire for things that we don't really need, the result being that we desire and consume more to feel good about ourselves. As the market works to produce supplies to meet the demand, the economy grows, and the planet heats up.

### 8. Economic growth

Belief in economic growth has become a faith not to be questioned. Governments tell us growth is necessary to build schools and hospitals, save the poor, and cure unemployment. But economic growth built on fossil fuel usage is the key reason the climate is changing. The term 'Green Economy' has been coined to describe economic growth based on renewable energy sources and green jobs.

### 10. Fossil fuels

Fossil fuels (oil, natural gas, and coal) provide most of the energy used to produce electricity, run automobiles, heat houses, and power factories. Carbon dioxide from the burning the fossil fuels is the largest single source of greenhouse emissions from human activities.

### Sources:

1. Amended from: Gabrielle Walker and David King (2008) *The Hot Topic: How to Tackle Global Warming and Still Keep the Lights on*. London: Bloomsbury, 118.
2. Inspired by Clive Hamilton (2010) *Requiem for a Species: Why We Resist the Truth About Climate Change*. London: Earthscan, 134-58.
3. Taken from: United Nations Population Fund and Women's Environment and Development Organization (2009). *Climate Change Connections*, 2.
4. Taken from: UN-REDD Programme  
<http://www.unredd.org/AboutREDD/tabid/582/Default.aspx>
5. Taken from: ActionAid (2009). *Sustainable Agriculture and Climate Change: An ActionAid Rough Guide*. 2.
6. Inspired by Alastair McIntosh (2008) *Hell and High Water*. Birlinn: Edinburgh and Clive Hamilton (2010) *Requiem for a Species: Why We Resist the Truth About Climate Change*. London: Earthscan.
7. Taken from: UN General Assembly (2008). *Implementation of the outcome of the United Nations Conference on Human Settlements (Habitat II) and strengthening of the United Nations Human Settlements Programme (UN-Habitat)*. A/63/291.
8. Inspired by and Clive Hamilton (2010) *Requiem for a Species: Why We Resist the Truth About Climate Change*. London: Earthscan, 32-65.
9. Amended from: United Nations Population Fund and Women's Environment and Development Organization (2009). *Climate Change Connections*, p. 2.
10. Taken from: UNEP & UNFCCC (2002). *Climate Change Information Kit*.  
[http://unfccc.int/resource/docs/publications/infokit\\_2002\\_en.pdf](http://unfccc.int/resource/docs/publications/infokit_2002_en.pdf)

[↩ back to Facilitation Guide: Climate Change Webs](#)

## Handout 4. Climate Change Stories

### Story 1: Nguyen Thi Lahn: A Climate Change Story from Viet Nam

Life has never been easy for Nguyen Thi Lahn, 51, from Quang Tri Province in Viet Nam. Viet Nam, with some 3,500 kilometres of coastline and large populations concentrated in low-lying delta regions, is especially vulnerable to the effects of climate change. Storms have become more intense and frequent, and the storm season now lasts longer.

The toll taken by extreme weather began at least a decade ago, recall Lahn and her husband, Phi, referring to the 1999 floods. 'We lost our rice, our pigs and chickens, everything. The water came up to the window. The flood came suddenly, and we could not prepare anything in advance,' Phi says. 'We moved to the temple, looking for shelter. We did not have time to take our belongings, just the clothes we were wearing, Lahn adds. In recent years, rains have become unusually heavy, making it impossible for farmers to plant on time, and harvests have therefore been smaller.

'Now we have to work harder because there often are floods, and we are afraid that in the future the situation will be even worse,' Lahn says. She's not alone — women, especially those in poor countries — are among the most vulnerable to climate change. In Viet Nam and in many other countries affected by climate change, men migrate to the cities in search of jobs, while women are usually left behind to take on all the responsibilities for their households, often including planting and harvesting, taking care of livestock and providing for their families. 'When my husband is not at home, I have to work in the field. And in order to pay the school fees, I work extra time in construction, even though I am not in good health,' she goes on, adding that she does her best to remain prepared for floods. Her home, like many in the area, has raised lofts so she can move belongings to higher places and keep the children safe when the waters rise, she explains.

Lahn — and many other women in Quang Tri — know that weather is no longer predictable and that flooding can happen almost any time. She and her neighbours participate in meetings and workshops organized once or twice per month by the Women's Union in Hai Ba Commune, where climate change and natural disasters are recurrent topics. The villagers carry out evacuation drills, discuss emergency preparations and receive first aid training. It's a chance for women to share their experiences on how to protect themselves, their families and their livelihoods during the flood season.

#### Source

Amended from: United Nations Population Fund (2009), *Facing the Flood: Women cope with Climate Change in Viet Nam* reported by Maria Larrinaga, with support from Oxfam Viet Nam. For the full story, visit [http://www.unfpa.org/public/media\\_resources/swp09](http://www.unfpa.org/public/media_resources/swp09)  
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## Story 2: Lars-Anders Baer: A Climate Change Story from Scandinavia

The indigenous Saamis are feeling the heat of global warming. Some 60,000 to 100,000 Saamis spread out across Finland, Norway, Sweden and Russia, making a living partly from fishing and hunting. Many of them, however, herd reindeer —the backbone of the traditional economy. Reindeer meat is prized for its flavour, tenderness and low fat content. The hides, bones and antlers are used for clothing and handicrafts.

Warmer weather has had an immediate toll on the Saamis. Lichen, a mossy fungus on rocks, abundant in these lands, is getting trapped under a layer of ice that forms as a result of rises and falls in temperature. It is the reindeer's main source of nutrition during the long winter months; however, herds are increasingly unable to reach it. 'A reindeer can normally dig through as much as one metre of snow to get to the lichen,' says Lars-Anders Baer, President of the Saami Parliament based in Kiruna, in northern Sweden. 'But now, with less snow and more ice, the plant is no longer accessible.' Feeding reindeer that cannot find enough food on their own is putting a huge financial burden on the herders. Recently, says Lars-Anders Baer, 'around 100,000 reindeer were not able to eat the lichen, so we had to give them extra food to prevent them from dying.' Despite government subsidies, the extra cost, amplified by the latest food crisis and a decline in revenues, has forced many to sell their reindeer and quit herding, which, he says, 'is essential for the survival of our culture.'

On a wider scale, pastures are starting to shrink due to the change in weather. 'As the snow melts, we can see the tree line climbing,' he says. 'This means that the ground is becoming more hospitable for agriculture and other uses, and that less pastures are available for the reindeer.' Central governments and the private sector, which had long shied away from the bitterly cold temperatures, have taken note of the available land. The land is particularly desirable since its ownership rights have not been determined yet.

'New interests are coming into our territory,' says Lars-Anders Baer. 'For example, men working in oil and gas exploration are bringing along new symptoms associated with modernization, such as alcohol consumption, prostitution and suicides. This is putting the indigenous communities under pressure. Reindeer herders are good at adapting to normal weather fluctuations,' he says. 'However, it is these secondary consequences of climate change that are troubling the Saamis. They are trying to cope with them by adopting new methods of doing business, such as changing reindeer movement patterns, introducing extra feeding and combining traditional and modern knowledge. 'The whole Swedish society is adapting to climate change, and we have to do the same,' he says. 'However, we are very concerned about possible social and cultural consequences, and will have to work hard on preserving our rights, our language and our way of life.' 'The climate and the cold weather have been our greatest defenders,' he adds. 'But now, when the climate has changed, it has opened up the area.'"

### Source

Taken from: United Nations Population Fund (2009), '*Scandinavia's Indigenous Saami Way of Life Threatened by Thawing Tundra*'.

For the full story, visit: [http://www.unfpa.org/public/media\\_resources/swp09](http://www.unfpa.org/public/media_resources/swp09)

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### Story 3: Thombi Masondro: A Climate Change Story from South Africa

According to Constansia Musvoto, researcher with the South African Council for Scientific and Industrial Research, rainfall patterns in the region have notably changed since the 1960s. Musvoto says the climate changes will have a tremendous effect on agriculture and the availability of clean water in the province. 'Southern Africa will be hit heavily by climate change over the next 70 years,' she says. 'Agricultural production is projected to be halved, a development that will threaten the livelihoods of farmers in a region where 70 per cent of the population is smallholder farmers.'

Thombi Masondo, 57, takes a rest after working under the baking sun on her 10-acre farm. Her crops are dying before they have a chance to break the soil. The area, dry at the best of times, is experiencing the longest ever rainless stretch in its history. Masondo has seen weather conditions change substantially over the past 30 years, with rains often starting a month later than they used to.

The province, long vulnerable to drought, has seen worsening dry spells. It often rains continuously for almost a week, which is bad news for the crops. Rising temperatures, delayed and unreliable rainfall, soil erosion, and severe droughts are making it difficult for small-scale farmers to continue growing food such as maize and beans in this drought-prone area.

Masondo, a gray-haired mother of five, scrapes her living growing crops which she sells at the nearest market to raise money to send her children and some of her grandchildren to school. Her husband died of AIDS in 2004, and the illness has also claimed two of her daughters, leaving her to look after their three orphaned children.

Limpopo is one of the poorest provinces in South Africa with a rural population of 89 per cent with a relatively high illiteracy and unemployment rates. It is the epicentre of South Africa's hunger but the government is responding with painful slowness. People rely heavily on agriculture for household food security. Growing malnutrition has led to reports of disease-related deaths among young children weakened by hunger. Drought has also weakened the animals and many died from hypothermia during the recent rains. The three cows dozing near to Masondo are the only ones left after more than 13 of her herd died during the droughts of the past four years. This, for her, was like losing part of her body as she used these cattle to plough her land, plant her crops and ferry her products from the field to the market. The area as a whole, she says, lost 'thousands of cows.'

#### Source

Taken from: Panos London. '*Limpopo Goes Hungry as Climate Change Bites.*'

For the full story, visit: <http://panos.org.uk/features/limpopo-goes-hungry-as-climate-change-bites/>  
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### Story 4: Corey Marchbank: A Climate Change Story from Canada

**Corey Marchbank, 35, lives in Miscouche, Prince Edward Island, Canada. He works as a goose hunting guide, which means that he takes goose hunters out to the field. He began hunting with his father not long after he learned to walk, and his love of the outdoors led him to become a professional guide 14 years ago. He hunts with clients from the United States and other Canadian provinces.**

For decades, the grain and potato fields around his home have been the primary location for consistent, high quality goose hunting, though lately things have been changing. In recent years he has noticed a dramatic rise in temperatures, a decrease of winter snow and ice, and how these changes have been affecting the migration patterns of Canadian geese in this region.

The goose hunting season starts on the first Monday in October and ends the second Saturday in December. Usually by the season opening the weather is a bit chilly but, over the last two years, right up to November, he was still swatting mosquitoes, wearing T-shirts and sneakers — not hunting jackets as it used to be.

‘We used to get snow by 1 November, but now we’re lucky to get snow by Christmas. During the winter of 2006-07 there wasn’t more than a week of good snowmobiling weather. In years past, snowmobiling was good from Christmas through spring. And I remember when I was a kid, you’d go outside and the snow would be up to the level of the power lines and there were warnings on the radio not to let the kids out. I haven’t seen that in a long time,’ he says.

With the increase in fall temperatures, Canadian geese are migrating south much later in the year. When it eventually gets cold and they migrate through Prince Edward Island, the geese hang out in the local bays and estuaries instead of collecting spent grain and potatoes from the agricultural fields. This is happening for a couple of reasons. First, the waters have not been freezing over like they used to. Second, without the cold temperatures, the geese don’t have the same pressure to stock up on food before continuing their migration south. ‘With the hot sunny days we’ve been having, the geese tend stay out on the water and don’t come inland at all. It’s a big change,’ he says. ‘And now, some of the geese are even staying around all year. I’ve never seen geese do this. They know not to take their chances though, and if it’s mild around here, they’ll stick around and take advantage of it.’

‘Usually the first two weeks of the hunting season are the best hunting that you have the whole season. Now, most hunters are going home with nothing. During the last two years, on opening day, we haven’t shot a single goose. I have a group of four guys that come every year, and just like clock-work, they expect to get their geese. But the last two years on opening day they didn’t get any. Clients are starting to say to me, “Gee, do you remember when we used to go out and the geese were everywhere and now you can go out on opening day and not see any geese at all?” ‘

#### Source

Taken from: *WWF Climate Witness: Corey Warchbank, Canada*. For the full story, visit: [http://wwf.panda.org/about\\_our\\_earth/aboutcc/problems/people\\_at\\_risk/personal\\_stories/witness\\_stories/map.cfm](http://wwf.panda.org/about_our_earth/aboutcc/problems/people_at_risk/personal_stories/witness_stories/map.cfm) © 2007WWF (panda.org). Some rights reserved.

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## Story 5: Ben Namakin, A Climate Change Story from Kiribati and Micronesia

Ben Namakin is originally from Kiribati. He currently lives in Pohnpei (formerly known as Ponape) in the Federated States of Micronesia (FSM) and works as an environmental educator for the Conservation Society of Pohnpei (CSP), the only local environment non-government organisation on the island.

During Ben Namakin's childhood days in Kiribati, people never experienced severe sea flooding. There were storms, but they weren't that bad. As the sea levels continue to rise in Kiribati, several king tides have hit the island. Saltwater intrusion affects the quality of water in wells, floods taro (root vegetable) patches, gardens, and puts stress on plants and trees that are very important to the life and culture in Kiribati.

'Pandanus trees mean a lot to us,' he says. 'They are used for house construction, local medicine, food, traditional clothing, etc., but are dying from saltwater intrusion. Serious storm surges cause coastal erosion, floods grave yards, and in 2006, led to the collapse of the beautiful Dai Nippon causeway. This incident brought huge costs to the people of Kiribati. They had to build new homes with their own finance, and dig up their deceased relatives from their graves and bury them further inland.'

While studying for his High School Diploma in Pohnpei in 2001, during his free time, he would hang out with his friends on a small islet, Dekehtik, located on the barrier reef a couple of miles away from the school. It was his favourite camping, picnicking and snorkelling spot. In 2005, he found to his surprise that Dekehtik Islet had split into two. "I went to see for myself, with my own eyes, and there it was, badly destroyed by sea flooding. How sad to see this unexpected, sudden threat to the islanders and the landowners!", he says.

Visiting the community on the coast of Sokehs, Pohnpei, he learned that many villagers had built their houses on raised foundations as the seawater was flooding their homes during high tide. They also built walls in front of their houses to prevent flooding during heavy rains. The villagers he spoke to mentioned noticing these changes in the last five years but not in the past.

'The civil, economic, social and cultural rights that climate change abuses have strengthened my spirit to stand up for my nation, fight for our rights and to let many people know that we need to do something now to stop global warming,' he adds.

He participated at the Youth Summit during the United Nations Conference on Climate Change in 2005. He spoke at the conference plenary session which had more than 10,000 people deliver the youth's message on 'Our Climate, Our Challenge, Our Future'. In 2006, he participated in a Climate Change tour across the United States. Through seminars, he encouraged university students to join the climate change movement. He also worked hard to convince leaders in the USA to improve US policy on clean energy to address climate change, ratify the Kyoto Protocol, and most importantly make decisions that will not affect his people in the Pacific Islands negatively.

### Source

Taken from: WWF *Climate Witness: Ben Namakin: Kiribati and Micronesia*.

For the full story, visit: [http://wwf.panda.org/about\\_our\\_earth/aboutcc/problems/people\\_at\\_risk/personal\\_stories/witness\\_stories/?100800/1/](http://wwf.panda.org/about_our_earth/aboutcc/problems/people_at_risk/personal_stories/witness_stories/?100800/1/) © 2007 WWF (panda.org). Some rights reserved.

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## Story 6: The Communities of the Chacaltaya Glacier: A Climate Change Story from Bolivia

On the steep slopes leading down from the Huayna Potosi and Chacaltaya mountains lies a string of tiny communities that make a meagre living by keeping llamas, sheep and chickens and by growing small crops of potatoes and oca, a perennial plant grown in the central and southern Andes. High above them, the Chacaltaya glacier that has sustained these activities is retreating at a completely unexpected pace - three times as quickly as was predicted just ten years ago - and will be gone in a generation. The glacier that once supported a ski resort is now reduced to a small chunk of snow and ice nestled just below the 18,000-foot summit. With it, a web of life that depends on the water seeping down from the glacier is changing forever.

Many of the slopes are now farmed primarily by women, some of them in their seventies, some of them girls who should be in school. Though they manage to survive off the land, there's nothing left over to sell, so many of the men have been forced to leave the mountains to take whatever work they can find in the nearby cities of La Paz or El Alto.

Village leader Felix Quispe, for example, feels deeply connected to the land his family has worked for generations. But now he spends much of his time in the city, selling toilet paper and cleaning windows. 'It is very sad,' he says, 'Many people have left and houses are abandoned. Husbands only come home maybe twice a month. It would be great to live like before and not be heartbroken every day.'

'Young people tend to leave these areas,' says Jaime Nadal, the UNFPA, United Nations Population Fund, representative in Bolivia. 'Old women are typically left in the community having to perform harder and harder tasks to keep up the household. We already see mostly old women in many of these communities.'

Cultural traditions heighten the sadness of these changes. For one thing, a culture that values a mutual sharing of men and women's roles is being disrupted by recent changes. And the people mourn the unravelling of their deep connection with Pachamama, Mother Earth. 'This is a culture that is very much attached to the land, says Jaime Nadal. 'In our culture, the person is a person in the context of the field, the sun, the earth, the water.'

The loss of the glaciers also jeopardizes water supplies for the cities of La Paz and El Alto. 'What will the world do when two million people will not have water for drinking?' asks Jose Gutierrez, a climate change expert in Bolivia. 'The world needs to know what is happening in Bolivia,' he adds. 'We are losing something that is a human right, a source of life - water for drinking, for food, for the animals, for electricity. We also need to have a future, as any other people in this world.'

### Source

Taken from: United Nations Population Fund (2009), *Melting glaciers alter a way of life: Adapting to harsh, new realities in Bolivia* reported by Trygve Olfarnes and Andi Gitow. For the full story, visit: [http://www.unfpa.org/public/media\\_resources/swp09](http://www.unfpa.org/public/media_resources/swp09)  
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[↩ back to Facilitation Guide: Climate Change Stories](#)

## Handout 5. Perspectives on Sustainable Development

### Perspective 1: Green Economy

“The proximate (first to be achieved) goal in the creation of a green economy is the notion of making the economy more ecologically efficient—meeting our economic needs without compromising our ecological integrity.”

Source: The Frederick S. Pardee Center for the Study of the Longer-Range Future at Boston University (2011). *Beyond Rio +20: Governance for a Green Economy*. p. 9.

### Perspective 2: Fairness and Justice for Future Generations

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Source: World Commission on Environment and Development (1987). *Our Common Future*.

### Perspective 3: No Unsustainable Exploitation of Global Resources

“Sustainable development shall never be attained as long as unsustainable exploitation of the earth’s resources by the North continues.” [Sustainable Development should seek] “to redress existing imbalances by ensuring equity in ...the control and exploitation of global resources.”

Source: *The Isiolo Declaration: Africa’s Perspective on Environment and Development* (n.d.).

### Perspective 4: Gender Equity and the Empowerment of Women

(1) “Gender equality and the empowerment of women [are] effective ways to combat poverty, hunger and disease and to stimulate development that is truly sustainable.”

Source: United Nations Millennium Declaration (2000).

(2) “The empowerment of women and improvement of their status are important ends in themselves and are essential for the achievement of sustainable development.”

Source: International Conference on Population and Development (1994). *Summary of the Programme of Action*.

### Perspective 5: The Need for Global Partnership

“Integration of environment and development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future. No nation can achieve this on its own; but together we can - in a global partnership for sustainable development.”

Source: United Nations Conference on Environment and Development. *Agenda 21. Preamble* (1992).

### Perspective 6: Aboriginal Perspectives

“Embedded within the Aboriginal world view is the concept of collective responsibility for tending the land and using only that which is needed for sustenance. Important, as well, is the interconnectedness and interdependence of all life forms — humankind, flora and fauna, and all that exists on the Earth. The concept of sustainability is not new to Aboriginal people; they are very aware of the growing need for all humans to show greater respect for the environment — respect for Mother Earth — if we are to continue to coexist in this world.”

Source: *Aboriginal Perspectives of Sustainable Development*, p. 1 (n.d.).

### **Perspective 7: Sustainable Human Development**

“Sustainable human development aims to eliminate poverty, promote human dignity and rights, and provide equitable opportunities for all through good governance, thereby promoting the realization of all human rights, economic, social, cultural, civil and political.”

Source: UNDP (1998). *Integrating human rights with sustainable human development: A UNDP policy document.*

### **Perspective 8: Disaster Risk Reduction and Sustainable Development**

“Disaster risk is associated with unsustainable elements of development such as environmental degradation, while conversely disaster risk reduction can contribute to the achievement of sustainable development, through reduced losses and improved development practices.”

Source: UNISDR (2009). *UNISDR Terminology on Disaster Risk Reduction*, p. 29.

### **Website References**

Web links are available for some of the above documents:

- Perspective 1:  
<http://www.bu.edu/pardee/files/2011/03/Rio20TFC-Mar2011.pdf>
- Perspective 3:  
<http://www.un-ngls.org/orf/documents/publications.en/voices.africa/number5/vfa5.04.htm>
- Perspective 4:  
(1) <http://www.un.org/millennium/declaration/ares552e.htm>  
(2) <http://www.un.org/ecosocdev/geninfo/populatin/icpd.htm#chapter4>
- Perspective 5:  
[http://www.un.org/esa/dsd/agenda21/res\\_agenda21\\_01.shtml](http://www.un.org/esa/dsd/agenda21/res_agenda21_01.shtml)
- Perspective 6:  
[http://www.edu.gov.mb.ca/k12/cur/socstud/frame\\_found\\_sr2/tns/tn-41.pdf](http://www.edu.gov.mb.ca/k12/cur/socstud/frame_found_sr2/tns/tn-41.pdf)
- Perspective 7:  
<http://mirror.undp.org/magnet/Docs/policy5.html>

[↩ back to Facilitation Guide: Sustainable Development and Climate Change Collages](#)

## Handout 6. UNESCO Teacher Education Course on Climate Change Education for Sustainable Development: Feedback Sheet

Workshop Day No: 1, 2, 3, 4, 5, or 6 (please circle as appropriate)

This is to help the workshop facilitator(s) know how the programme is being received. They will take account of your comments in adjusting the course or their facilitation.

1. What I liked about today's workshop

2. What I think could be improved in how the workshop is being conducted

3. What questions and concerns the day has left me with

4. My other comments

Thank you very much!

[↩ back to Facilitation Guide: Close](#)

## Summary of what is learned on Day One

### 1. Pedagogies

Discovery of and familiarization with ESD issue	e.g.: Climate change (Classroom Activities & Handouts: Climate Change People Search, pp. 10-11)
Decoding & deconstruction	e.g.: Media interpretation (Facilitation Guide: Climate Change Webs, pp. 5-6)
Reflection as means of finding causal connections and interrelationships Solving climate change problems of varying complexity	e.g.: Human factors affecting climate change: interconnections (Classroom Activities & Handouts: Climate Change Webs, pp. 8-9)
Assessing responsibility	(Facilitation Guide: Sustainable Development and Climate Change Collages, pp. 7-8)
Collective reflection processes	e.g.: Sharing insight and knowledge (Classroom Activities & Handouts: SD and Climate Change Collages, pp. 12-13)
Assessing perceptions and understanding of SD	e.g.: Encouraging reinterpretation, emphasis on climate change action (Classroom Activities & Handouts: SD and Climate Change Collages, p. 13)

### 2. Definitions

Probable, feasible and preferred futures	
Zone of potential	
Personal futures, local futures, national futures, regional futures, global futures	
Mitigation	Identifying the causes of climate change and developing the knowledge, skills and dispositions required for individual and societal change
Systemic thinking	

### 3. Interdisciplinary Knowledge Systems

Knowledge from Natural Sciences	Knowledge from Social Sciences	Knowledge from Humanities
<ul style="list-style-type: none"> <li>Environment Science</li> <li>Sustainability, Climate Change, Ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>Implications of Climate Change on society</li> </ul>	<ul style="list-style-type: none"> <li>Emotional causes/effects on humans</li> </ul>
<ul style="list-style-type: none"> <li>Impacts of Climate Change on SD</li> </ul>	<ul style="list-style-type: none"> <li>Problem-solving</li> </ul>	<ul style="list-style-type: none"> <li>Analyzing perceptions and personal experiences</li> </ul>
<ul style="list-style-type: none"> <li>Human Impact on Climate Change</li> </ul>	<ul style="list-style-type: none"> <li>Economics</li> <li>Weighing challenges, Recognizing Consequences and Impact of Climate Change, Desirable/Undesirable Futures</li> </ul>	<ul style="list-style-type: none"> <li>Community building</li> <li>Collective sharing</li> </ul>
<ul style="list-style-type: none"> <li>Human Vulnerability to Climate Change</li> </ul>		<ul style="list-style-type: none"> <li>Re-thinking/Changing behaviors</li> <li>Exploring possibilities to limit/reduce impacts in future</li> </ul>
		<ul style="list-style-type: none"> <li>Personal identification with ESD issue</li> </ul>

#### 4. International Frameworks

MDGs	
Human Rights	<ul style="list-style-type: none"> <li>• The right to adequate housing, right to health, etc.</li> <li>• Students assess personal responses to climate change to connect with and identify direct effects of ESD issue within their communities, families, etc.</li> <li>• Students make projections about future which include, but are not limited to, projections about health, water, food, natural disaster in relation to climate, etc.</li> </ul>
Disaster Risk Reduction (DRR)	

#### 5. Skills

Encouraging alertness in everyday interactions	
Futures casting	<ul style="list-style-type: none"> <li>• Opportunity-building (exploring opportunities for CCESD across curriculum)</li> <li>• Building Sustainable Communities</li> </ul>
Empowerment	<ul style="list-style-type: none"> <li>• Building empathetic understanding through sharing experiences</li> </ul>
Listening	
Problem Solving	

[↩ back to Facilitation Guide: Introduction](#)

## Day One Powerpoint Slides

1

United Nations Educational, Scientific and Cultural Organization

CLIMATE CHANGE IN THE CLASSROOM

UNESCO COURSE FOR SECONDARY TEACHERS ON CLIMATE CHANGE EDUCATION FOR SUSTAINABLE DEVELOPMENT

Day 1 | Climate Change Learning for Sustainable Development

2

Welcome!

Welcome to the UNESCO Course for Secondary Teachers on CCESD!

3

### CCESD: The Teacher Education Task

- To familiarize teachers with the multi-faceted nature of climate change, the driving forces behind it, its effects and impacts, and what can be done to limit the severity of climate change now and in the future
- To build teachers capacity for introducing CCESD into the subjects they teach and for making CCESD connections across the curriculum
- To build teachers capacity for contributing to whole-school and community responses to climate change
- To develop teacher confidence and competence in using participatory learning approaches to deliver CCESD
- To enable teachers to build learners' capacity to respond to present climate change threats and climate changed futures by developing their skills and dispositions for climate change adaptation and mitigation, and for disaster risk reduction

4

### CCESD Teacher Education Course: Themes for Each Day

- Day 1: Climate Change Learning for Sustainable Development
- Day 2: Climate Change: A Futures Learning Approach
- Day 3: Learning for Climate Change Mitigation and Adaptation
- Day 4: Climate Change Learning: A Local Focus
- Day 5: Climate Change Learning: A Global Focus
- Day 6: Confronting Climate Change: Towards Empowerment and Action

5

### Day One: Objectives

- To share and pool participants' experiences and understandings of climate change
- To establish participants' hopes and expectations of the workshop
- To establish a basic understanding of the science of climate change
- To examine human factors driving climate change
- To consider the impact of climate change on peoples' lives around the world
- To pool and then broaden and deepen participants' understanding of sustainable development
- To consider the implications of climate change for sustainable development
- To begin consideration of CCESD across the curriculum
- To think about using the learning activities experienced during the day back in the classroom

6

### Learning Approaches

- Individual learning* – participants work on their own (before usually sharing what they have done with others)
- Group learning* – participants work as a whole group but often in smaller groups of differing sizes exchanging ideas, experiences and perspectives often in response to stimulus material (what is often called *interactive* or *cooperative* learning). This may involve *milling* (i.e. moving around and sharing) or sitting down.
- Experiential learning* – participants go through a carefully crafted experience inside or outside the classroom (e.g. field visits) before discussing and analysing what they have learnt. They may be asked to work as a whole group and/or in small groups. Two forms of experiential learning that will be encountered are *simulation games* and *role-play activities*.
- Inputs* – the facilitator will make a brief input, allowing time for discussion of what she or he says

7

### Why Participatory Learning?

- It allows for the fullest sharing of the ideas, experiences and perspectives that learners bring to the classroom while revealing what they don't know.
- It is informed by the core values of human rights, peace and democracy and gives everyone a voice.
- It gives practice in participation and so builds the skills and dispositions that empower young people to contribute to social change
- It provides for variety and diversity in learning programs, mixing activities for different sized groups, high energy and more slow-paced reflective activities, activities favouring all types of learner
- It offers 'whole-person learning' combining cognitive learning (e.g. problem solving, decision-making) with affective (emotional) learning, making the learning experience richer

8

### End-Of-The-Day Tasks

- Complete a *feedback sheet* on the day's activities
- Write a *Workshop Reflections* diary
- Read over the *Classroom Activities* related to the day's workshop activities

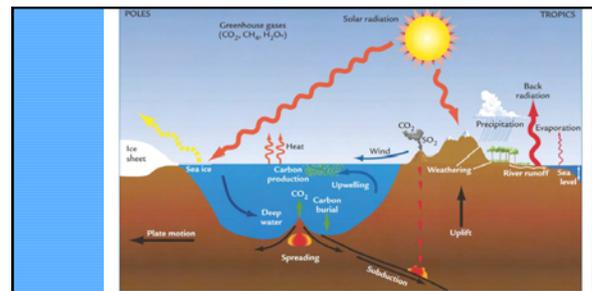
9

### Climate Change Art Gallery

Climate Change Experiences	Climate Change Causes
Hopes and Expectations	Climate Change Effects

[↩ back to Facilitation Guide: Climate Change Art Gallery](#)

10



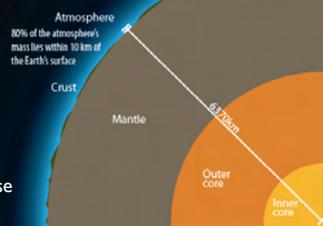
#### Components of the Earth's Atmosphere

The movement of heat around the Earth is accomplished via the global climate system, which comprises the atmosphere, the oceans, the ice sheets, the biosphere (all living organisms) and soils, sediments and rocks. The climate system is made up of numerous subsystems with many processes occurring within and between each subsystem. These complex interactions result in intermittent and constantly changing phenomena (e.g. El Niño and the North Atlantic Oscillation)

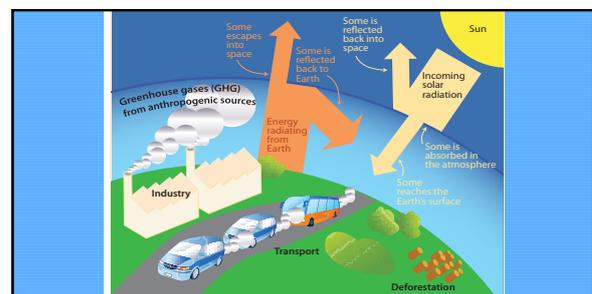
11

### Composition of the Atmosphere

- Thin layer of gases; 80% of the mass is contained below 10km of altitude
- Predominantly made up of nitrogen (78%) and oxygen (21%)
- Remaining 1% is made up of water vapour, carbon monoxide, carbon dioxide, neon, methane, krypton and ozone, some of which are so-called greenhouse gases



12



#### The Greenhouse Effect Illustrated

Sunlight (solar radiation) passes through the atmosphere and warms the Earth. Energy in the form of infrared radiation (IR) is given off by the Earth. Most IR escapes to outer space and cools the Earth. But some IR is trapped by greenhouse gases (GHG) emitted from industry, transport, deforestation and other sources, and this reduces the cooling effect.

13

### The Greenhouse Effect

- Weather is the temperature, precipitation and wind as they change hour by hour and day by day
- Climate is the average weather and the nature of its rhythmical variations that we experience over time
- The greenhouse effect is the natural process of the atmosphere letting in some of the energy we receive from the Sun and trapping it. For several thousands of years the atmosphere has been delicately balanced
- Human activities have led to an increase in greenhouse gases in the atmosphere causing an increased greenhouse effect and extra warming
- The main greenhouse gas responsible for recent climate change is carbon dioxide (CO<sub>2</sub>). Others greenhouse gases produced from human activities include methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O).

[↪ back to Facilitation Guide: The Science of Climate Change](#)

14

### The Dynamics of Transformation

15

### Climate Change Education for Sustainable Development (CCESD) is about:

- Building understandings of climate change and the impacts it has and will have on prospects for sustainable development
- Creating alertness and attentiveness to the driving forces behind climate change and its environmental, economic, social and cultural impacts
- Developing the change skills and dispositions of learners so they can contribute to limiting the severity of climate change (*climate change mitigation*)
- Developing the change skills and dispositions of learners so they can play their part in adapting to the dangers of climate change and in reducing the risks to their community (*climate change adaptation and risk reduction*)

16

### CCESD...

- Is an integrated approach to learning
- Has a place across the curriculum
- Requires a whole-school approach
- Calls for a school-in-community approach, bringing together formal and non-formal learning

[↪ back to Facilitation Guide: CCESD](#)

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### End of Day 1 – See you tomorrow

Please don't forget to:

- Fill out and submit your feedback form
- Read through classroom activities for the day and bring any questions to the next day workshop
- Write your reflective workshop diary entry for the day and bring the diary to Day 2

[↪ back to Facilitation Guide: Introduction](#)

# Get the Facts:

## THE SCIENCE OF CLIMATE CHANGE

Climate can be defined as ‘average weather’ and is described in terms of the mean and variability of relevant characteristics such as temperature, precipitation and wind over a period of time ranging from months to thousands or millions of years. Climate reflects how weather behaves over the long-term, and as such needs to be distinguished from weather which is a particular meteorological condition that we experience daily, characterized by precipitation, temperature, wind, and so on.

Meteorological conditions, like the annual average temperature at the Earth’s surface, change over time. Small changes in these conditions can result in ice ages, or warm periods. Over the past century an increase of the Earth’s average surface temperature of about  $+0.76^{\circ}\text{C}$  has been observed.

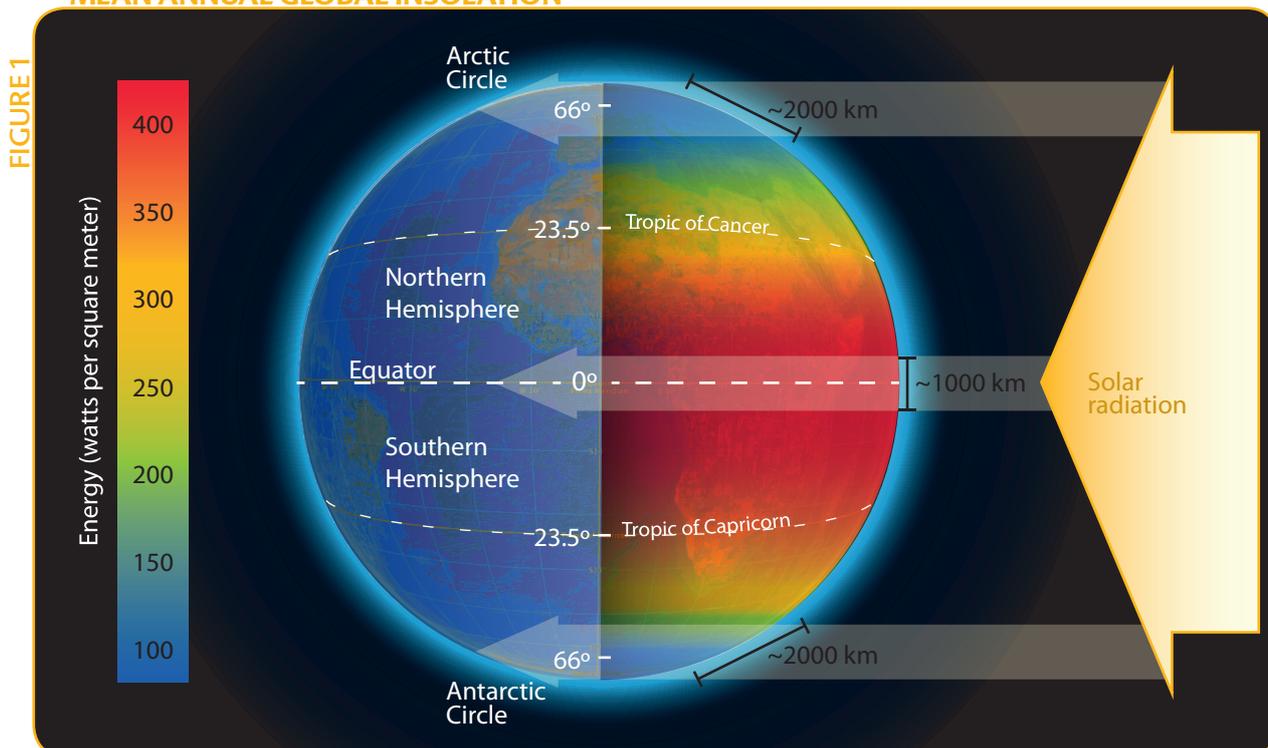
There are several natural factors that can influence the climate, such as changes in the Earth’s orbit around the sun, volcanic eruptions, or even periods of heightened or diminished solar activity. However, the current warming trend we are experiencing has been primarily linked to an increased concentration of heat-trapping greenhouse gases (GHGs) such as carbon dioxide ( $\text{CO}_2$ ), methane ( $\text{CH}_4$ ) and nitrous oxide ( $\text{N}_2\text{O}$ ) in the atmosphere.

The 2007 Intergovernmental Panel on Climate Change (IPCC) Assessment Report confirms that the warming of the global climate is unequivocal and that it is very likely due to human activities (also known as **anthropogenic** activities) and has been increasing since the dawn of the industrial age (circa 1750). These activities include, among others, the burning of fossil fuels (coal, oil and gas), clearing of forests, and agricultural practices that lead to increased GHG concentration in the atmosphere.

The impacts of global warming are already apparent today in melting glaciers, increased frequency of extreme weather events such as droughts, cyclones or heavy rainfalls, sea level rise, and changes in plant growth affecting agriculture and food production. These and other observed changes are expected to intensify and inflict a significant impact on human societies and the environment around the world especially if no drastic efforts are undertaken to reduce the emissions of GHGs into the atmosphere.

This chapter explains the components of the climate system, outlines the underlying factors of observed climate change, and concludes by presenting the climate change impacts that can be observed today.

### MEAN ANNUAL GLOBAL INSOLATION



# Get the Facts:

## THE SCIENCE OF CLIMATE CHANGE

### 1.1 What is 'Climate'?

#### Weather vs. climate

In order to define 'climate' it is important to distinguish it from 'weather'. The weather that we experience on a day-to-day basis is a momentary atmospheric state characterized by temperature, precipitation, wind, and so on, and seems to vary in an irregular way, not following any particular pattern.

When one considers longer time scales, weather can be seen to vary in a recurrent way, be it on global, regional or local scale. This is what we refer to as climate. In contrast to the instantaneous conditions described by weather, climate is described with average values (e.g. annual average, or mean, temperature), but also typical variability (e.g. seasonal maximum/minimum temperatures) and frequency of extremes such as monsoons/hurricanes/cyclones. The timescale upon which climate statistics are calculated is typically thirty years (e.g. 1981–2010).

#### The function of Earth's climate system

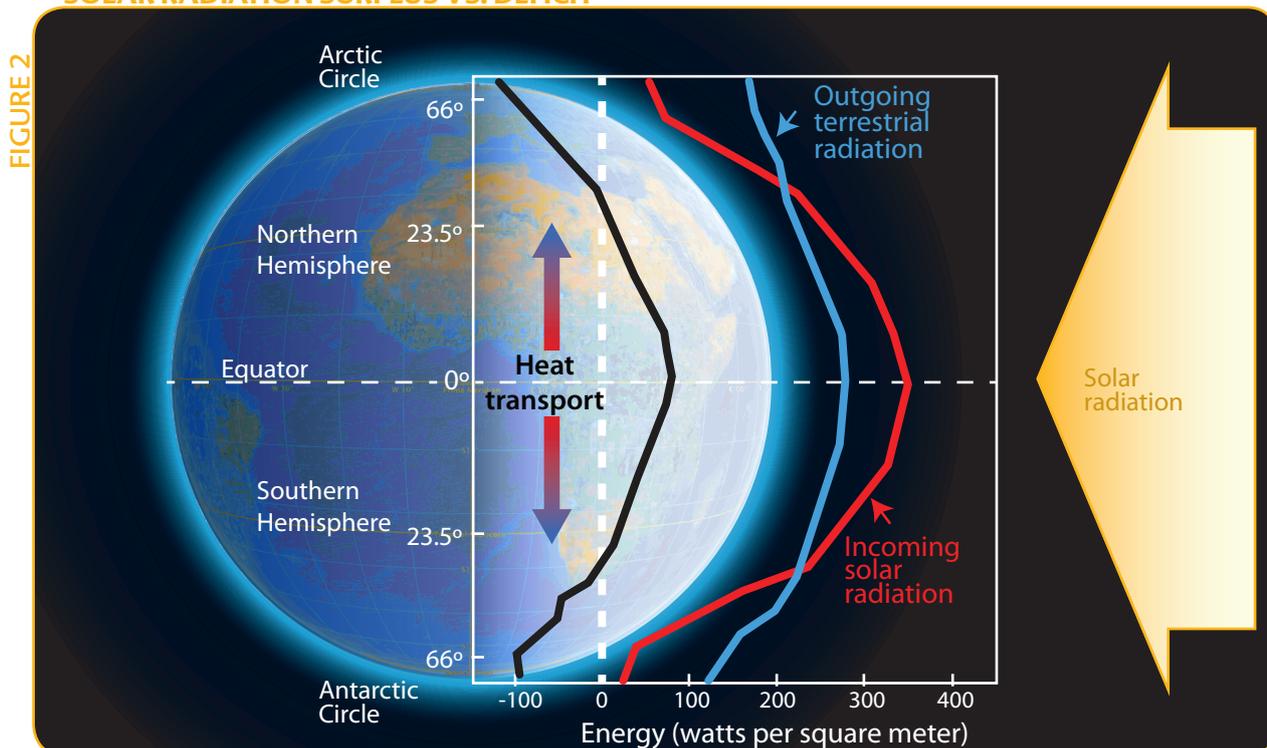
An enormous amount of energy from the Sun in the form of solar radiation hits the Earth between the tropics of Capricorn and Cancer (see Figure 1). Without any way to move this energy

away, the equator would be incredibly hot and inhospitable to life. On the other hand, because the Earth is a sphere, at the north and south poles less solar radiation is being received and more radiation is being reflected or released back into space. Without any additional energy input, these regions would be far too cold to support any kind of life whatsoever. However, both these regions remain liveable to human, animal, and plant species.

It can thus be said that the equator region has a constant surplus of solar radiation (which makes it hot) and the poles have a constant deficit (making it cold). The Earth's climate system provides the means to balance out the surplus and deficit of energy and heat. It uses the air and vapour in the atmosphere and water of the oceans to transport the energy around the globe to somewhat balance out the regional energy imbalance within the system (see Figure 2).

Generally speaking, the climate remains stable over long periods of time if the various elements within the system remain stable. However, if one or more of the components of the system is altered, the stability of the whole system is compromised and can lead to uncharacteristic behaviour and give rise to weather which is outside the usual range of expectations. This situation can be described as climate change.

#### SOLAR RADIATION SURPLUS VS. DEFICIT



The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural variability observed over comparable time periods.”

### Additional Resources

1. ‘The Climate System: An Overview’, A.P.M Baede, E. Ahlonsou, Y. Ding and D. Schimel, Chapter 1 of the Working Group 1 Report of the IPCC Third Assessment Report (TAR) Climate Change 2001: The Scientific Basis. Cambridge University Press, 2001. [http://www.grida.no/climate/ipcc\\_tar/wg1/pdf/TAR-01.pdf](http://www.grida.no/climate/ipcc_tar/wg1/pdf/TAR-01.pdf)
2. Intergovernmental Panel on Climate Change. <http://www.ipcc.ch/>
3. WMO home page for basic climate information for young people. [http://www.wmo.int/youth/climate\\_en.html](http://www.wmo.int/youth/climate_en.html)
4. WMO page on climate. [http://www.wmo.int/pages/themes/climate/index\\_en.php#](http://www.wmo.int/pages/themes/climate/index_en.php#)

## 1.2 What causes Climate Change?

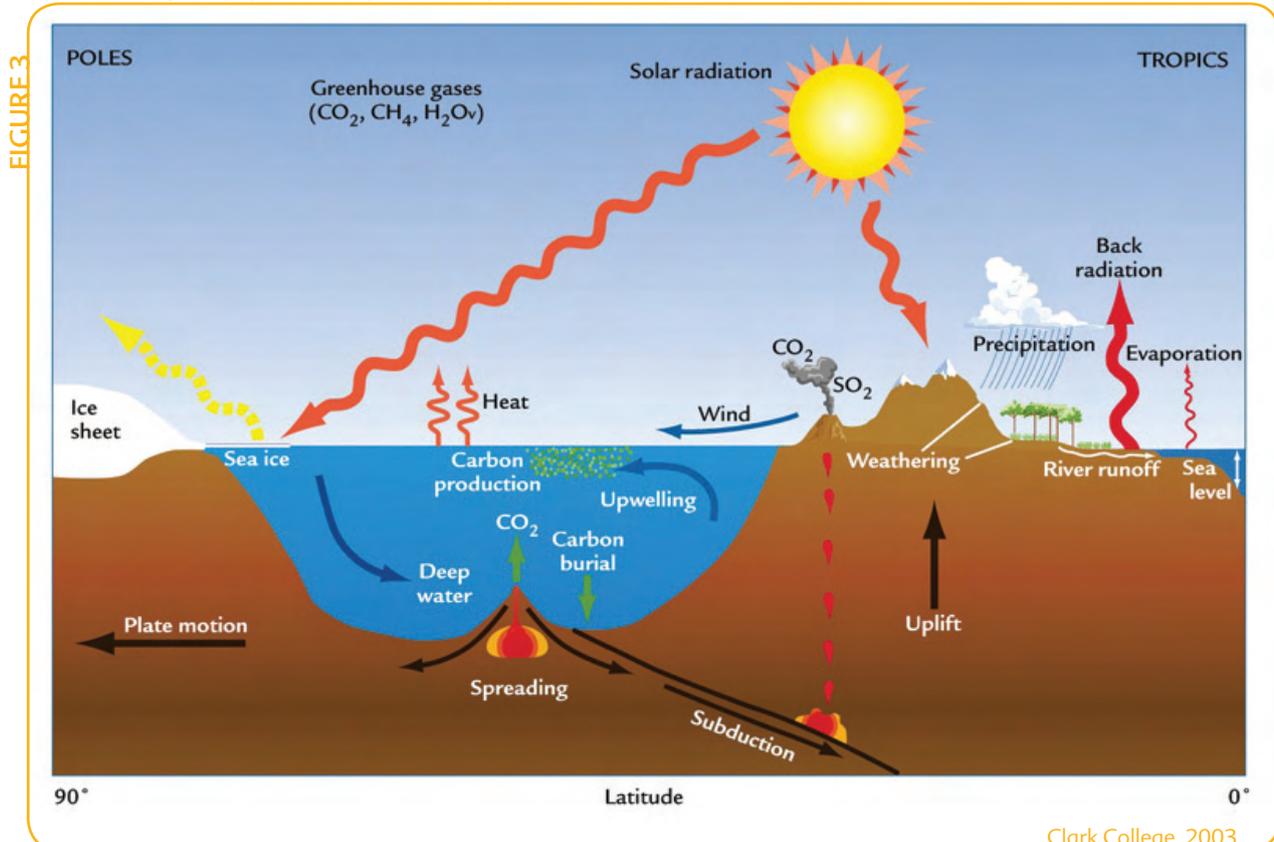
### How the climate works and how we know it is changing

In recent centuries, there has been much debate over the influences and triggers of the Earth’s radical climatic shifts from ice age to humid period and back again. Modern scientists have long suspected that human activity is capable of affecting the climate, and until recently, a comprehensive understanding of the complex processes that affect both the Earth’s energy balance and the energy flows within the global climate system remained elusive.

Fortunately, the last few decades have seen significant strides in Earth system science as scientists have made advances in quantifying the energy and material fluxes that determine the dynamics of these systems. This has enabled them to obtain a clearer understanding of how the climate functions, as well as a clearer picture of the factors that influence changes in the global climate system (see Figure 3).

The Earth’s climate is affected by a myriad of drivers that operate over different time scales

THE EARTH’S CLIMATE SYSTEM COMPONENTS



# Get the Facts:

## THE SCIENCE OF CLIMATE CHANGE

and result in different changes over various geographical scales and geological eras. The movement of heat around the Earth is accomplished via the global climate system, which comprises the atmosphere, the oceans, the ice sheets, the biosphere (all living organisms) and soils, sediments and rocks. The climate system is made up of numerous subsystems with many processes occurring within and between each subsystem. These complex interactions result in intermittent and constantly changing phenomena (e.g. El Niño and the North Atlantic Oscillation (see text box below).

The state of the Earth's climate is determined by the amount of energy stored by the climate system, and especially the balance between energy received from the Sun and the portion of this energy which the Earth releases back to space. This global energy balance is regulated in large part by the flows of energy within the global climate system.

There are four main known influences of larger long-term changes in the Earth's climate. These are: (i) changes in the Earth's orbit

### El Niño / La Niña (ENSO) and the North Atlantic Oscillation

El Niño/La Niña-Southern Oscillation, or **ENSO**, is a climate pattern that occurs across the tropical Pacific Ocean roughly every five years. It is characterized by variations in the temperature of the surface of the tropical eastern Pacific Ocean—warming or cooling known as El Niño and La Niña respectively—and air surface pressure in the tropical western Pacific—the Southern Oscillation. Mechanisms that cause the oscillation remain under study.

ENSO causes extreme weather (such as floods and droughts) in many regions of the world. The frequency and intensity of ENSO are potentially subject to dramatic changes as a result of global warming, and is a target for research in this regard.

**North Atlantic Oscillation:** A permanent low-pressure system over Iceland (the Icelandic Low) and a permanent high-pressure system over the Azores (the Azores High) control the direction and strength of westerly winds into Europe. The relative strengths and positions of these systems vary from year to year and this variation is known as the North Atlantic Oscillation.

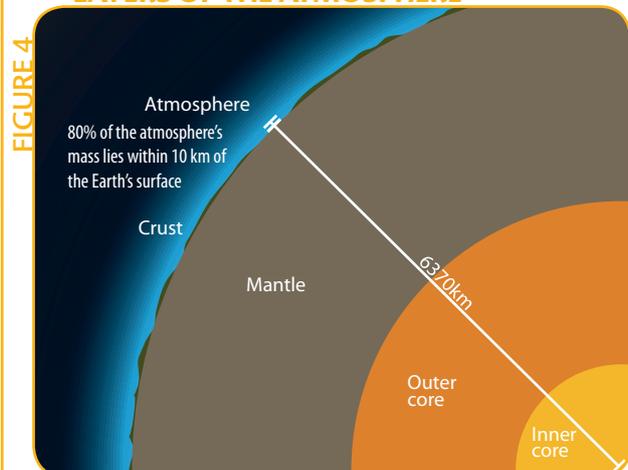
around the Sun, (ii) variations in the output of energy from the Sun, (iii) changes in ocean circulation resulting mainly from fluctuations in the upwelling of deep cold waters in the tropical Pacific Ocean, and (iv) changes in the composition of the atmosphere. Though the first three influences are beyond the control of humankind, the composition of the atmosphere has been altered by human activities for over 200 years.

### Composition of the atmosphere

The atmosphere is a comparatively thin layer of gases which fades rapidly away with altitude and does not have a definite top<sup>1</sup>. About 80% of the mass of the atmosphere is contained below 10 km of altitude (see Figure 4). Compared with the Earth's radius (6370 km) the atmosphere is just one sixth of one percent. Yet it is an extremely important multifunctional layer composed of numerous gases in varying proportions in different regions, and which serve different functions. It is predominantly made up of nitrogen (78%) and oxygen (21%). Besides water vapour, several other gases are also present in much smaller amounts (Carbon monoxide (formula CO), Carbon dioxide (CO<sub>2</sub>), Neon (Ne), Oxides of nitrogen, Methane (CH<sub>4</sub>), Krypton (Kr), and Ozone (O<sub>3</sub>)).

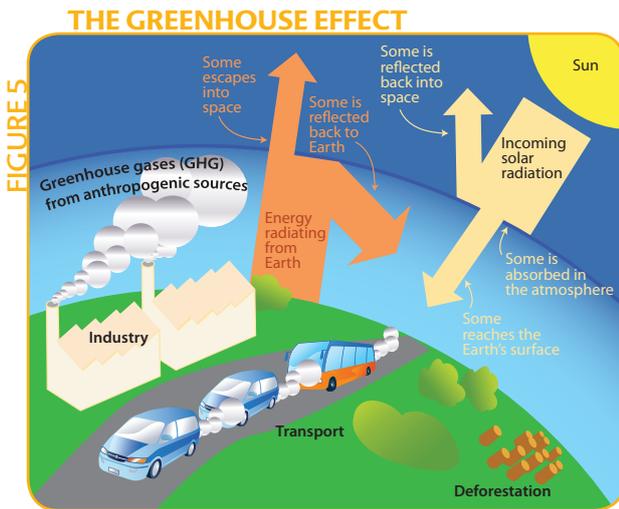
This mix of gases facilitates the multifunctional nature of the atmosphere, on the one hand allowing a portion of the solar radiation directed at the Earth to reach the surface, and on the other, inhibiting the escape of longwave radiation (in the form of heat) back out into space. This

### LAYERS OF THE ATMOSPHERE



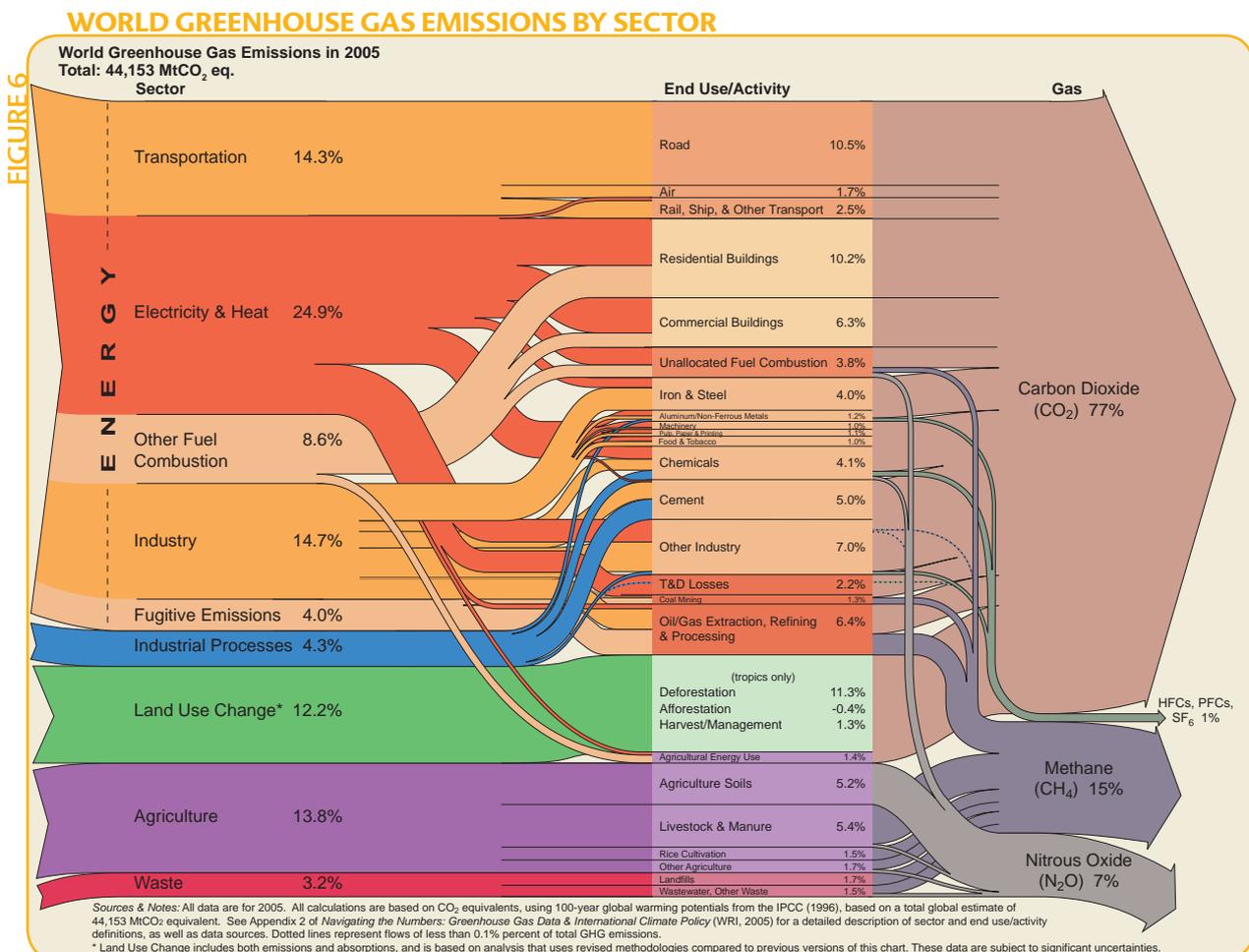
<sup>1</sup> If one considers the size of a standard classroom globe, the atmosphere would be approximately as thick as a coat of paint on its surface.

heat trapping function is what is known as the 'greenhouse effect' and is what keeps the Earth's surface in a suitable temperature range to sustain life as we know it (see Figure 5). After water vapour, the most important 'greenhouse gases' (GHG) are carbon dioxide, methane, and ozone.



These GHGs remain active in the atmosphere over long periods of time (see Table 1). Over shorter periods, gases and particles emitted in large volcanic eruptions, such as Mt. Pinatubo in 1991, can also affect the global climate (see 'The Effects...' text box). In contrast, the relative position and movement of continents, among other factors, also affects global climate but over millions of years.

Many GHG-emitting activities are now essential to the global economy and form a fundamental part of modern life. Carbon dioxide from the burning of fossil fuels is the largest single source of GHG emissions from human activities. The supply and use of fossil fuels accounts for about 80 percent of mankind's carbon dioxide (CO<sub>2</sub>) emissions, one fifth of the methane (CH<sub>4</sub>), and a significant quantity of nitrous oxide (N<sub>2</sub>O). In summary, the main contributing sectors to anthropogenic GHG emissions are electricity and heat (24.9%), industry (14.7%), transportation (14.3%) and agriculture (13.8%) (see Figure 6).



World Resources Institute, 2005.

# Get the Facts:

## THE SCIENCE OF CLIMATE CHANGE

### Measuring temperature changes

Since the late nineteenth century, various land and sea instruments have been used to measure, in a fairly accurate manner, the air temperature near the surface of the Earth. Over the last forty years, the addition of satellite instruments has provided extremely accurate temperature readings. Given that such direct measurements and records of temperature and other climate variables exist for only a fraction of the Earth's history, longer perspectives on the evolution of climate must be studied through climate-dependent natural phenomena, the clues of which can be found in tree rings, ice cores and sea floor sediments (see Figure 7).

During the twentieth century, the accelerated rate of discoveries and controversies surrounding Earth System complexities provoked increasing interest among scientists, particularly regarding a significant trend in global warming. Scientists began investigating the extent to which human activity could have provoked this and other large changes in the Earth's system. For the last twenty-five years, tens of thousands of researchers and leading scientists have lent their expertise toward the intensive investigation and scientific analysis of these phenomena — facilitated and inspired by the Intergovernmental Panel on Climate Change — in an attempt to determine the sources of GHG, monitor ongoing changes to the global climate, and understand their potential environmental and socio-economic impacts.

Over the past century, the Earth's surface and the lowest part of the atmosphere have witnessed a warming of about  $+0.76^{\circ}\text{C}$ . In fact, since records began in the early 1860s — the height of the industrial revolution — globally averaged surface temperatures have been continuously rising. In the past two decades, the pace at which average global temperatures have risen has accelerated to an equivalent rate of  $1.0^{\circ}\text{C}$  per century. Nine of the warmest years on record have occurred in the last decade (see Figure 8, next page). During this period of recorded global warming, the concentration of greenhouse gases in the atmosphere has also increased. This increase is directly associated with human activities, namely the burning of fossil fuels for energy and transportation, as well as deforestation and other land-use changes. In the last twenty years, concern has grown that these two phenomena are, at least in part, highly correlated. The warming of the Earth's surface that has taken

place since the 1970s is now considered explicable only as the result of humanity's greenhouse gas emissions.

### Current scientific consensus

In 2003, the American Geophysical Union concluded that 'It is scientifically inconceivable that — after changing forest into cities, putting dust and soot into the atmosphere, putting millions of acres of desert into irrigated agriculture, and putting greenhouse gases into the atmosphere — humans have not altered the natural course of the climate system.'<sup>2</sup> While the subject of climate change remains a very complex and highly debated matter (both publicly and politically), global warming is an undeniable fact. Moreover, the balance of evidence now firmly indicates that there is a discernible

<sup>2</sup> American Geophysical Union, *Eos* 84(51), 574 (2003).

### The Effects of Volcanic Eruptions

In 1990, Mt. Pinatubo injected 20 million tons of sulfur dioxide into the stratosphere, which was observed around the globe in the equatorial region. The result of this was that average hemispheric temperatures dropped by  $0.2\text{--}0.5^{\circ}\text{C}$  for a period of 1-3 years.



© NASA Goddard Photo and Video

### ICE CORE SAMPLES

FIGURE 7



© brookpeterson

human influence on the global climate; put simply, humans have contributed to observed global warming.<sup>3</sup> The current consensus of the scientific community is that the following fundamental conclusions provide only a glimpse of the changes that future generations will have to accept and face:

- The planet is warming due to increased concentrations of heat-trapping gases in our atmosphere.
- Most of the increase in the concentration of these gases over the last century is due to human activities, especially the burning of fossil fuels and deforestation.
- Natural causes always play a role in changing Earth's climate, but are now being overwhelmed by human-induced changes.
- Warming the planet will cause many other climatic patterns to change at speeds

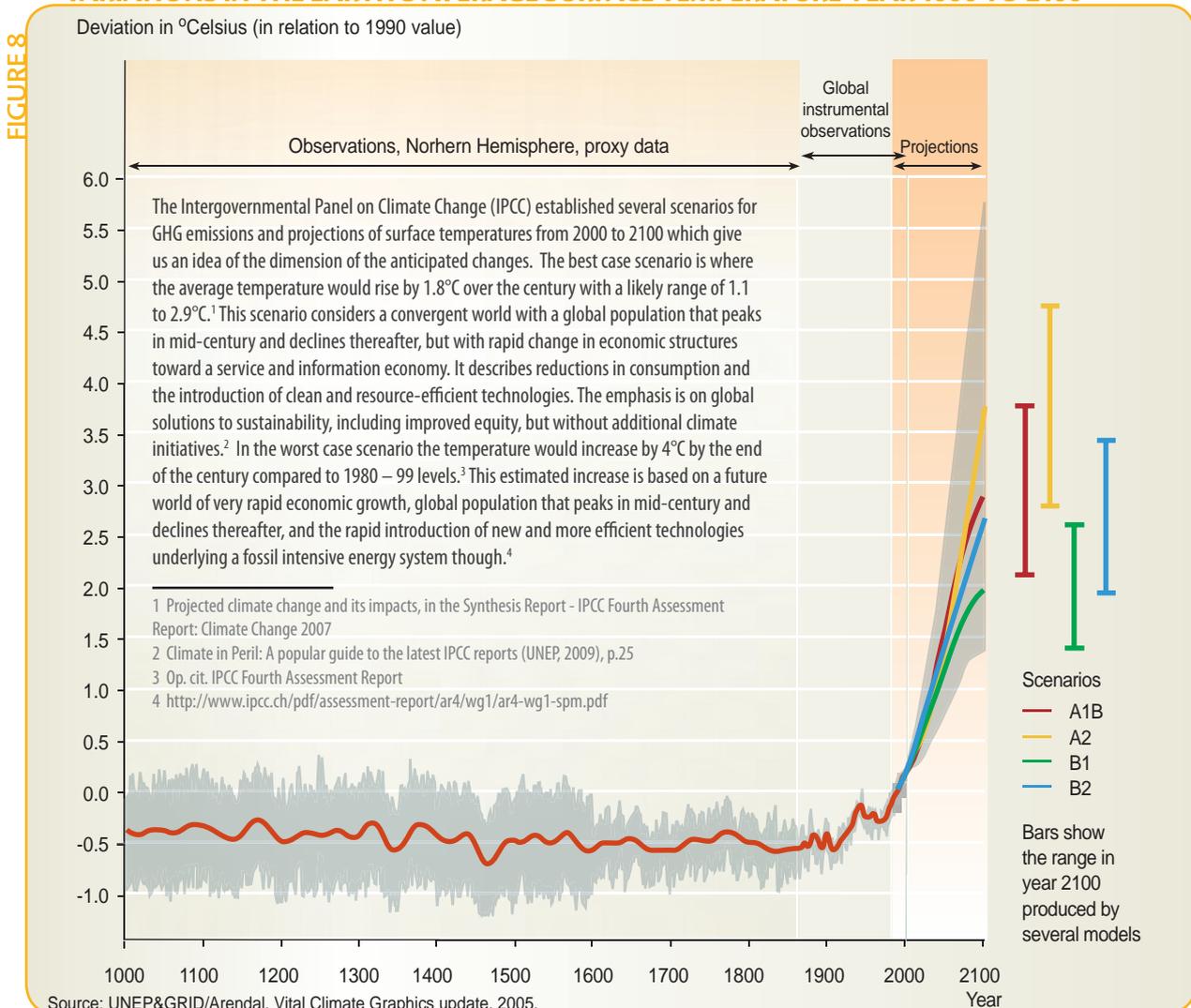
3 R.K. Pachauri and A. Reisinger (eds) Climate Change 2007: Synthesis Report, IPCC, p. 104.

### RELATIVE CONTRIBUTIONS OF MAJOR GHGS TO THE GREENHOUSE EFFECT AND ATMOSPHERIC LIFETIMES

GHG	Contribution (%)	Mean lifetime
Water vapour	36% to 66%	9 days
Carbon dioxide	9% to 26%	Tens of thousands of years
Methane	4% to 9%	12 years
Ozone	3% to 7%	9–11 days

Note: 'The determination of CO<sub>2</sub>'s atmospheric lifetime is often grossly underestimated because it incorrectly ignores the balancing fluxes of CO<sub>2</sub> from the atmosphere to other reservoirs – as it is removed by mixing into the ocean, photosynthesis, or other processes. It is the net concentration changes of the various GHG by all sources and sinks that determines atmospheric lifetime and not simply the removal processes.' From: D. Archer, 'Fate of fossil fuel CO<sub>2</sub> in geologic time', Journal of Geophysical Research 110(C9): C09S05.1–5.6, 2005.

### VARIATIONS IN THE EARTH'S AVERAGE SURFACE TEMPERATURE YEAR 1000 TO 2100



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# Get the Facts:

## THE SCIENCE OF CLIMATE CHANGE

unprecedented in modern times, including increasing rates of sea level rise and alterations in the hydrologic cycle. Rising concentrations of carbon dioxide are also making the oceans more acidic.

- Climate change impacts are already being observed, including more frequent and extreme weather patterns, changes in plant growth affecting agriculture and food production, loss of plant and animal species unable to adapt or migrate to changing conditions, changes in the spread of infectious diseases in terms of the rate and the expansion of ranges, changes in the flow of ocean currents, and changes in seasons.
- The combination of these complex climate changes threatens coastal communities and cities, our food and water supplies, marine and freshwater ecosystems, forests, high mountain environments, and far more.<sup>4</sup>

### Additional Resources

1. Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, 2007.
2. Climate Change Science Compendium 2009, C. McMullen and J. Jabbour (eds) United Nations Environment Programme, EarthPrint, 2009. <http://www.unep.org/compendium2009/>
3. Understanding Climate Change: A Beginner's Guide to the UN Framework Convention and its Kyoto Protocol. UNEP, 1999. <http://www.unep.org/dec/docs/info/ccguide/beginner-99.htm>

### 1.3 What has changed so far?

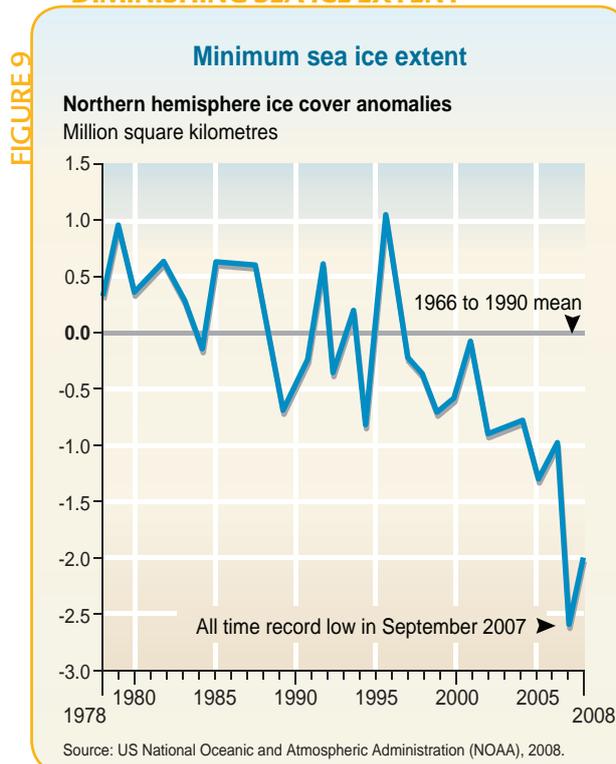
Observations show that warming of the climate is unequivocal. The global warming of the past fifty years is due primarily to human-induced increases of greenhouse gas (GHG) emissions. These emissions come mainly from the burning of fossil fuels (coal, oil and gas), with additional contributions from the clearing of forests, agricultural practices, and other activities. The effects of human activities have also been identified in many other aspects of the climate system, including changes in ocean heat content,

<sup>4</sup> 'Climate Change and the Integrity of Science', J. Sills, Science 328: 691–92, 2010.

precipitation, atmospheric moisture and Arctic sea ice.

This conclusion rests on multiple sources of evidence. First, the examination of records of climate changes over the last 1,000 to 2,000 years show that global surface temperatures over the last several decades were higher than at any time during at least the past 400 years (1,000 years for the Northern Hemisphere). A second source of evidence is our increased understanding of how GHGs trap heat, how the climate system responds to increases in GHGs, and how other human and natural factors influence climate. As result of this knowledge, there is a broad qualitative consistency between observed changes in climate and the computer model simulations of how climate would be expected to change in response to human activities. Finally, there is extensive statistical evidence. The community of scientists reporting to the IPCC in 2007 identified 765 significant observed changes in the physical system (snow, ice and frozen ground, hydrology and coastal processes) of which 94 per cent were consistent with climate change. Similarly, observations of biological systems (terrestrial, marine and fresh water) produced 28,671 significant observed changes with a 90 per cent agreement with expected impacts of climate change.

### DIMINISHING SEA ICE EXTENT



## Increasing warming

As already mentioned, the global average surface temperature has risen by about 0.76°C since the year 1900, with much of this increase occurring since 1970. The estimated change in the Earth's average surface temperature is based on measurements from thousands of weather stations, ships and buoys around the world, as well as from satellites. These measurements are independently compiled, analysed and processed by different research groups. The warming trend that is apparent in all of these temperature records is confirmed by other independent observations, such as the melting of Arctic sea ice (see Figure 9, next page), the retreat of mountain glaciers on every continent, reductions in the extent of snow cover, increased melting of the Greenland and Antarctic ice sheets, and earlier blooming of plants in spring.

The temperature increase is spread across the globe and is greater at higher northern latitudes. Average Arctic temperatures have increased at almost twice the global average rate in the past 100 years. Land regions have warmed faster than the oceans. Observations show that the average temperature of the global ocean has increased to depths of at least 3,000 metres and that the

ocean has been taking up over 80 per cent of the heat being added to the climate system. Satellite measurements of air temperatures at high elevations show warming rates similar to those observed in surface temperature.

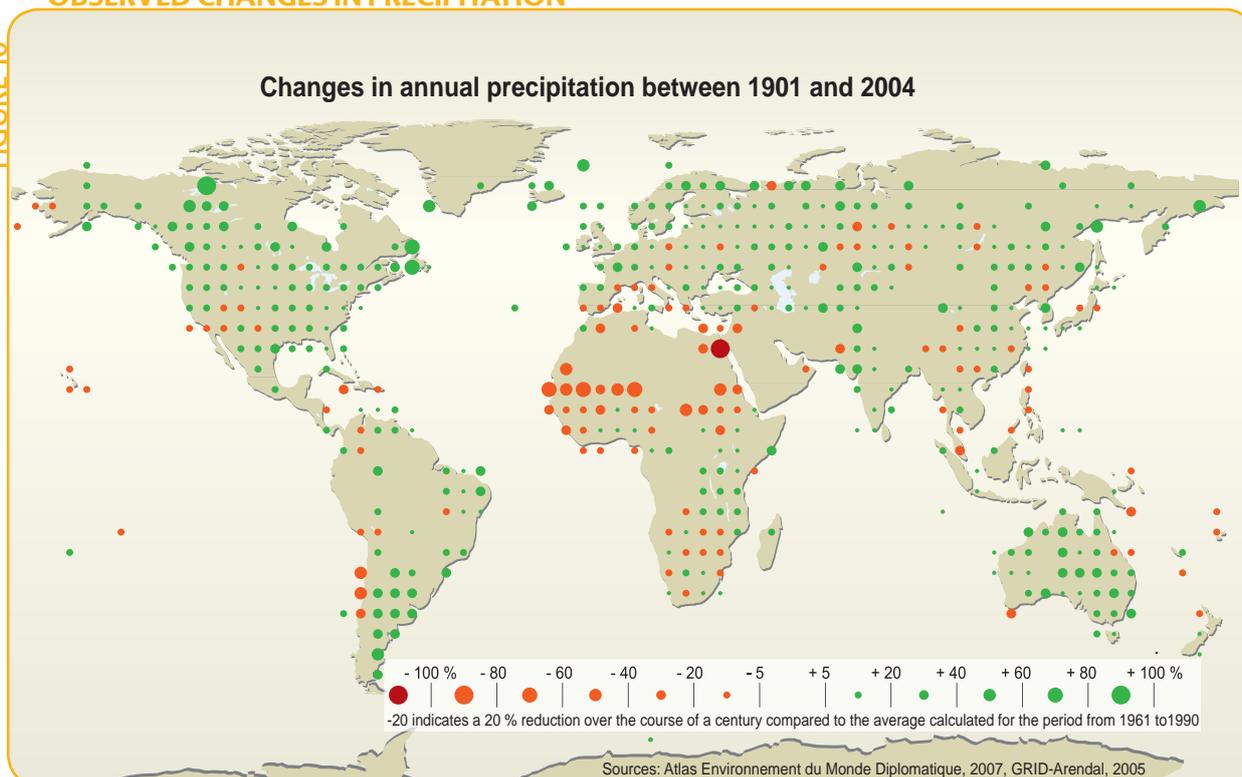
## Changing precipitation patterns

Globally, precipitation shows a minor upward trend with most of the increase taking place during the rainy season. On a regional basis, increases in annual precipitation have occurred in the higher latitudes of the Northern Hemisphere and southern South America and northern Australia. Decreases have occurred in the tropical region of Africa, and southern Asia. The measured changes in precipitation are consistent with observed changes in river flows, lake levels and soil moisture (where data are available and have been analysed) (see Figure 10).

Scientists have also noted changes in the amount, intensity, frequency and type of precipitation. Pronounced increases in precipitation over the past 100 years have been observed in eastern North America, southern South America, Asia and northern Europe. Decreases have been seen in the Mediterranean, most of Africa and southern Asia. The amount

### OBSERVED CHANGES IN PRECIPITATION

FIGURE 10



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## THE SCIENCE OF CLIMATE CHANGE

of rain falling in the heaviest downpours has increased approximately 20 per cent on average in the past century, and this trend is very likely to continue, with the largest increases in the wettest places. Evidence of increasing cyclone and hurricane strength has been documented and linked to rising sea surface temperatures and warming air (see Figure 11).

Changes in the geographical distribution of droughts and flooding have been complex. In some regions, there have been increases in the occurrence of both droughts and floods. As the world warms, northern regions and mountainous areas are experiencing more precipitation falling as rain rather than snow. Widespread increases in heavy precipitation events have occurred, even in places where total rain amounts have decreased.

### Widespread water concerns

Climate change has already altered the water cycle, affecting where, when and how much water is available for all uses. Further, it will likely

be the case that there will be too little water in some places, too much water in other places, and degraded water quality — and some locations are expected to be subject to all of these conditions during different times of the year. Water cycle changes are expected to continue and to adversely affect hydroelectricity production, drinking water availability, human health, transportation, agriculture and ecosystems.<sup>5</sup>

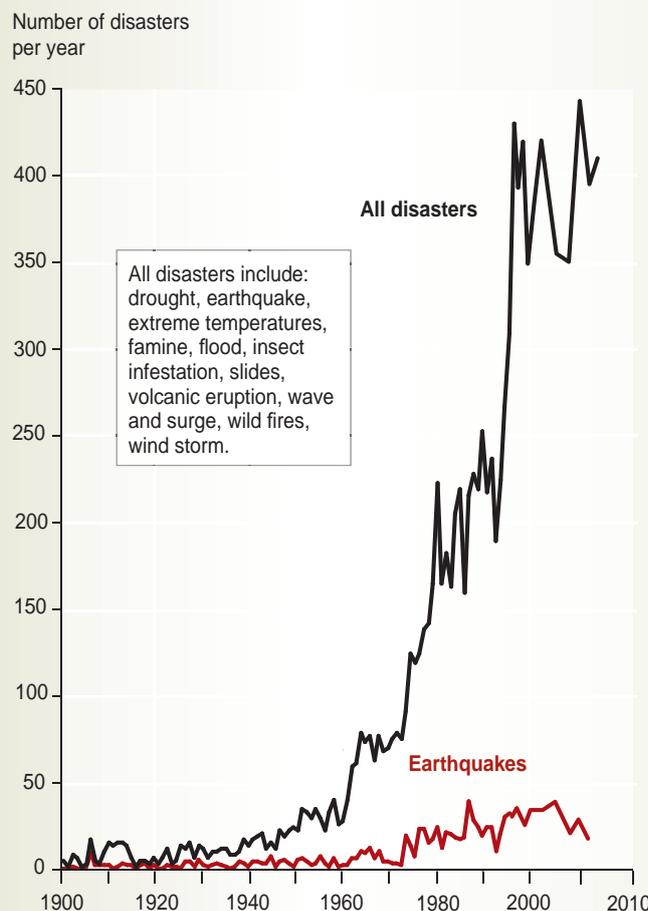
### Vulnerable ecosystems

Climate change is affecting many ecosystems around the world. Perhaps the most publicized of all the impacts of global warming are Arctic ecosystems that rely on sea ice, which is vanishing rapidly and is projected to disappear entirely in summertime within the twenty-first century. Algae that bloom on the underside of the sea ice form the base of a food web linking

<sup>5</sup> These changes are associated with the fact that warmer air holds more water vapour evaporating from the world's oceans and land surface. This increase in atmospheric water vapour has been observed from satellite measurements.

### INCREASED NUMBER OF WEATHER-RELATED DISASTERS

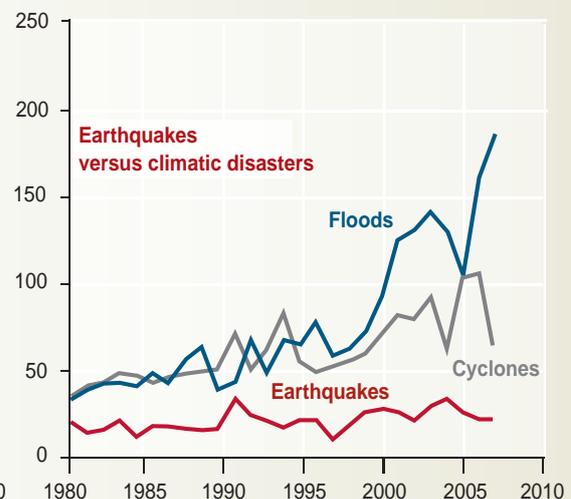
FIGURE 11



Source: CRED Annual Disaster Statistical Review 2006, 2007.

### Trends in number of reported disasters

Much of the increase in the number of hazardous events reported is probably due to significant improvements in information access and also to population growth, but the number of floods and cyclones reported is still rising compared to earthquakes.



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microscopic animals and fish to seals, whales, polar bears and people. As the sea ice disappears, so too do these algae. The ice also provides a vital platform for ice-dependent seals (such as the ringed seal) to give birth, nurse their pups and rest. Polar bears use the ice as a platform from which to hunt their prey. The walrus rests on the ice near the continental shelf between its dives to eat clams and other shellfish. As the ice edge retreats away from the shelves to deeper areas, there will be no clams nearby.

Observed and documented impacts of climate change include sea level rise that threatens coastal habitats and human settlements; increased sea surface temperature with more frequent ocean heat waves that cause coral bleaching and death (see Figure 12); ocean acidification (due to increased absorption of carbon dioxide (CO<sub>2</sub>) by sea surface waters) hampering shell formation and coral reefs (see Figure 13); melting of glaciers and snow caps, including rapid retreat of tropical glaciers and loss of natural water regulation function (see Figure 14); higher frequency of forest fires; spread of disease and pests to areas naturally protected by climate conditions; changes in plant productivity and potential mismatch of interlinked symbiotic life cycles and many more.

### Forests: Climate change beneficiaries?

The climate has a strong influence on the processes that control growth and development in ecosystems. Increases in temperature generally speed up plant growth, rates of decomposition, and the speed at which the cycling of nutrients occurs, although other factors, such as whether sufficient water is available, also influence these rates. Forest growth has risen over the past several decades as a consequence of a number of factors: young forests reaching maturity, temperature

increases, an increased concentration of CO<sub>2</sub> in the atmosphere, a longer growing season, and increased deposition of nitrogen from the atmosphere. Separating the effects of each factor remains a challenge.

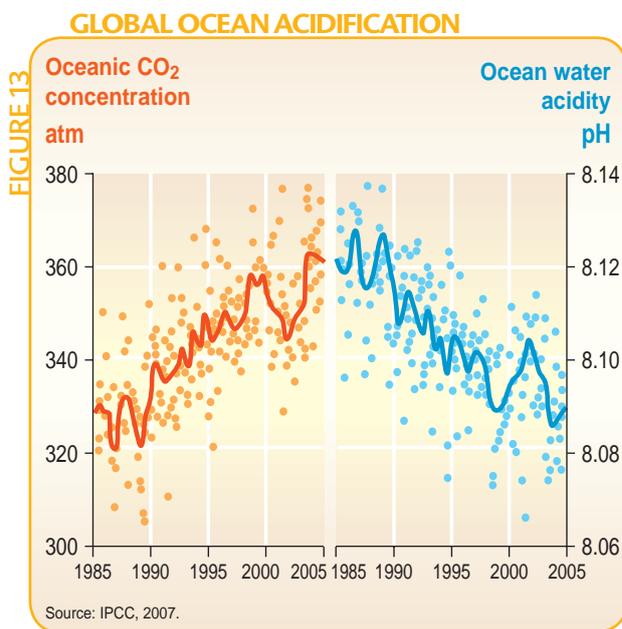
A higher concentration of atmospheric CO<sub>2</sub> causes trees and other plants to capture more carbon from the atmosphere, but experiments show that trees convert much of this extra carbon into producing fine roots and twigs rather than new wood. The effect of CO<sub>2</sub> in increasing growth thus seems to be relatively modest, and is generally seen most strongly in young forests on fertile soils where there is also sufficient water to sustain this growth. Wherever droughts increase, forest productivity will decrease and tree death will increase.

### Additional observed impacts

Other changes that are consistent with the warming observed over the past several decades and which are not mentioned above include:

- Reductions in lake and river ice
- Changes in soil moisture and runoff
- Changes in the extent of permafrost
- Changes in food chains in marine ecosystems
- Massive extinction of species
- Early flowering
- Increase weather variability.

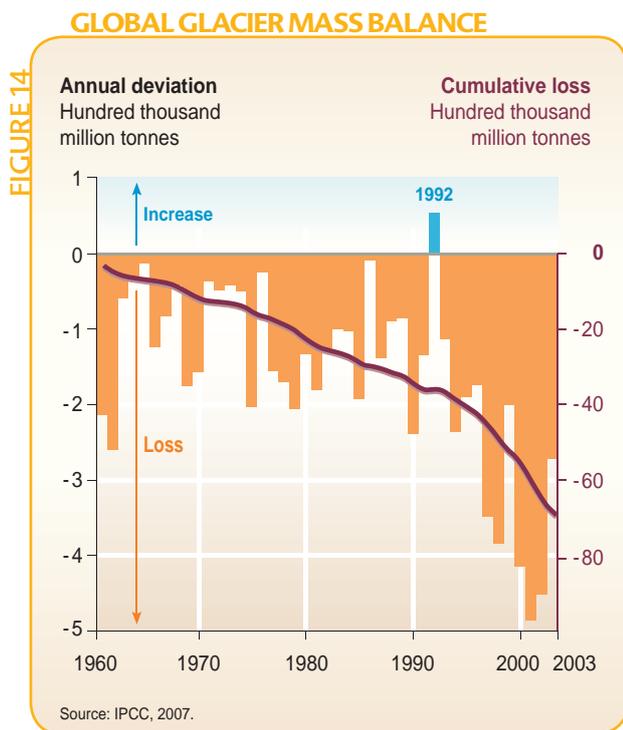
Though many uncertainties remain and surprises are expected, it is evident that each of the impacts listed above are not occurring in isolation. Each one has consequences that can



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and likely will induce a chain of impacts, small or large, between the interlinked ecosystems in every region and on every continent. Similar to tracking disruptions upward in the food chain, these consequences will filter their way up through the flora, fauna and diverse species to ultimately exert their combined impact on human society. The question remains as to how humankind will react to the climate change threat and what preparations will be made to meet the challenges posed by an uncertain and unpredictable future climate.

[↪ back to Facilitation Guide:  
The Science of Climate Change](#)

[↪ back to Handout 2:  
The Science of Climate Change](#)

### Additional Resources

1. National governments have reported local observations of climate change, as well as their vulnerabilities to the effects of global warming, to the United Nation Framework Convention on Climate Change (UNFCCC). [http://unfccc.int/national\\_reports/items/1408.php](http://unfccc.int/national_reports/items/1408.php)
2. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Core Writing Team, Pachauri, R.K. and Reisinger, A. (Eds.) IPCC, Geneva, Switzerland. [http://www.ipcc.ch/publications\\_and\\_data/publications\\_ipcc\\_fourth\\_assessment\\_report\\_synthesis\\_report.htm](http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm)
3. Climate in Peril: A Popular Guide to the Latest IPCC Reports. UNEP/GRID Arendal, 2009. <http://www.grida.no/publications/climate-in-peril/>

## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE IN THE CLASSROOM



## Day Two At-A-Glance

Sample Schedule (Duration)	Session	Materials Needed
9:00 - 9:30 (30 minutes)	Revisiting Day One	<ul style="list-style-type: none"> <li>• PowerPoint slide 2</li> </ul>
9:30 - 9:45 (15 minutes)	Input: Key Concepts in Futures Learning	<ul style="list-style-type: none"> <li>• PowerPoint slides 3-4</li> </ul>
9:45 - 10:30 (45 minutes)	Activity: Picturing the Future	<ul style="list-style-type: none"> <li>• One half-sheet of plain paper per participant</li> <li>• One marker, crayon or pencil per participant</li> </ul>
10:30 - 10:50 (20 minutes)	Break	
10:50 - 12:00 (70 minutes)	Activity: Climate Futures Wheel	<ul style="list-style-type: none"> <li>• Large sheet of chart paper and two markers of different colours per group of 3-4 participants</li> <li>• One Copy of Handout 1 per group</li> <li>• Pins and/or adhesive tape</li> <li>• PowerPoint slide 5</li> </ul>
12:00 - 13:00 (60 minutes)	Lunch	
13:00 - 14:15 (75 minutes)	Activity: Climate Change Future Scenarios (2030)	<ul style="list-style-type: none"> <li>• One cut-up set of Handout 2 (scenarios) per groups of 3-4 participants</li> <li>• One sheet of chart paper, marker and glue stick per group</li> <li>• One copy of Handout 3 per participant</li> <li>• PowerPoint slide 6</li> </ul>
14:15 - 14:30 (15 minutes)	Input: Intergenerational Justice and Accountability	<ul style="list-style-type: none"> <li>• PowerPoint slides 7-9</li> </ul>
14:30 - 15:10 (75 minutes)	Activity: Inheritance	<ul style="list-style-type: none"> <li>• One copy, printed both sides, of Handout 4 (Inheritance) per participant</li> </ul>
15:10 - 15:25 (15 minutes)	Break	
15:25 - 15:35 (10 minutes)	Reading	<ul style="list-style-type: none"> <li>• One copy of Handout 5 ('Climate Change: Two Histories of the Twenty-First Century')</li> </ul>
15:35 - 16:00 (25 minutes)	Activity: A Future in the Curriculum Brainstorm	<ul style="list-style-type: none"> <li>• Flip chart and marker</li> <li>• PowerPoint slides 10-11</li> </ul>
16:00	Close	<ul style="list-style-type: none"> <li>• Handout 6</li> <li>• Day Two 'Classroom Activities'</li> <li>• Day Three Handout 3 ('Climate Change Adaptation Stories') for overnight reading</li> </ul>

## Day Two Facilitation Guide

This module explores teaching and learning about climate change across time, especially the present and the future. This module introduces the concept that just as previous generations shaped the past and life today, the current generation shapes the present and the future. Participants envision the future within a context of climate change, creating a variety of scenarios—some desirable and others undesirable. Themes such as intergenerational justice and accountability are woven into this day and throughout the module. Desirable and undesirable futures are used as entry points for practical community based engagement. The module ends with an examination of the practical considerations of methods to insert reflections and projections of the future into the secondary curriculum.

[Click to consult the Summary of what is learned on Day Two](#) 

### 9:00-9:30 Revisiting Day One

With slide 2 showing, facilitator leads a two-part discussion, opening each part with one of the following questions:

- As you wrote your reflections diary entry for Day One did any issues and questions arise that you would like to raise with the group?
- Do you have any questions concerning the classroom activities for Day One in your activities file?

[Click to download the Powerpoint slides in pptx format for Day Two](#) 

### 9:30-9:45 Input: Key Concepts in Futures Learning

- Speak about the concepts of Probable, Feasible and Preferred futures (slide 2)
- Speak about the idea of the future as a zone of potential (slide 3); draw from the 'Futures Dimension to Climate Change Learning' section of the Conceptual Framework

[Click to consult the Powerpoint slides for Day Two](#) 

### 9:45-10:30 Activity: Picturing the Future

#### Time Needed

- 45 minutes (10 minutes for drawing; 15 minutes for circulating; 20 minutes for discussion).

#### Objectives/Explanation

- To give students an opportunity to consider and envision the future and learn of others' visions of the future
- To practice working with some key concepts in futures thinking
- To enquire into how much climate change is intruding into personal and collective images and visions of the future

#### Materials Needed

- One half-sheet of plain paper per participant
- One marker, crayon or pencil per participant

#### Procedure

1. Ask participants to sit quietly on their own, think about the future, and then draw their images and visions on the half-sheet of paper. Repeat the instruction but do not elaborate further.
2. Ask them to interpret the task in their own way and to represent the future only through drawings, not writing. They should not worry about the quality of their artwork!
3. The drawing completed, ask participants to move around the room and form pairs or small groupings, explaining their drawings and learning about the images and visions of colleagues. They should try to form different pairs and small groupings in the time available so they meet with a good cross-section of participants.
4. The facilitator leads a group discussion on what participants found out.

[Click to consult the Conceptual Framework text on 'the Futures Dimension to Climate Change Learning'](#) 

**10:30-10:50 Break**

**10:50-12:00 Activity: Climate Futures Wheel**

**Time Needed**

- 70 minutes (35 minutes for Stage 1; 35 minutes for Stage 2)

**Objectives/Explanation**

- To consider the range of probable and possible near and mid-term consequences (and knock-on effects) arising with the onset of increasingly severe climate change
- To explore the likely interplay between the consequences and so encourage systemic thinking about climate change impacts

**Materials Needed**

- Large sheet of chart paper and two markers of different colours per group of 3-4 participants
- One copy of the relevant regional page of Handout 1 per group
- Pins and/or adhesive tape

 Click to consult Handout 1

**Procedure**

**Stage 1**

1. Invite participants to form groups of three or four (making sure to work with people they have not worked with yet) and distribute the chart paper and markers.
2. Show slide 5.
3. Ask groups to write the words 'Climate Change in (name of place, country or region)' in the centre of the sheet and to draw a circle around the words. They should use only one colour of marker.
4. Ask them to consider likely concrete effects of climate change in their place/region, to draw single lines radiating out from the central circle, write in each of the effects, and draw a circle around each.
5. Have them then consider the possible repercussions from the first set of consequences (the first-order consequences). This time they draw double lines radiating out to one or more second-order consequences arising from each first-order consequence.
6. Encourage them to go on and write in and circle third-, fourth- and even fifth-order consequences.
7. Ask groups to consider how different consequences might work together to magnify the consequences for human communities and the severity of climate change. The consequences should be linked by drawing a two-way arrow between the consequences concerned, with an explanation written in. For this the second marker should be used.

 Click to consult slide 5

**Facilitation Guidance**

The futures wheel device helps show how immediate consequences of climate change will themselves trigger a range of knock-on effects. In itself it is not much of an aid to discerning interrelationships between effects. This is why the corrective of using a second marker to identify how consequences are linked is employed. The linking stage of the activity will show how various combinations of consequences can exacerbate the climate change threat; also how combinations of consequences can themselves become key drivers in accelerating climate change. The facilitator might focus on the following in the debriefing discussion:

- Differences in group presentations (interpretations, emphases, omissions)
- The problematic nature of forecasting given the variables, unknowns and uncertainties of complex systems; in particular, forecasting local manifestations
- Interrelationships between consequences that participants felt other groups had overlooked

**Stage 2**

1. Have groups stick or pin their charts on the classroom wall or pin board, and invite everyone to go read the work of other groups.
2. Lead a whole group debriefing discussion.

## Variations

- Collect articles on local or regional climate change happenings and have groups stick the article in the centre of the sheet.
- Have groups choose a specific local or regional climate change event and have them write it in the centre circle.

**12:00-13:00 Lunch**

**13:00-14:15 Activity: Climate Change Future Scenarios (2030)**

### Time Needed

- 75 minutes (30 minutes in initial groups, 20 minutes in combined groups, 25 minutes in whole group discussion)

### Objectives/Explanation

- To examine a collection of climate-changed future scenarios and consider their credibility and desirability
- To reflect on what, if anything, should be done now in anticipation of the scenarios

### Materials Needed

- One cut-up set of scenarios (Handout 2) per group of three-four participants
- One sheet of chart paper, marker and glue stick per group
- One copy of Handout 3 per participant

### Procedure

1. Invite participants to form new groups of three/four members.
2. Distribute a set of scenarios to each group (which they are to place them on the table upside down like a pack of cards).
3. Show slide 6 and ask each group to copy the slide onto their chart paper using all the paper space available.
4. Ask members of each group to take it in turns to pick up a card and read out the future scenario on the card. [Stress that all scenarios that are suggested are seen as having their roots in climate change.] The group should discuss the scenario and try to reach agreement as to whether what is being predicted is Likely and Desirable or Likely but Undesirable or Unlikely but Desirable or Unlikely and Undesirable. They paste the scenario on the appropriate line on the chart. If group members are unable to reach agreement, they place the scenario on the Can't Agree line. They then move on to the next scenario...
5. When all the statements have been placed, ask each group to join with another group to explain and discuss their decisions.
6. Conduct a whole group discussion.

### Facilitation Guidance

This activity works on two levels. First, it is about engaging with a range of scenarios set in a climate-changed future. Second it is about engaging with the perspectives and value positions of colleagues as they surface in the discussion of the scenarios.

In the whole group debriefing, the facilitator should first ask about scenarios that engendered the most debate and discussion (the Can't Agree scenarios). Where did the disagreement lie? What was at the root of the disagreement? Different perspectives? Different values?

Participants should also be asked whether they found that the scenarios fell into categories, and, if so, what the categories might be. Having sought and discussed suggestions, Handout 3 should be distributed. The four broad scenarios it contains come from a downloadable Forum for the Future document (which is also the source of the scenarios in Handout 2). Participant responses to the categories should be encouraged. Do they agree with them? Do they prefer their earlier suggestions?

Finally, the discussion should be reminded that future scenarios are, more than anything, tools to make us think about the present and our actions in the present. If a scenario is Likely and Desirable what do we need to do now to ensure it happens? If a scenario is Likely but Undesirable what do we need to do now to help ensure it doesn't happen? If a scenario is Unlikely but Desirable what do we need to do? If a scenario is Unlikely and Undesirable is there anything we should be doing or can we just let things lie? The discussion will work better if the group considers one or more particular scenarios falling under each heading.

[Click to consult Handout 2](#) 

[Click to consult Handout 3](#) 

[Click to consult slide 6](#) 

**14:15-14:30 Input: Intergenerational Justice and Accountability**

 Click to consult slides 7-9

- Introduce the aboriginal idea of seven generations (slide 7)
- Explain the concepts of intergenerational justice and accountability (slides 8, 9)
- Ask participants who they think should most take heed of the idea of intergeneration justice (who does the writer of slide 8 particularly have in mind?)
- Take any questions

**14:30-15:10 Activity: Inheritance**

**Time Needed**

- 40 minutes (10 in role as young people today; 20 in role as young people in 2050 (including letter writing); 10 reading out letters)

**Objectives/Explanation**

- To introduce an approach to intergenerational justice and accountability for classroom use
- To introduce the idea of future history or ‘history backwards

**Materials Needed**

- One copy, printed both sides, of the two-page Inheritance sheet (Handout 4) per participant

**Procedure**

1. Distribute the Inheritance sheet.
2. Ask participants to put themselves into the role of present-day young people, circulate around the room, and ask each other in what ways earlier generations have improved the lives of their generation and in what ways they have reduced the quality of life for their generation. Positive inheritances are listed in the left-hand column; negative inheritances in the right-hand column.
3. Now ask participants to put themselves into the role of young people living in the climate-changed world of 2050. They circulate around the room again and (staying in role) share thoughts on how the previous two generations have, on the one hand, enhanced their life quality and, on the other, passed on a reduced inheritance. The two columns on the second copy of the Inheritance chart are completed.
4. Invite participants to form groups of three, to sit, and (still in role) compose a ‘To Whom it May Concern’ letter to someone living in the 2010s. In the letter they point out what was being done and what was not being done to ensure an equal quality of life and well-being for their generation. Important here is to ask participants to decide to whom the letter should be addressed in 2010. It can go to any person, group of people (of whatever size) or organization in their country or around the world that they hold to be particularly responsible for any loss of quality of life for their generation.
5. Ask each group to read out their letter and reveal to whom they have addressed it.

**Facilitation Guidance**

This can be a powerful, emotional experience, especially in the reading of the letters. It is best not to debrief the activity but just let it stand as an experience.

 Click to consult Handout 4

**15:10-15:25 Break****15:25-15:35 Reading**

- Hand out and go through **Climate Change: Two Histories of the Twenty-First Century** (Handout 5) with the group
- Point out that the writers of the future depictions have based their predictions on the work of the Intergovernmental Panel on Climate Change and on a study of scientific papers but that their detail is uncertain
- Point out, nonetheless, that histories of a desolate future can be very powerful means of focusing the mind and encouraging preventive action now

Click to consult  
Handout 5 

**15:35-16:00 Activity: A Future in the Curriculum Brainstorm****Time Needed**

- 25 minutes

**Objectives/Explanation**

- To pool ideas for introducing the future across the curriculum

**Materials Needed**

- Flip chart and marker

**Procedure**

1. Using slide 10 explain that considering the future is a powerful learning vehicle for students.
2. Using slide 11 explain that the future is often ignored as an area of learning but because the needs of future generations are threatened by climate change, it is a crucial dimension of curriculum.
3. Invite a brainstorming of concrete ideas about how and where across the curriculum the future might be considered. Write all ideas down.
4. Review the brainstorm with the group. What ideas do they like? What ideas seem problematic?
5. Hang the brainstorm sheets on the wall for further review.

**Facilitation Guidance**

This brief concluding activity builds on the CCESD across the Curriculum activity that ended Day One. In a brainstorming session all ideas are accepted without comment. Only in the review stage are they subjected to critical scrutiny. Hanging the brainstorming on the wall as was done with the CCESD activity. This helps underline the message that a growing body of cross-curricular ideas is emerging from the workshop.

Click to consult  
slides 10-11 

**16:00 Close**

- Ask participants to complete a feedback sheet for Day Two (Handout 6).
- Ask participants to read through the Climate Change Adaptation Stories (Day 3, Handout 3).
- Remind participants to read through the Classroom Activities for the day and to bring any questions to the next day's workshop.
- Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Three.



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UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY TWO HANDOUTS

## Handout 1. Climate Change Regional Impact Descriptions

Click to consult  
Factsheet  
information  
on predicted  
regional  
impacts of  
climate change 

### Africa

- New studies confirm that Africa is one of the most vulnerable continents to climate variability and change because of multiple stresses and low adaptive capacity. Some adaptation to current climate variability is taking place; however, this may be insufficient for future changes in climate.
- By 2020, between 75 million and 250 million people are projected to be exposed to increased water stress due to climate change. If coupled with increased demand for water, this will adversely affect livelihoods and exacerbate water-related problems.
- Agricultural production, including access to food, in many African countries and regions is projected to be severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are expected to decrease. This would further adversely affect food security and exacerbate malnutrition in the continent. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020.
- Local food supplies are projected to be negatively affected by decreasing fisheries resources in large lakes due to rising water temperatures, which may be exacerbated by continued over-fishing.
- Towards the end of the 21st century, projected sea-level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5-10% of Gross Domestic Product (GDP). Mangroves and coral reefs are projected to be further degraded, with additional consequences for fisheries and tourism.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p13. Cambridge University Press.

 Click to consult  
Factsheet  
information  
on predicted  
regional  
impacts of  
climate change

## Asia

- Climate change is projected to impinge on the sustainable development of most developing countries of Asia, as it compounds the pressures on natural resources and the environment associated with rapid urbanization, industrialization, and economic development.
- Glacier melt in the Himalayas is projected to increase flooding and rock avalanches from destabilized slopes, and to affect water resources within the next two to three decades. This will be followed by decreased river flows as the glaciers recede.
- Freshwater availability in Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease due to climate change which, along with population growth and increasing demand arising from higher standards of living, could adversely affect more than a billion people by the 2050s.
- Coastal areas, especially heavily-populated megadelta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some megadeltas, flooding from the rivers.
- It is projected that crop yields could increase up to 20% in East and South-East Asia while they could decrease up to 30% in Central and South Asia by the mid-21st century. Taken together, and considering the influence of rapid population growth and urbanization, the risk of hunger is projected to remain very high in several developing countries.
- Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and South-East Asia due to projected changes in the hydrological cycle associated with global warming. Increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p13. Cambridge University Press.

## Europe and North America

### Europe

- For the first time, wide-ranging impacts of changes in current climate have been documented: retreating glaciers, longer growing seasons, shift of species ranges, and health impacts due to a heat wave of unprecedented magnitude. The observed changes described above are consistent with those projected for future climate change.
- Nearly all European regions are anticipated to be negatively affected by some future impacts of climate change, and these will pose challenges to many economic sectors. climate change is expected to magnify regional differences in Europe's natural resources and assets. Negative impacts will include increased risk of inland flash floods, and more frequent coastal flooding and increased erosion (due to storminess and sea-level rise). The great majority of organisms and ecosystems will have difficulty adapting to climate change. Mountainous areas will face glacier retreat, reduced snow cover and winter tourism, and extensive species losses (in some areas up to 60% under high emission scenarios by 2080).
- In Southern Europe, climate change is projected to worsen conditions (high temperatures and drought) in a region already vulnerable to climate variability, and to reduce water availability, hydropower potential, summer tourism and, in general, crop productivity. It is also projected to increase health risks due to heat-waves, and the frequency of wildfires.
- In Central and Eastern Europe, summer precipitation is projected to decrease, causing higher water stress. Health risks due to heat waves are projected to increase. Forest productivity is expected to decline and the frequency of peatland fires to increase.
- In Northern Europe, climate change is initially projected to bring mixed effects, including some benefits such as reduced demand for heating, increased crop yields and increased forest growth. However, as climate change continues, its negative impacts (including more frequent winter floods, endangered ecosystems and increasing ground instability) are likely to outweigh its benefits.
- Adaptation to climate change is likely to benefit from experience gained in reaction to extreme climate events, specifically by implementing proactive climate change risk management adaptation plans.

Click to consult  
Factsheet  
information  
on predicted  
regional  
impacts of  
climate change



Click to consult  
Factsheet  
information on  
future health  
impacts of  
climate change



### North America

- Warming in western mountains is projected to cause decreased snowpack, more winter flooding, and reduced summer flows, exacerbating competition for over-allocated water resources.
- Disturbances from pests, diseases and fire are projected to have increasing impacts on forests, with an extended period of high fire risk and large increases in area burned.
- Moderate climate change in the early decades of the century is projected to increase aggregate yields of rain-fed agriculture by 5-20%, but with important variability among regions. Major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilized water resources.
- Cities that currently experience heat waves are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts. Elderly populations are most at risk.
- Coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. Population growth and the rising value of infrastructure in coastal areas increase vulnerability to climate variability and future climate change, with losses projected to increase if the intensity of tropical storms increases. Current adaptation is uneven and readiness for increased exposure is low.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, pp 14-15. Cambridge University Press.

### Small Island Nations

 Click to consult Factsheet information on climate change's impacts on poverty

- Small islands, whether located in the tropics or higher latitudes, have characteristics which make them especially vulnerable to the effects of climate change, sea-level rise and extreme events.
- Deterioration in coastal conditions, for example through erosion of beaches and coral bleaching, is expected to affect local resources, e.g., fisheries, and reduce the value of these destinations for tourism.
- Sea-level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards, thus threatening vital infrastructure, settlements and facilities that support the livelihood of island communities.
- Climate change is projected by mid-century to reduce water resources in many small islands, for example, in the Caribbean and Pacific, to the point where they become insufficient to meet demand during low-rainfall periods.
- With higher temperatures, increased invasion by non-native species is expected to occur, particularly on mid- and high-latitude islands.

 Click to consult Factsheet information on predicted regional impacts of climate change

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p15. Cambridge University Press.

[↩ back to Facilitation Guide: Climate Futures Wheel](#)

## Handout 2. Climate Change Future Scenarios

In 2030: The pan-African grassroots 'Elephant Movement' campaigns for high-income countries to repay their 'carbon debt' to Africa. It unites the voices of low-income countries in climate change negotiations and funds lawsuits and governments.	In 2030: Food security is a worldwide concern; vegetarianism is a global moral movement
In 2030: The number of climate refugees grows by the day and campaigners demand that developed nations make land available for settlement.	In 2030: State-sponsored family planning and public health initiatives — and limits on numbers of children — are common.
In 2030: Insects, such as farmed grasshoppers, have replaced animals and fish as the main source of protein for hundreds of millions of people in Africa and Eurasia. Vegetarian diets are common — and enforced in some areas.	In 2030: The 2026 Climate Treaty makes failure to meet emissions reduction targets as serious as failure to comply with a UN Security Resolution. Countries that refuse to sign the treaty are threatened with sanctions and even military intervention.
In 2030: Low-income countries generate 40% of the world's solar energy, a huge increase since 2010.	In 2030: Regional integration of low-income countries is a common strategy to increase resilience and political power; the Pacific members of the alliance of Small Island States become a single country in 2023.
In 2030: Smallholder cooperatives have become the dominant agricultural model in low-income countries; these are linked into global supply chains and organized using collaborative online software.	In 2030: Compulsory identity cards holding information about personal resource consumption are common all over the world; companies sell services (such as 'personal carbon management') to help people avoid falling foul of strict legislation.
In 2030: Oil-importing countries have suffered hugely. Oil-exporting countries have built up huge sovereign wealth funds with massive influence over the global economy, and are starting to invest in renewable energy technologies.	In 2030: the 2028 Olympics are cancelled for the first time since World War II, because of the lack of carbon credits to fund either the building of stadiums or travel.
In 2030: New political alliances form around natural geographic boundaries such as the Niger/Volta Watershed collaboration. Regional blocs manage food, energy, biodiversity and even population.	In 2030: 'Nuclear off-shoring' is becoming common; wealthy nations build nuclear plants in low-income countries, which are run by their own military; they export the power giving the host country a share.

Click to consult  
Factsheet  
information  
on gender and  
climate change 

Source: Forum for the Future (2010). *The Future Climate for Development: Scenarios for Low-Income Countries in a Climate Changing World*. pp. 5-6. Reproduced with permission.

[↩ back to Facilitation Guide: Future Scenarios](#)

### Handout 3. Future Scenarios

<p><b>1. Reversal of Fortunes</b></p> <p>This is a fraught world where the urgent need to cut carbon dominates international relations. Drastic measures to decarbonizing the global economy spell crisis for many industries and no country is immune to the pain. Having rapidly developed—mostly on carbon-intensive pathways—many low-income countries of the 2010s are now middle-income. They speak a strong, united voice on the world stage, holding wealthier nations to account for the problems of climate change. These new emerging economies are the least resilient and are suffering the most, and with the world focused on cutting carbon there is little money in the pot for aid.</p>	<p><b>2. Age of Opportunity</b></p> <p>This is a world where low-income countries have received significant and effective development assistance as part of a strong climate change deal. They play a growing role in the world economy and are spearheading a low-carbon energy revolution, leapfrogging the old high-carbon technologies in pursuit of a prosperous and clean future. Cultural confidence in these countries is high: their politicians take a prominent role on the world stage, and increasingly people reject hi-carbon Western lifestyles has uncivilized. In many states power has devolved to regions and communities; in some countries this has brought positive change, but in others large areas have fallen under the control of local mafia and warlords.</p>
<p><b>3. Coping Alone</b></p> <p>This is a world in which low-income countries feel increasingly abandoned. Two decades of high oil prices and economic stagnation have driven the global community apart. Attempts to coordinate action to reduce carbon emissions have been dropped. Regional blocs now focus on their own concerns, such as food security, resource shortages and adapting to climate change. Low-income countries face all these problems with few resources and limited support from wealthy nations; some states have collapsed. New models of business and governance are starting to emerge from the shadows increasing inequality.</p>	<p><b>4. The Greater Good</b></p> <p>This is a world where people understand that economies rely fundamentally on access to natural resources. Climate change is seen as the ultimate resource crunch, but there are equal concerns or water, food and soil depletion. States manage natural resources pragmatically to give the greatest good for the greatest number and are prepared to take draconian action to protect them. Individual liberties and choice of Siefert, but most people feel that their future is at least being safeguarded. Those low-income countries with natural resources prosper; those without have little bargaining power. Tensions between rival resource blocs are intense, and sometimes spill over into violent conflict.</p>

 Click to consult Factsheet information on links between security and climate change

Source: Forum for the Future (2010). *The Future Climate for Development: Scenarios for Low-Income Countries in a Climate Changing World*. pp. 5-6. Reproduced with permission.

[↩ back to Facilitation Guide: Future Scenarios](#)

**Handout 4. Inheritance**

Inheritance (Now)	
Positive	Negative

<b>Inheritance (2050)</b>	
Positive	Negative

[↩ back to Facilitation Guide: Inheritance](#)

## Handout 5. Climate Change: Two Histories of the Twenty-First Century

### History 1

#### 2000-2025 The era when we 'Reap the Whirlwind'

- Period of increasingly regular and increasingly extreme weather events
- Last chance for massive sustained efforts to cut carbon emissions

#### 2025-2050 The era of 'Planetary Purgatory'

- Point of 'no return' when further warming of the planet can't be stopped
- Rising temperatures trigger release of carbon stored in tundra and forests

#### 2050-2100 The era of 'Hell and High Water'

- Massive sea level rises lead to abandoning low-lying coastal areas
- Droughts, expanding deserts, wildfires depopulate continental areas

Source: Joseph Romm, *Hell and High Water* (2007)

### History 2

#### A 1.0°C warmer world (above pre-industrial levels)

- Creeping desertification of the present North American wheat belt
- Arctic meltdown begins
- Amazon pushed to the edge
- Pacific atoll nations swamped

#### A 2.0°C warmer world

- Increasing acidity of oceans makes seas toxic to sea life
- Heat wave emergencies in Europe and other temperate areas
- Ecosystems already under pressure suffer significant species loss

#### A 3.0°C warmer world

- Amazon dies and burns
- Arctic ice almost gone
- Seawater penetrates coastal cities
- Uncontrollable wildfires in Australia and elsewhere
- Loss of glacial melt in Himalayas dries water supplies in the Indus
- Hundreds of millions of people have no choice but to migrate

Source: Mark Lynas, *Six Degrees: Out Future on a Hotter Planet* (2007)

Click to consult  
Factsheet  
information on  
links between  
migration and  
climate change



[↩ back to Facilitation Guide: Reading](#)

## Handout 6. UNESCO Teacher Education Course on Climate Change Education for Sustainable Development: Feedback Sheet

Workshop Day No: 1, 2, 3, 4, 5, or 6 (please circle as appropriate)

This is to help the workshop facilitator(s) know how the programme is being received. They will take account of your comments in adjusting the course or their facilitation.

1. What I liked about today's workshop

2. What I think could be improved in how the workshop is being conducted

3. What questions and concerns the day has left me with

4. My other comments

Thank you very much!

[↩ back to Facilitation Guide](#)

## Summary of what is learned on Day Two

### 1. Pedagogies

Futures Thinking/Envisioning	e.g.: Sharing image-based perspectives on future to emphasize visions of climate change
Systemic thinking about ESD issue	e.g.: Recognizing consequences through interrelation of actions and effects on climate change – assessing combinations of how consequences can exacerbate climate change (Facilitation Guide: Climate Futures Wheel, pp. 4-5)
Understanding complexities of forecasting	Accounting for variables, unknowns and uncertainties of complex systems
Engaging in value positions	Values clarification and analysis

### 2. Definitions

<b>Futures thinking</b>
Outcomes Probable, feasible and preferred
Scaled futures Personal, local, national, regional, global
Zone of potential
<b>Systemic thinking</b>
<b>Inheritance</b>

### 3. Interdisciplinary Knowledge Systems

Knowledge from Natural Sciences	Knowledge from Social Sciences	Knowledge from Humanities
<b>Environment Science</b> <ul style="list-style-type: none"> <li>Students consider how climate change effects (direct and indirect) interact and can become mutually amplifying</li> </ul>	<b>Climate Change Education (Socioeconomics)</b> <ul style="list-style-type: none"> <li>Using current knowledge on climate change to predict costs and benefits of climate change on society (Resource Pack Section A)</li> </ul>	<b>Ethics</b> <ul style="list-style-type: none"> <li>Respect for limits</li> </ul>
	<b>Economics</b> <ul style="list-style-type: none"> <li>Direct and Indirect effects of ESD issue – linking to world economy</li> </ul>	<b>CCESD across the curriculum</b> <ul style="list-style-type: none"> <li>Holistic approach to learning and thinking about climate change</li> </ul>
	<b>Development Studies</b> <ul style="list-style-type: none"> <li>Understanding accountability</li> </ul>	<b>Values and Perspectives</b> <ul style="list-style-type: none"> <li>Students use scenarios to share personal values and perspectives</li> </ul>

#### 4. International Frameworks

<b>MDGs</b>	<b>Disaster Risk Reduction (DRR)</b>
<b>Human Rights</b>	<ul style="list-style-type: none"> <li>Recognizing combinations of climate change consequences can exacerbate the climate changed future</li> </ul>

#### 5. Skills

<b>Processing Information to analyze complexity</b>
<b>Media discernment</b> <ul style="list-style-type: none"> <li>Use images to illustrate climate change future, and to interpret climate change through personal and collective vision</li> </ul>
<b>Systemic thinking</b> <ul style="list-style-type: none"> <li>Climate change impacts on future</li> </ul>
<b>Living simply</b> <ul style="list-style-type: none"> <li>Understanding sustainable forms of consumption</li> </ul>
<b>Emotional coping</b>
<b>Evaluating Information</b> <ul style="list-style-type: none"> <li>Capacity to think critically about values</li> </ul>
<b>Apply Awareness and Knowledge to Action</b>
<b>Backcasting</b> <ul style="list-style-type: none"> <li>Inheritance presents platform to consider accountability</li> </ul>

[↩ back to Facilitation Guide](#)

# Day Two PowerPoint Slides

1

**CLIMATE CHANGE IN THE CLASSROOM**

UNESCO COURSE FOR SECONDARY TEACHERS ON CLIMATE CHANGE EDUCATION FOR SUSTAINABLE DEVELOPMENT

Day 2 Climate Change: A Futures Learning Approach

2

Welcome to Day 2!

Climate Change: A Futures Learning Approach

3

### Three Prospective Futures

- **Probable Futures** ... Futures that are *likely to come about* if present trends continue
- **Feasible Futures** ... Futures that *may come about* and that *cannot be ruled out*
- **Preferred Futures** ... Futures that we would *like to see happen* given our values and what we hold to be important

4

### The Zone of Potential

- *If a feasible future is preferred, then the key task is to help push it from the margins and into the centre*

5

### Climate Futures Wheel - Example

[↩ back to Facilitation Guide: Climate Futures Wheel](#)

6

### Climate Change Future Scenarios

- LIKELY/DESIRABLE \_\_\_\_\_
- LIKELY/UNDESIRABLE \_\_\_\_\_
- UNLIKELY/DESIRABLE \_\_\_\_\_
- UNLIKELY/UNDESIRABLE \_\_\_\_\_
- CAN'T AGREE \_\_\_\_\_
- Are there any regions or income level groups particularly affected?

[↩ back to Facilitation Guide: Climate Change Future Scenarios](#)

7

### Consideration of Future Generations

- 'The Iroquois tribal council began each meeting with this invocation. "Let us remember in our deliberations the effect our decisions may have on the next seven generations." Any vote taken was not only for those present, but also for those who would live two hundred years in the future.'
- Kathryn Sheehan & Mary Waidner. (1991). *Earthchild*. Tulsa, Oklahoma: Council Oak Books

8

### Intergenerational Justice and Accountability

- Based on a broad understanding of justice which states that justice is not just a matter between contemporaries but that future generations have a legitimate claim of rights against present generations
- In an intergenerational conflict of interests, present generations should be obligated by considerations of justice not to live in ways that benefit themselves and in so doing impose costs on those who will live in the future.
- Unlike in justice issues between contemporaries, unborn generations cannot make a complaint against present generations so there is an unequal power relationship. Those living today can manipulate things in their interest and against the interests of future generations without future generations being able to protest.
- Intergenerational justice calls for those alive today to act as though they can be held accountable by the people of the future

9

### Limited Action Shifts Responsibility to Future Generations

- 'Climate change's ...complexity may turn out to be *perfectly convenient* for us, the current generation, and indeed each successor generation as it comes to occupy our position.
- For one thing, it provides each generation with a cover under which it can seem to be taking the issue seriously – by negotiating week global accords, for example, then heralding them as great achievements – when it is simply exploiting the opportunities of coming earlier in time.
- By avoiding overtly selfish behavior, an earlier generation can take advantage of the future without the unpleasantness of admitting it.'
- - Stephen Gardiner (2008), 'A Perfect Moral Storm: Climate Change, Intergenerational Ethics, and the Problem of Corruption.' (text amended).

10

### Why Include a Futures Learning Dimension in the Curriculum?

- Students are fascinated by the future
- They have real hopes and fears for their future – those hopes and fears should be addressed as they learn
- Exploring and envisioning futures provides lots of scope for creative thinking, other higher order thinking skills, and the imagination
- Thinking about preferred futures offers scope for clarifying values
- Considering the future can be the springboard for learner involvement in projects to affect change

[↪ back to Facilitation Guide: Intergenerational Justice and Accountability](#)

11

- 'Schools, charged with the task of educating future generations, tend to make little or no investment in helping students think about and understand the future. They are rather like a speeding driver on the motorway who keeps a fraction of an eye on the road ahead but most of her attention on the rear mirror as she watches out for the flashing light of any approaching police car. They are driving into the future with what has gone before as their frame of reference. Schools, in short, are inventing the future backwards.'
- David Selby (2000), 'Global Education as Transformative Education.'

12



### End of Day 2 – See you tomorrow

**Please don't forget to:**

- Fill out and submit your feedback form
- Read through *Classroom Activities* for the day and bring any questions to tomorrow's workshop
- Write your reflective workshop diary entry for the day and bring the diary to Day 3

[↪ back to Facilitation Guide: A Future in the Curriculum](#)

[↪ back to Facilitation Guide: Introduction](#)

## Excerpt from the Conceptual Framework on ‘the Futures Dimension to Climate Change Learning’

### Why a Strong Futures Dimension to Climate Change Learning?

Sustainable development has long been defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their needs (World Commission on Environment and Development, 1987, p. 43). In the definition is a clear recognition of the responsibilities of those alive today to generations to come through what is referred to as **intergenerational accountability** or **intergenerational justice**. The ‘sustainable’ element of ‘sustainable development’ is about ensuring that future generations can enjoy at least the same level of opportunity for a fulfilling life as present generations.

“The startling conclusion is that continued exploitation of all fossil fuels on Earth threatens not only the other millions of species on the planet but also the survival of humanity itself –and the timetable is shorter than we thought.”

- James Hansen, *Storms of My Grandchildren*, 2009.

### Applying current knowledge to steer toward a sustainable future

From its inception Education for Sustainable Development has asked that the three-way dynamic between past, present and future be given full representation in learning programs. Implicit in this call has been a critique of a traditional ‘rear view mirror’ curriculum in which learners are encouraged to look backwards into the past as the best way of making sense of the present without ever studying the present in any depth and with little or no consideration of the likely impact of the present on the future. In contrast, a sustainability-oriented curriculum focuses upon the co-creating and co-evolving dynamic that exists between past, present and future. The past lights up our understanding of the present and of possible future directions. The choices, decisions and priorities of the present shape the future and also influence what we take from the past and teach as ‘history’. Images and visions of the future shape what we do and decide now, and also how we view the past (Pike & Selby, 1988).

As understanding of climate change has deepened, so has appreciation of the importance of addressing sustainable futures. We have become aware of the closing window of opportunity to limit climate change before the amplifying and incontrollable effects of climate tipping points set in. We recognize now that the effects of global climate change we are now experiencing are the deferred impact of CO<sub>2</sub> emissions from some time in the past, and that our present-day emissions will have delayed but mounting consequences for future generations. We must also recognize that to choose the convenience of doing nothing or making ineffectual gestures goes against the grain of the intuitive desire to build for a better future.

Futures-oriented learning involves exploring probable, feasible and preferred futures (respectively, futures that are likely to come about given present trends, futures that might conceivably come about, and futures that we would like to see realized given our values and priorities). It is also about identifying and seeking to achieve desired futures while identifying and acting to avoid undesired futures (Pike & Selby, 1988).

[↩ back to Facilitation Guide: Introduction](#)

# Get the Facts:

## CLIMATE CHANGE AND SOCIETY

### Gender and Climate Change

#### The links between gender and climate change

An examination of the historic gender-poverty interrelationship reveals how lack of access to education, health, water, sanitation, food, and exposure to HIV results in differing vulnerabilities and adaptive capacities of men and women towards impacts of climate change, disasters, and poor environmental management.

Climate change tends to exacerbate these differences, and places a larger burden on women and girls. This reinforcing interrelationship therefore increases the effects of climate change on women in several ways as described below.

#### Migration

Environmentally displaced women who migrate in search of a job will face challenges of finding employment, housing and appropriate social services, but with the added impairment of gender discrimination. Another possible scenario is in rural, agriculture-dependent households, where the male breadwinner may migrate to the city for work as a result of limited resources. In the absence of the male partner, women may experience greater autonomy and have enhanced decision-making power if they become de facto heads of household. However, this is not always the case. For example, in many regions

of Bangladesh and Pakistan, women may not be able to take major decisions that affect their families without permission from a male family member.

#### Agriculture

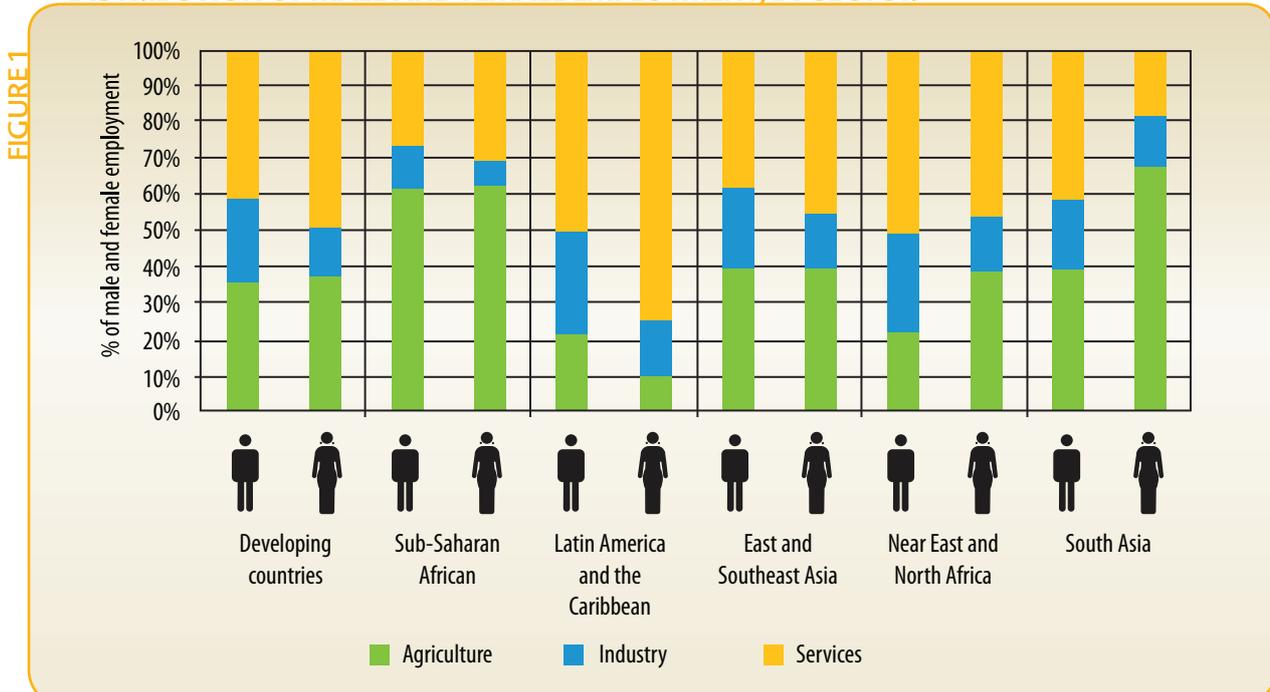
The management and use of natural resources can differ between women and men. For example, women and girls in rural areas of developing countries bear much of the responsibility of basic food production – an activity highly vulnerable to events linked to climate change such as drought or flood. As a consequence, these female farmers face significant risks for the security of their food production and thus their capacity to survive.<sup>1</sup> Thus, a loss of natural resources as a result of climate change greatly affects women and girls and has the potential to increase gender inequalities (see Figure 1).

#### Health

One key variable in determining direct and indirect impacts of climate change on health is gender. For example, studies have shown that women's and men's health risks differ during heat waves, due to both social and physiological reasons. Socially-constructed gender roles also often render women more vulnerable than men during natural disasters, leading to higher mortality and morbidity rates. This is

<sup>1</sup> Resource Guide on Gender and Climate Change, UNDP, 2009.

DISTRIBUTION OF MALE AND FEMALE EMPLOYMENT, BY SECTOR



FAO. The Role of Women in Agriculture. ESA Working Paper No. 11-02, 2011.

exacerbated in countries where women have lower education, awareness, and socioeconomic status compared with men, which limits their mobility and access to information.<sup>2</sup>

Consider also that women are the primary caregivers to the sick. When the health impact of climate change leads to increased levels of water-borne and vector-borne diseases, women will be called upon more frequently to tend to the sick. Again, this will leave less time for the other activities for which women are responsible, adding to their stress and workload.

### Additional Resources

1. *Resource Guide on Gender and Climate Change*, UNDP, 2009. <http://content.undp.org/go/cms-service/download/publication/?version=live&id=2087989>
2. *Training Manual on Gender and Climate Change*, IUCN, UNDP, GGCA, 2009. <http://www.gender-climate.org/pdfs/Training%20Manual%20on%20Gender%20and%20Climate%20Change.pdf>
3. *Gender, Climate Change and Community-based Adaptation*, UNDP, 2010. <http://www.beta.undp.org/undp/en/home/librarypage/womens-empowerment/gender-climate-change-and-community-based-adaptation.html>
4. *Women, Gender Equality and Climate Change*, UN WomenWatch, 2009. [http://www.un.org/womenwatch/feature/climate\\_change/downloads/Women\\_and\\_Climate\\_Change\\_Factsheet.pdf](http://www.un.org/womenwatch/feature/climate_change/downloads/Women_and_Climate_Change_Factsheet.pdf)
5. *Gender and Climate Forum*, UNESCO, 2009. <http://unesdoc.unesco.org/images/0018/001863/186309e.pdf>

[↩ back to Handout 2](#)

<sup>2</sup> Bart W. Édes. Climate Change Impacts on Health and Migration. Asian Development Bank. Prepared Remarks for the Plenary Session on Vulnerability and Resilience in the Context of Climate Change Delhi Sustainable Development Summit, 5 February 2011.

## Migration and Climate Change

Climate change has both intermittent - but increasingly frequent - extreme impacts (such as large storms and heat waves), and slow on-set, cumulative effects (such as extinction of life forms and sea level rise). Both kinds of effects may have a role in disrupting livelihoods and displacing human populations (see ‘The Scale...’ text box).

Climate change manifestations such as sea level rise, desertification and growing water scarcity, and extreme climate variability and events such as cyclones and floods do not take place in a vacuum. They can lead to millions of people being displaced by shoreline erosion, coastal flooding and agricultural disruption.<sup>3</sup> Scientists are increasingly confident about the identified impacts of climate change on the environment. Upon viewing these data through a human rights lens, it is clear that projected impacts threaten the effective enjoyment of a range of human rights, such as the right to safe and adequate water and food, the right to health and to adequate housing. Equally, the human rights perspective brings into focus that climate change is set to hit the poorest countries and communities the hardest.

The relationship between climate change and displacement is complex and context-dependent. There are often several underlying economic, political and other social factors. Nationally and regionally, climate change has the potential to sharply intensify human displacement bringing

<sup>3</sup> Migration and Climate Change, IOM Migration Research Series, No. 31, p. 9

### The Scale of Displacement

Migration, rising populations, unsustainable use of resources, poverty and civil war all contribute to vulnerability in the face of natural and weather-related disasters. The UN Office for the Coordination of Humanitarian Affairs (OCHA) and the Internal Displacement Monitoring Centre (IDMC) examined 2008 data and found that at least 36 million people were displaced by “sudden-onset natural disasters”, of which more than 20 million were displaced owing to the sudden onset of weather-related disasters, including about 6.5 million people because of floods in India. “Research from other sources suggests that many millions of people are also displaced annually as a result of slow-onset climate-related disasters such as drought,” it adds.

# Get the Facts:

## CLIMATE CHANGE AND SOCIETY

communities into increasing competition for finite natural resources, and with world-wide repercussions for the stability of the global economy.

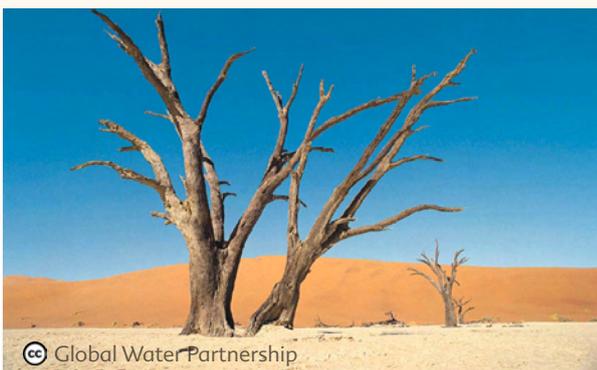
### Climate change induced migration leads to increased pressure on urban infrastructure and services

The services provided by urban infrastructure systems include flood control, water supply, drainage, waste water management, solid and hazardous waste management, energy, transportation, providing constructed facilities for residential, commercial, and industrial activities, communication, and recreation. The real value of infrastructure is that the socio-economic and environmental services it provides are essential; without them, the economy could not function and many human and environmental systems could collapse.

#### Desertification leads to Migration

In Nigeria, 3,500 km<sup>2</sup> (1,350 miles<sup>2</sup>) of land transform into desert each year, making desertification the country's primary problem. As the desert advances, farmers and herdsman are forced to move, either squeezing into the shrinking area of habitable land or migrating to already overcrowded cities.

Mexico has a long history of international migration and is the second largest migrant sending country in the world (OECD, 2007). In 2005 alone, 164 million migrants left the country. It is also a country subject to extreme climate variability in the form of droughts in the country's northern and central regions. In Zacatecas, for example, about 85 per cent of the crops were destroyed by droughts in 2005 and 2006 according to the Mexican media. In addition, desertification affecting Mexico's dryland regions leads 600,000 to 700,000 people to migrate from these areas annually (IOM, 2008).



© Global Water Partnership

If, as a consequence of climate change, sea levels rise by one metre, the infrastructure and inhabitants of many coastal cities and populations will be under threat. For example, megacities under threat include Buenos Aires, Rio de Janeiro, Los Angeles, New York, Lagos, Cairo, Karachi, Mumbai, Kolkata, Dhaka, Shanghai, Osaka-Kobe, and Tokyo. Many smaller coastal cities will suffer under the same effects.

#### Additional Resources

1. Brown, L.B. (2006). *Plan B 2.0: Rescuing a Planet Under Stress and a Civilization in Trouble*. [http://www.earth-policy.org/books/pb2/pb2ch6\\_ss6](http://www.earth-policy.org/books/pb2/pb2ch6_ss6)
2. UNHCR (2009). *Climate change, natural disasters and human displacement: A UNHCR Perspective*. United Nations High Commissioner for Refugees (UNHCR). <http://www.unhcr.org/4901e81a4.html>
3. IOM (2008). *Migration and Climate Change*. IOM Migration Research Series, No. 31. <http://www.iom.int>
4. IOM (2009). *Migration, Climate Change and the Environment*. IOM Policy Brief. [http://www.iom.int/jahia/webdav/shared/shared/mainsite/activities/env\\_degradation/iom\\_policybrief\\_may09\\_en.pdf](http://www.iom.int/jahia/webdav/shared/shared/mainsite/activities/env_degradation/iom_policybrief_may09_en.pdf)
5. M. Leighton (2011). "Drought, desertification and migration: past experiences, predicted impacts and human rights issues", Migration and Climate Change, UNESCO/Cambridge University Press
6. Piguet, A., Pécoud, A. and de Guchteneire, P. (2010). *Migration and Climate Change: an Overview*. Working Paper No. 79, University of Oxford, Centre on Migration, Policy and Society (COMPAS). [http://www.compas.ox.ac.uk/fileadmin/files/docs/WP1079%20Piguet-Pecoud-de%20Guchteneire\\_01.pdf](http://www.compas.ox.ac.uk/fileadmin/files/docs/WP1079%20Piguet-Pecoud-de%20Guchteneire_01.pdf)
7. Refugee Studies Centre (2008). *Climate Change and Displacement, Forced Migration Review*, Issue 31, Oxford University Press. <http://www.forcedmigration.org/browse/thematic/climate-change>
8. Rodriguez, J., F. Vos, et al. (2009). *Annual Disaster Statistical Review 2008, The numbers and trends*. <http://www.emdat.be>

↩ back to Handout 5



## Health Effects of Climate Change

Researchers have long observed the close links between climate and human health. There was consequently little surprise when the scientific community concluded that changes to the global climate would affect the fundamental requirements for good health everywhere: clean air, safe drinking water, sufficient food and secure shelter.

Climate change is already having a negative effect on health worldwide. The World Health Organization (WHO) estimated that global warming between the 1970s and 2004 has caused over 140,000 additional deaths annually,<sup>4</sup> and is making serious infectious diseases like malaria and diarrhea more challenging to control. These trends are likely to worsen in the near future, regardless of current efforts to cut greenhouse gas (GHG) emissions and mitigate climate change.<sup>5</sup> Depending on the specific area affected, a warmer and more variable climate is also likely to increase the frequency and intensity of heat waves, elevate the levels of some air pollutants, increase transmission of diseases through contaminated water and food, compromise agricultural production, and

increase the hazards of extreme weather events. The threats that climate change poses to health may vary in different places and across time. For example, cities that periodically suffer from heat spells could expect more intense heatwaves, while areas prone to malaria could experience an increase in outbreaks. Table 1 lists some of the most likely health concerns caused by climate change.

### Unfair distribution of risks

As with other foreseeable climate change impacts, the potential negative effects of climate change on health are also unfairly distributed, affecting mainly the world's poorest countries, social groups and individuals. People living in small island developing states (SIDS) and other coastal regions, megacities, and mountainous and polar regions are particularly vulnerable. Health systems and populations in these regions as well as in the developing countries will have to adapt to new climate conditions and cope with additional needs ranging from injuries and non-communicable conditions to food-borne, water-borne and vector-borne infectious diseases. Areas with weak health infrastructure — mostly in developing countries — will be the least able to cope (see Figure 2, next page).

<sup>4</sup> Global health risks: Mortality and burden of disease attributable to selected major risks. WHO, 2009.

<sup>5</sup> Climate and health factsheet. WHO, 2005.

### POTENTIAL HEALTH CONCERNS CAUSED BY CLIMATE CHANGE

TABLE 2

Weather Events	Impacts on Human Health
Warm spells, heat waves and stagnant air masses	<ul style="list-style-type: none"> <li>Heat stroke, affecting mainly children and the elderly</li> <li>Increase in respiratory diseases</li> <li>Cardiovascular illnesses</li> </ul>
Warmer temperatures and disturbed rainfall patterns	<ul style="list-style-type: none"> <li>More exposure to vector-borne diseases like malaria, Japanese encephalitis and other diseases carried by vectors such as mosquitoes, rodents and ticks</li> </ul>
Heavy precipitation events	<ul style="list-style-type: none"> <li>Increased risk of diseases related to contaminated water (water-borne) and to unsafe food (food-borne). Depletion of safe water supplies and poor sanitation will increase the incidence of diarrhoeal diseases such as cholera.</li> </ul>
Droughts	<ul style="list-style-type: none"> <li>Malnutrition and starvation particularly affecting children's growth and development.</li> <li>Reduced crop yields causing stress for farmers and their families (known as "psychosocial stress"), who may be unable to pay their debts during extended and repeated droughts.</li> </ul>
Intense weather events (cyclones, storms)	<ul style="list-style-type: none"> <li>Loss of life, injuries, life-long handicaps.</li> <li>Damaged public health infrastructure such as health centers, hospitals and clinics.</li> <li>Loss of life, property and land, displacement and forced migration due to disasters will bring about psychosocial stress affecting mental health.</li> </ul>
Sea level rise and coastal storms	<ul style="list-style-type: none"> <li>Loss of livelihoods and disappearance of land will trigger massive migration and cause potential social conflicts, affecting mental health.</li> </ul>

# Get the Facts:

## CLIMATE CHANGE AND SOCIETY

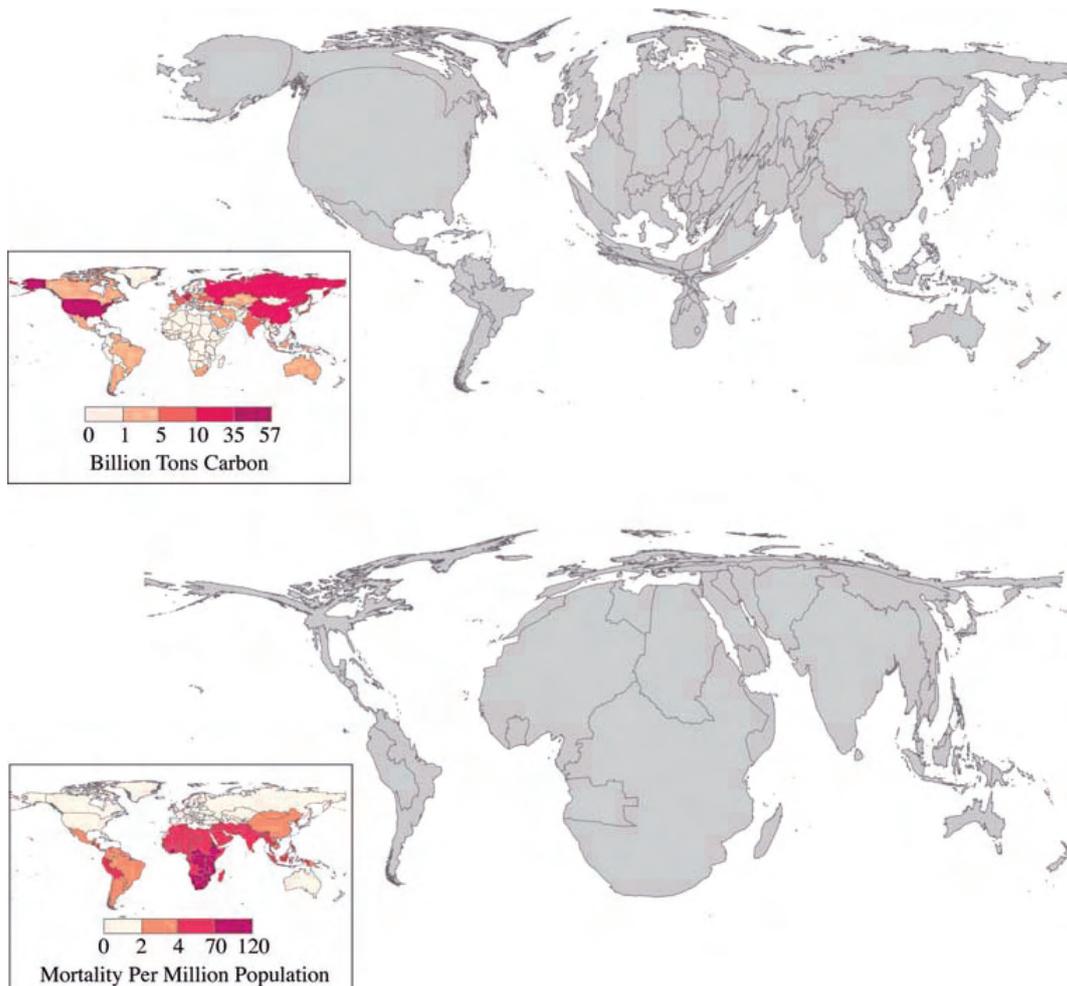
### Additional resources

1. *Climate and health factsheet*. World Health Organization (WHO), 2005. <http://www.who.int/globalchange/publications/factsheets/fsclimandhealth/en/index.html>
2. *Fourth Assessment Report, Intergovernmental Panel on Climate Change, Working Group II, Section 8 (human health)*. [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg2/en/ch8.html](http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch8.html)
3. *Global health risks: Mortality and burden of disease attributable to selected major risks*. WHO, 2009. [http://www.who.int/healthinfo/global\\_burden\\_disease/GlobalHealthRisks\\_report\\_full.pdf](http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf)
4. *Protecting health from climate change. Messages to different groups and sectors (Young people, 16–24 years old)*. WHO, 2008. [http://www.who.int/globalchange/publications/factsheets/WHD2008\\_young\\_people\\_2.pdf](http://www.who.int/globalchange/publications/factsheets/WHD2008_young_people_2.pdf)
5. *WHO Manual for Students (South Asia Regional Office)*. [http://www.searo.who.int/LinkFiles/World\\_Health\\_Day\\_2008\\_Toolkit-Student-Manual.pdf](http://www.searo.who.int/LinkFiles/World_Health_Day_2008_Toolkit-Student-Manual.pdf)
6. *WHO Manual for Teachers (South Asia Regional Office)*. [http://www.searo.who.int/LinkFiles/World\\_Health\\_Day\\_2008\\_TeacherManual.pdf](http://www.searo.who.int/LinkFiles/World_Health_Day_2008_TeacherManual.pdf)
7. *WHO portal on climate change and health*. <http://www.who.int/globalchange/en/>

[↩ back to Handout 1](#)

### HIGH EMISSION COUNTRIES VS. HIGH HEALTH IMPACT COUNTRIES

FIGURE 2



Patz, Jonathan et al. *Climate Change and Global Health: Quantifying a Growing Ethical Crisis*, as published in *EcoHealth* 4, 397–405, 2007.



## Climate Change Induced Threats to Security

Climate change is best viewed as a threat multiplier, exacerbating existing vulnerabilities and changing the distribution and supply of resources, rather than being the direct cause of conflicts. Changes in climate can, however, play an indirect role in generating the conditions for conflict at different levels (see Figure 3). The impacts of climate change will furthermore be magnified or mitigated by underlying conditions of governance, poverty and resource management as well as the nature of impact at local and regional levels.

Three areas are of particular concern when looking at the links between climate change and security:

1. Sea level rise accompanied by storm surges and other extreme weather events represent a key threat to security let alone the future viability of low small island states and low lying coastal zones;
2. Natural disasters challenge food security in a number of ways – loss of productive land from sea level rise, destruction of crops and damage to food distribution networks;
3. Competition over scarce land and water exacerbated by regional changes in climate are already a key factor in local level conflicts (i.e. Darfur) – when livelihoods are threatened by declining resources, people either innovate, flee (“environmental

refugees”), or can be brought into conflict.<sup>6</sup> (see ‘Desertification leads...’ text box, p. 26);

However, the way climate change affects security issues is not direct but through a long causal chain. Studies of past and recent conflicts have not yielded proof that they were rooted in environmental impacts resulting from climate change.<sup>7</sup>

### Additional Resources

1. McLeman, R. (2011) *Climate change, migration and international security considerations*. International Organization for Migration. IOM Migration Research Series, No. 42. <http://publications.iom.int/bookstore/free/MRS42.pdf>
2. Morton, A., Boncour, P., and Laczko, F., *Human Security Policy Challenges, Climate Change and Displacement*, FMR 31. <http://www.fmreview.org/FMRpdfs/FMR31/05-07.pdf>
3. International Crisis Group. *Climate Change and Conflict*. <http://www.crisisgroup.org/en/key-issues/climate-change-and-conflict.aspx>

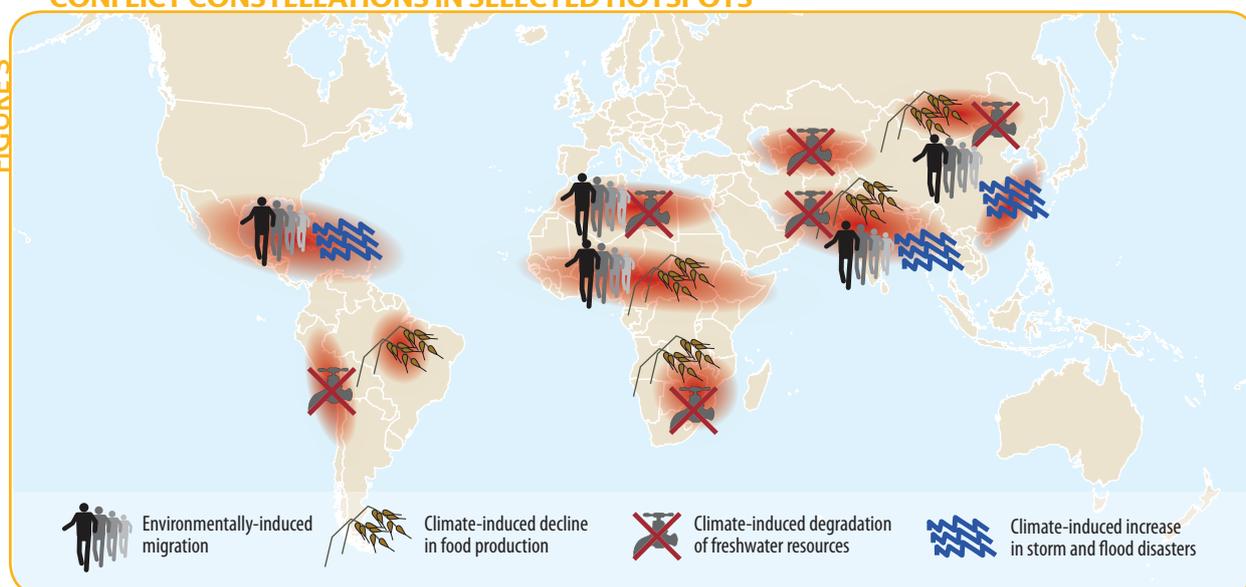
6 Address by UN Under-secretary-General and UNEP Executive Director Achim Steiner at UN Security Council debate on The Impact of Climate Change on Maintaining International Peace and Security, 20 July 2011.

7 Ragnhild Nordås and Nils Petter Gleditsch. *Climate Change and Conflict*. 2007. Centre for the Study of Civil War (CSCW) at the International Peace, Research Institute, Oslo (PRIO) and Department of Sociology and Political Science, Norwegian University of Science and Technology, Trondheim

[↩ back to Handout 3](#)

### CONFLICT CONSTELLATIONS IN SELECTED HOTSPOTS

FIGURE 3



WBGU. *Climate Change as a Security Risk*. 2008.

# Get the Facts:

## CLIMATE CHANGE AND SOCIETY

### Climate Change and Poverty

#### Who can be considered a person living in poverty?

At the UN's World Summit for Social Development (1995), the Copenhagen Declaration described poverty as "a condition characterised by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information." When people are unable to eat, go to school, or have any access to health care, then they can be considered to be in poverty, regardless of their income.

#### Different capacities to cope

The capacity of a country or region to successfully cope with climate change is highly dependent on its level of economic and human development.

#### The Case of Bangladesh

The case of Bangladesh is a good illustration of a society severely affected by climate change. The country has a low-lying coastline, high population density and an economy highly dependent on agriculture. Frequent cyclones and their associated effects, such as saltwater intrusion, render agricultural lands unproductive and threaten the lives and livelihoods of Bangladesh's people. In addition, the country frequently experiences major floods. In 1998, about 68% of the country's geographical area was flooded, affecting more than 30 million people. These climatic events have generated a significant loss of human life, reduced access to safe drinking water, and have had a negative impact on food security.

From *Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation* (see reference at the end of the chapter).



© EU Humanitarian Aid and Civil Protection

Disparities in development worldwide mean that countries are affected unequally by climate change impacts. According to the Fourth Assessment Report of the IPCC (2007), developing countries are expected to suffer most from the negative impacts of climate change. Asia, Africa and many Small Island Developing States would be more vulnerable due to projected changes in annual average river runoff and water availability, decreases in crop productivity in dry and tropical regions, exposure of coastal areas to cyclones, storm surges, erosion, coastal subsidence and sea level rise (see 'The Case...' text box). Hence, the countries with the fewest resources are likely to bear the greatest burden of climate change in terms of loss of life and their related impacts on investment and the economy. Often, extreme weather events set back the development process for decades.

Even though developing countries are predicted to face the most severe impacts of climate change, they are less prepared and thus less able to confront the challenges than developed countries. For example, climate change-related weather disasters (e.g. floods, cyclones) are likely to cause substantial loss of life in developing countries, in particular amongst the most vulnerable populations who often dwell in precarious geographic areas and in sub-standard dwellings. The institutional capacity to successfully deal with such weather events is comparatively low. Indeed, over 96% of disaster-related deaths in recent years have taken place in developing countries.<sup>8</sup>

Developing countries are less prepared to cope with sea level rise, water shortages, increased extreme events, or the negative effects on agriculture resulting from climate change. All of these impacts put increased pressure on the capacities of the governments of those countries.

#### The urban poor

The urban poor are among the most vulnerable to climate change impacts for many reasons:

- greater exposure to hazards (e.g. through living in makeshift housing on unsafe sites and areas with high vulnerability to landslides and extreme weather events)
- lack of hazard-reducing infrastructure (e.g. drainage systems, roads allowing emergency

<sup>8</sup> *Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation*, African Development Bank, Asian Development Bank, DfID (United Kingdom), Directorate-General for Development (European Commission), Federal Ministry for Economic Cooperation and Development (Germany), Ministry of Foreign Affairs Development Cooperation (The Netherlands), OECD, UNDP, UNEP, The World Bank, 2003. <http://siteresources.worldbank.org/INTCC/817372-1115381292846/20480623/PovertyAndClimateChangeReportPart12003.pdf>

- vehicle access)
- less adaptive capacity (e.g. the ability to move to better quality housing or less dangerous sites)
- less state provision for assistance in the event of a disaster (indeed, state action may increase exposure to hazards by limiting access to safe sites for housing)
- less legal and financial protection (e.g. a lack of legal tenure for housing sites, lack of assets, and insurance)
- less income diversification options.

Impacts on the urban poor include:

- direct impacts such as more frequent and more hazardous floods;
- less direct impacts such as the reduced availability of freshwater supplies available to poorer groups;
- indirect impacts such as climate change-related weather events that increase food prices or damage poorer households' asset bases.<sup>9</sup>

### Additional Resources

1. *Climate Change Adaptation: Enabling people living in poverty to adapt*, K. Pettengell, Oxfam Research Report, 2010.
2. *The Costs to Developing Countries of Adapting to Climate Change: New Methods and Estimates / The Global Report of the Economics of Adaptation to Climate Change Study (Consultation Draft)*, The World Bank, 2010.
3. *Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report: Impacts, Adaptation and Vulnerability*, UNEP, GRID Arendal, 2001.
4. *Poverty and Climate Change: Assessing Impacts in Developing Countries and the Initiatives of the International Community*, C. McGuigan, R. Reynolds and D. Wiedmer, London School of Economics (Consultancy project for the Overseas Development Institute), 2002.
5. *Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation*, African Development Bank, Asian Development Bank, DfID (United Kingdom), Directorate-General for Development (European Commission), Federal Ministry for Economic Cooperation and Development (Germany), Ministry of Foreign Affairs Development Cooperation (The Netherlands), OECD, UNDP, UNEP, The World Bank, 2003.

<sup>9</sup> Ibid.

[↩ back to Handout 1](#)

## Ethical Dimensions of Climate Change

### Ethics and climate change solutions

When examining possible responses to address greenhouse gas emissions, there are important ethical issues to address, as the following case demonstrates.

#### Geo-engineering

Geo-engineering involves the intentional manipulation of the global environment to limit global warming. Several techniques are under examination and experimentation:

- the fertilization of oceans with iron to encourage the growth of plankton, which uses CO<sub>2</sub> from the atmosphere to produce organic matter. The resultant organic matter is also seen as a means to increase fish production and thus support the growing global population.
- Carbon Dioxide Removal (CDR), which typically involves CO<sub>2</sub> capture at point sources such as power plants and then sequestration underground.
- Solar Radiation Management (SRM) where large and long-time dissemination of particles in the stratosphere lead to cooling of the atmosphere by blocking incoming solar radiation.

These techniques could be perceived as unethical inasmuch as their successful application can be used to justify inaction on the human causes of climate change. Moreover, alterations of global systems like the atmosphere or oceans may engender irreversible effects and unknown consequences for life and ecosystems.

### Additional Resources

1. The UNESCO climate change initiative: notably its Climate Change Education for Sustainable Development flagship programme and its research programme on the 'social, human, ethical and gender dimensions of climate change'. <http://unesdoc.unesco.org/images/0018/001896/189620e.pdf>
2. *The Ethical Implications of Global Climate Change*, World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), UNESCO, 2010.
3. *Environmental Education, Ethics and Action*, UNEP, 2006. [http://www.unep.org/training/downloads/PDFs/ethics\\_en.pdf](http://www.unep.org/training/downloads/PDFs/ethics_en.pdf)

# Get the Facts:

## CLIMATE CHANGE AND SOCIETY

### Potential Regional Climate Change Impacts

#### Future Global Impacts

##### Freshwater resources and their management

By mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water-stressed areas. In some places and in particular seasons, changes differ from these annual figures.

Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.

In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.

Adaptation procedures and risk management practices for the water sector are being developed in some countries and regions that have recognised projected hydrological changes with related uncertainties.

##### Ecosystems

The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).

Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.

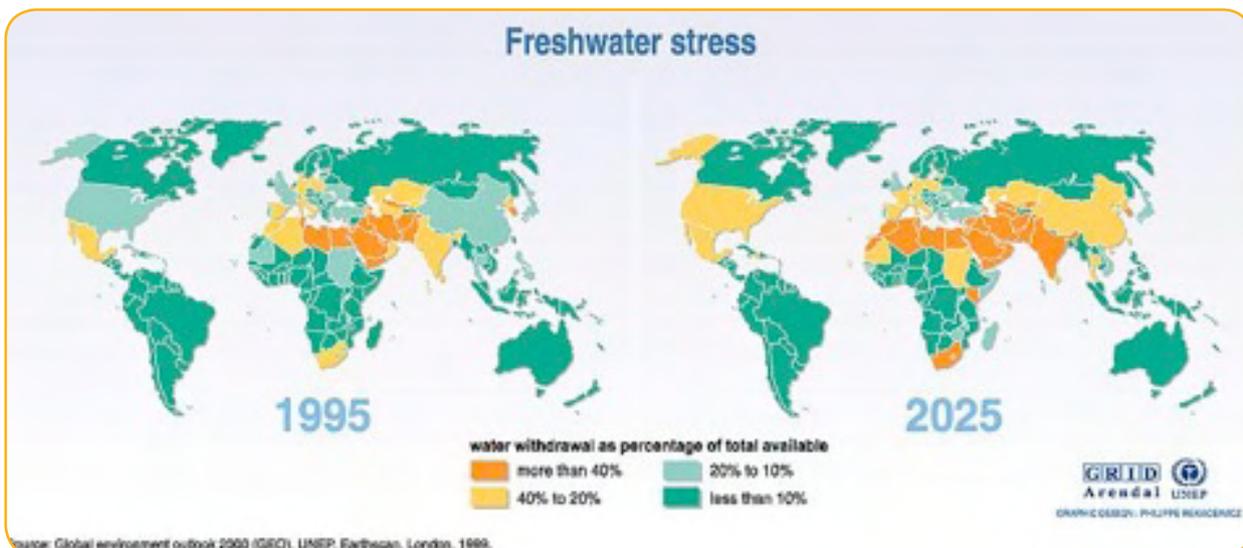
The progressive acidification of oceans due to increasing atmospheric carbon dioxide levels increases the potential for the skeletons of coldwater coral reefs to dissolve, perhaps already within a few decades. The impacts will be greatest at high latitudes..

##### Food, Fibre and forest products

Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3°C depending on the crop, and then decrease beyond that in some regions.

At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase the risk of hunger.

Globally, the potential for food production is projected to increase with increases in local



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average temperature over a range of 1-3°C, but above this it is projected to decrease.

Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes.

Adaptations such as altered cultivars and planting times allow low- and mid- to high-latitude cereal yields to be maintained at or above baseline yields for modest warming.

Globally, commercial timber productivity rises modestly with climate change in the short- to medium-term, with large regional variability around the global trend.

Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.

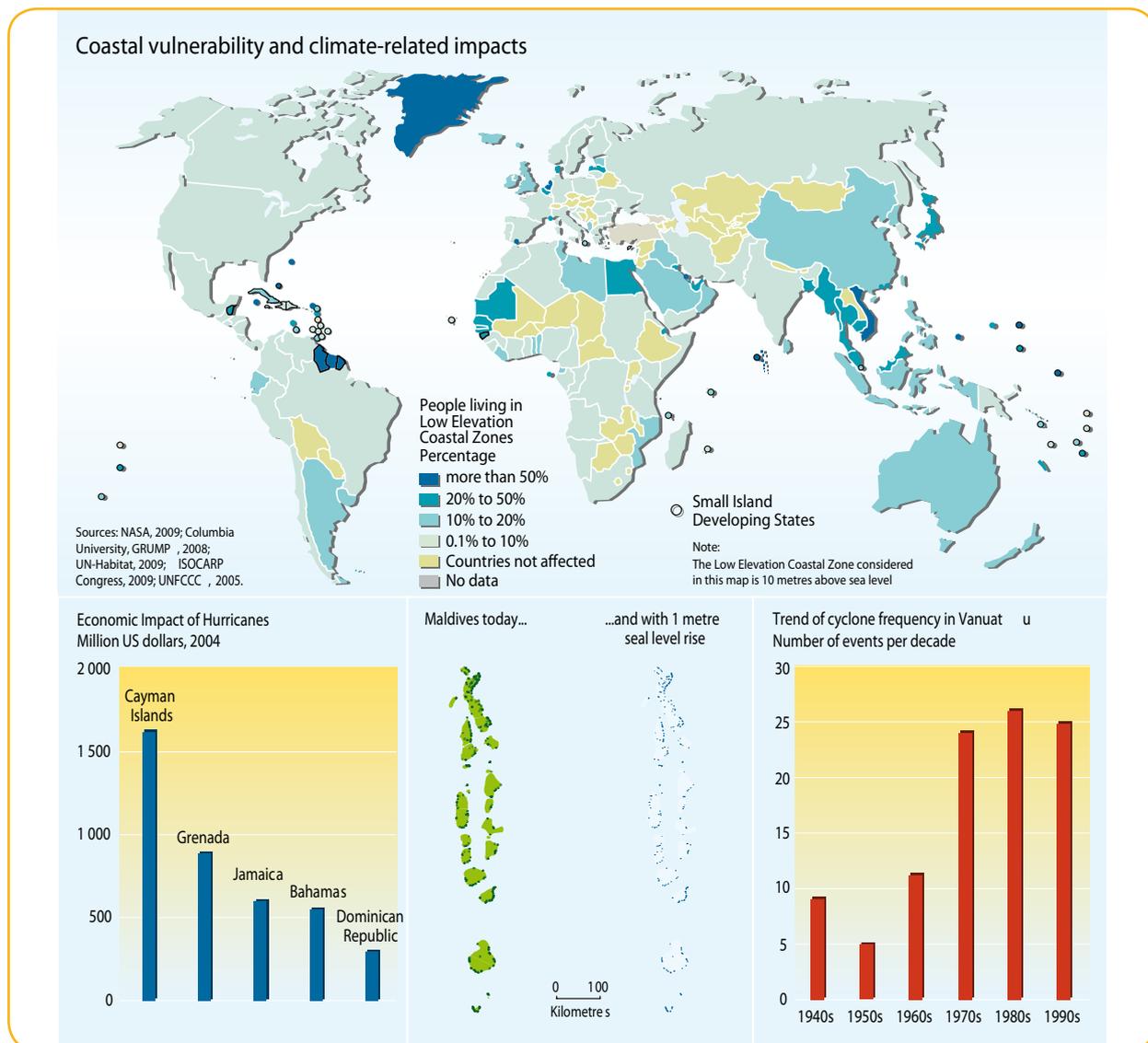
## Costal systems and low lying areas

Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas.

Corals are vulnerable to thermal stress and have low adaptive capacity. Increases in sea surface temperature of about 1-3°C are projected to result in more frequent coral bleaching events and widespread mortality, unless there is thermal adaptation or acclimatisation by corals.

Coastal wetlands including salt marshes and mangroves are projected to be negatively affected by sea-level rise especially where they are constrained on their landward side, or starved of sediment.

Many millions more people are projected to be flooded every year due to sea-level rise by



UNEP/GRID-Arendal and CICERO (n.d.) Many Strong Voices - Turning Vulnerability into Strength

# Get the Facts:

## CLIMATE CHANGE AND SOCIETY

the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.

Adaptation for coasts will be more challenging in developing countries than in developed countries, due to constraints on adaptive capacity.

### Industry, settlement and society

Costs and benefits of climate change for industry, settlement and society will vary widely by location and scale. In the aggregate, however, net effects will tend to be more negative the larger the change in climate.

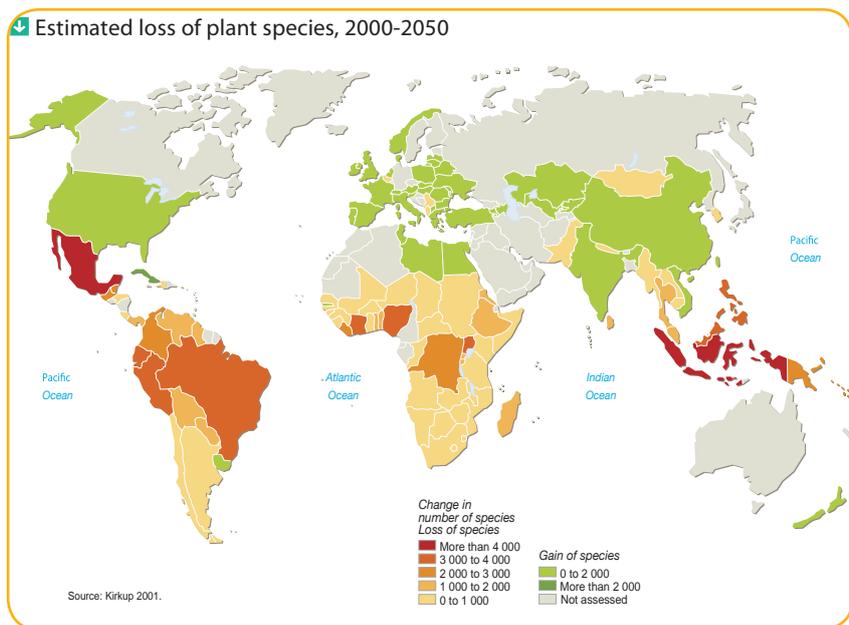
The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies.

Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

### Health

- Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity, through:
- increases in malnutrition and consequent disorders, with implications for child growth and development;



UNEP/ GRID-Arendal (2009) Vital Forest Graphics

- increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts;
- the increased burden of diarrhoeal disease;
- the increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and,
- the altered spatial distribution of some infectious disease vectors.
- Climate change is expected to have some mixed effects, such as a decrease or increase in the range and transmission potential of malaria in Africa.

Studies in temperate areas have shown that climate change is projected to bring some benefits, such as fewer deaths from cold exposure. Overall it is expected that these benefits will be outweighed by the negative health effects of rising temperatures worldwide, especially in developing countries.

The balance of positive and negative health impacts will vary from one location to another, and will alter over time as temperatures continue to rise. Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives and infrastructure and economic development.

## Vulnerability in Africa

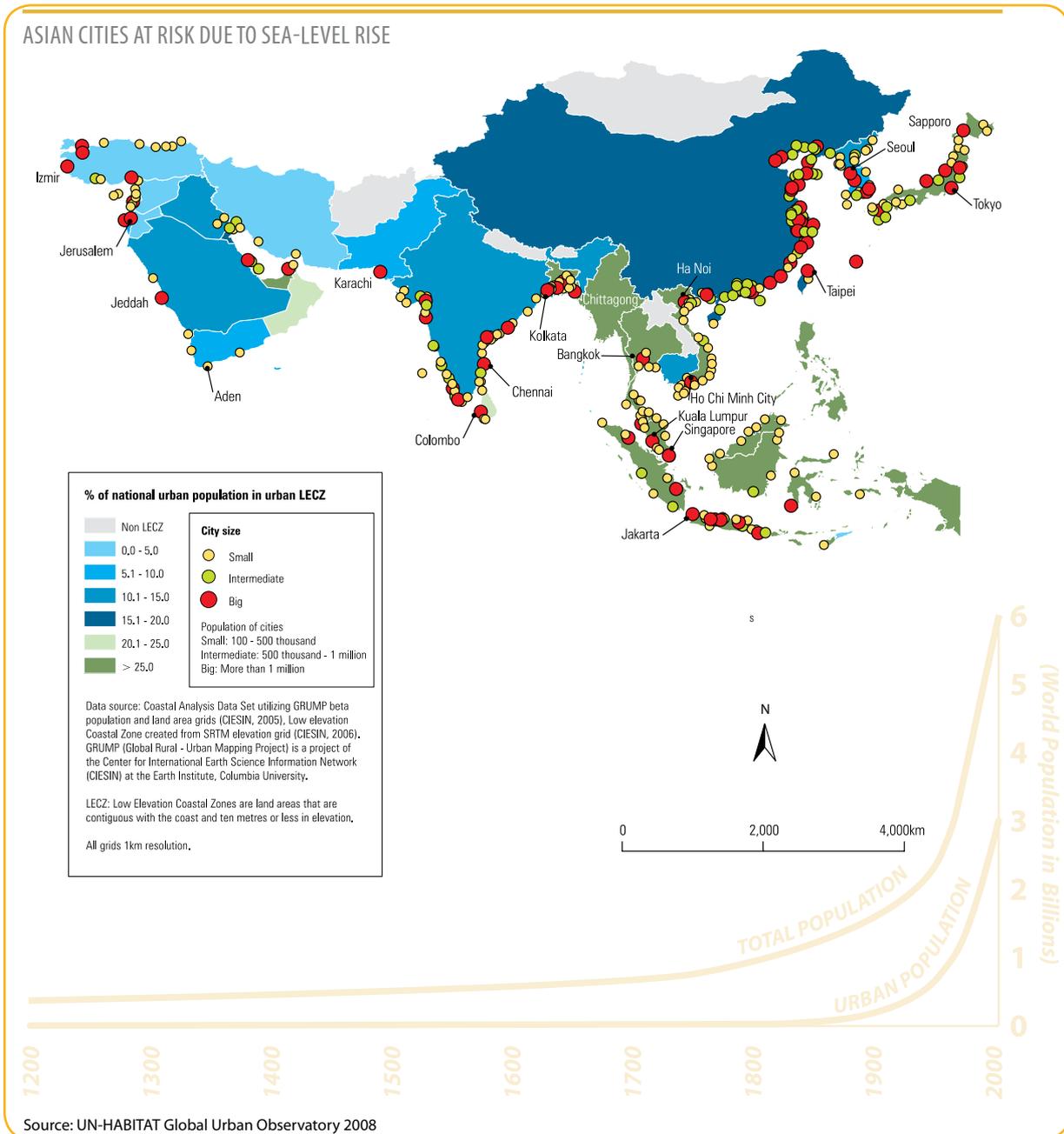


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# Get the Facts:

## CLIMATE CHANGE AND SOCIETY

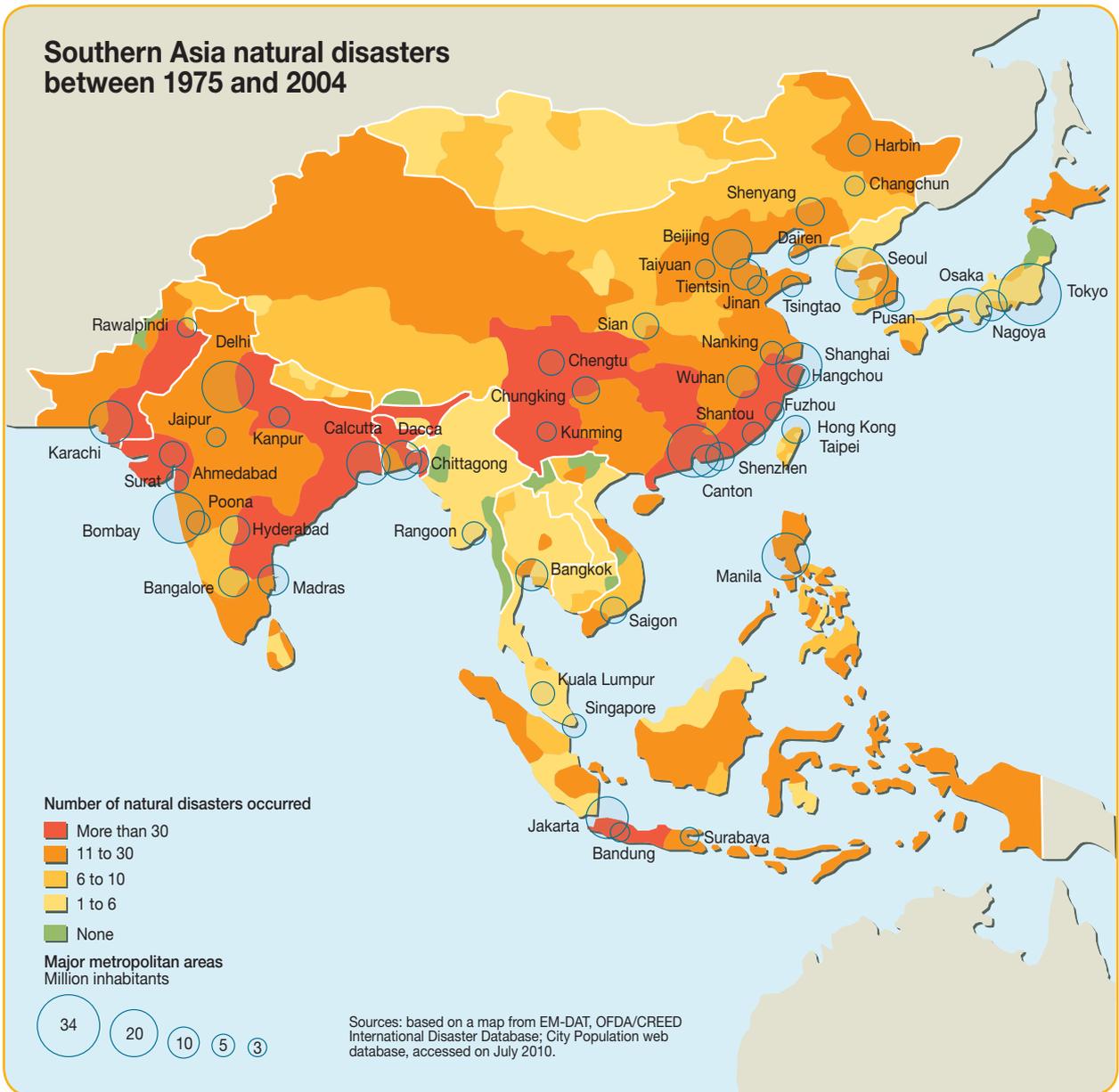
### Vulnerability in Asia



UN-HABITAT(2008). *State of the World Cities 2008/9*.



### Southern Asia natural disasters between 1975 and 2004



UNEP/GRID-Arendal Maps and Graphics Library

# Get the Facts:

## CLIMATE CHANGE AND SOCIETY

### Vulnerability in Europe



European Environment Agency.

## Vulnerability in Small Island States

Impacts	Sectoral Vulnerabilities	Adaptive Capacity
<p><b>Temperature</b></p> <ul style="list-style-type: none"> <li>Warming above the global mean is predicted in most of Latin America.</li> <li>In southern South America warming similar to global mean.</li> <li>Precipitation, snow and ice</li> <li>Decrease in annual precipitation in most of Central America and in the southern Andes, although large local variability in mountainous areas.</li> <li>Increase in winter precipitation in Tierra del Fuego.</li> <li>Increase in summer precipitation in south-eastern South America.</li> <li>Uncertain rainfall changes over northern South America, including the Amazon forest.</li> <li>Increasing reduction and disappearance of Andean glaciers.</li> </ul> <p><b>Extreme events</b></p> <ul style="list-style-type: none"> <li>Increasing frequency and intensity of extreme events, many related to ENSO, particularly:               <ul style="list-style-type: none"> <li>intense rainfall events causing landslides and severe floods;</li> <li>dry spells and drought, such as in northeast Brazil;</li> <li>heat waves, with particularly major effects in megacities due to heat island effects;</li> </ul> </li> <li>Increase in intensity of tropical cyclones in the Caribbean basin.</li> </ul>	<p><b>Water</b></p> <ul style="list-style-type: none"> <li>Increase in the number of people experiencing water stress – likely to be 7–77 million by the 2020s.</li> <li>Runoff and water supply in many areas compromised due to loss and retreat of glaciers.</li> <li>Reduction in water quality in some areas due to an increase in floods and droughts.</li> </ul> <p><b>Agriculture and food security</b></p> <ul style="list-style-type: none"> <li>Reductions of crop yields in some areas, although other areas may see increases in yields.</li> <li>By the 2050s, 50% of agricultural lands are very likely to be subjected to desertification and salinization in some areas.</li> <li>Food security a problem in dry areas where agricultural land subject to salinization and erosion-reducing crop yields and livestock productivity.</li> </ul> <p><b>Health</b></p> <ul style="list-style-type: none"> <li>Risks to life due to increases in the intensity of tropical cyclones.</li> <li>Heat stress and changing patterns in the occurrence of disease vectors risk to health.</li> </ul> <p><b>Terrestrial Ecosystems</b></p> <ul style="list-style-type: none"> <li>Significant habitat loss and species extinctions in many areas of tropical Latin America, including tropical forests, due to higher temperatures and loss of groundwater with effects on indigenous communities.</li> </ul> <p><b>Coastal Zones</b></p> <ul style="list-style-type: none"> <li>Impacts on low lying areas, such as the La Plata estuary, coastal cities and coastal morphology, coral reefs and mangroves, location of fish stocks, availability of drinking water and tourism due to sea level rise and extreme events.</li> </ul>	<ul style="list-style-type: none"> <li>The lack of modern observation equipment and climate monitoring hinders the quality of forecasts lowering public trust in climate records and applied meteorological services. This has a negative impact on the quality of the early warning and alert advisory services.</li> <li>Some social indicators have improved in recent decades including life expectancy, adult literacy and freshwater access. However, adaptive capacity is limited by high infant mortality, low secondary school enrolment and high levels of inequality both in income and in access to fresh water and health care as well as gender inequalities.</li> </ul>

## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE IN THE CLASSROOM



## Day Three At-A-Glance

Sample Schedule (Duration)	Session	Materials Needed
9:00 - 9:30 (30 minutes)	Revisiting Day Two	<ul style="list-style-type: none"> <li>• PowerPoint slide 2</li> </ul>
9:30 - 10:30 (60 minutes)	Activity: Climate Change Mitigation and Adaptation	<ul style="list-style-type: none"> <li>• PowerPoint slides 3-4</li> <li>• One cut-up set of the 'Climate Change Actions?' statements (Handout 1) per four participants</li> <li>• One sheet of chart paper, a marker and a paste stick per four participants</li> </ul>
10:30 - 10:45 (15 minutes)	Break	
10:45 - 11:00 (15 minutes)	Input: Mitigating and Adapting to Climate Change	<ul style="list-style-type: none"> <li>• Handout 1 and PowerPoint slides 5-9</li> </ul>
11:00 - 12:00	Activity: Climate Change Mitigation Continuums	<ul style="list-style-type: none"> <li>• One cut-up set of twelve 'Climate Change Mitigation Strategies?' (Handout 2) per two participants</li> <li>• One strip of paper (made by cutting chart paper lengthwise into two halves), marker and paste stick per two participants</li> <li>• PowerPoint slide 10</li> </ul>
12:00 - 13:00 (60 minutes)	Lunch	
13:00 - 13:50 (50 minutes)	Activity: Adaptation Stories	<ul style="list-style-type: none"> <li>• Handout 3 (Set of 'Climate Change Adaptation Stories' - already distributed to participants)</li> <li>• 4 slips of paper per participant</li> <li>• Additional sheets of paper</li> <li>• Flip chart and marker</li> </ul>
13:50 - 14:05 (15 minutes)	Input: Disaster Risk Reduction	<ul style="list-style-type: none"> <li>• PowerPoint slides 11-17</li> </ul>
14:05 - 14:50 (45 minutes)	Activity: Categories of Disaster Risk Reduction	<ul style="list-style-type: none"> <li>• One cut-up Set of Disaster Risk Reduction descriptions (Handout 4) per group of 3 participants</li> <li>• Cut-up sets of Disaster Risk Reduction Strategies labels (Handout 5), Children's Contributions to DRR labels (Handout 6) and Modes of Child and Youth DRR labels (Handout 7) per group</li> <li>• 10 lengths of thin string per group</li> <li>• Blank slips of paper</li> <li>• PowerPoint slide 18-20</li> </ul>
14:50 - 15:05 (15 minutes)	Break	
15:05 - 16:00 (55 minutes)	Activity: The Climate Change Awareness School Committee	<ul style="list-style-type: none"> <li>• One of the four Task Cards (Handout 8) per group so that all Task Cards are being used</li> <li>• One sheet of chart paper, marker and pins per group</li> <li>• Pins or adhesive tape</li> <li>• PowerPoint slide 21</li> </ul>
16:00	Close	<ul style="list-style-type: none"> <li>• Participants asked to complete Handout 6</li> <li>• Remind participants to read through Day Three 'Classroom Activities' and bring any questions to the next day's workshop</li> <li>• Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Four</li> </ul>

## Day Three Facilitation Guide

This module begins by delving deeper into climate change mitigation and adaptation and the overlaps and relationships between the two. Mitigation strategies are introduced and adaptation is illustrated through stories from around the world. Participants explore disaster risk reduction through descriptive examples and learn about the concepts of resilience and vulnerability. Special attention is given to the contribution of schools and young people to community disaster risk reduction strategies. The day closes with a role-play in which groups describe their plans for whole-school and school-in-community responses to climate change to a Ministry of Education official.

[Click to consult the Summary of what is learned on Day Three](#) 

[Click to download the Powerpoint slides in pptx format for Day Three](#) 

[Click to consult the Powerpoint slides for Day Three](#) 

### 9:00-9:30 Revisiting Day Two

With slide 2 showing, facilitator leads a two-part discussion, opening each part with one of the following questions:

- As you wrote your reflections diary entry for Day Two did any issues and questions arise that you would like to raise with the group?
- Do you have any questions concerning the classroom activities for Day Two in your activities file?

### 9:30-10:30 Activity: Climate Change Mitigation and Adaptation

#### Time Needed

- 60 minutes (35 minutes working in groups; 25 minutes reporting back and whole group discussion)

#### Objectives/Explanation

- To refine understandings of the concepts of climate change mitigation and climate change adaptation
- To explore the overlaps and synergies between the two concepts

#### Materials Needed

- One cut-up set of the Climate Change Actions statements (Handout 1) per group of four participants
- One sheet of chart paper, a marker and a glue stick per group of four participants

#### Procedure

1. Briefly introduce the concepts of climate change mitigation and climate change adaptation (slides 3 and 4) and take questions.
2. Divide the participants into groups of four.
3. Hand out a set of statements, chart paper, a marker and a glue stick to each group.
4. Ask groups to divide their chart paper into two columns one titled 'Mitigation', one 'Adaptation.'
5. Ask them to discuss each statement and decide whether it is an example of climate change mitigation or adaptation, pasting it in the appropriate column and adding in a note explaining their decision.

#### Facilitation Guidance

While questions of climate change mitigation and adaptation have been ever-present in the first two workshop days, this activity introduces the concepts in a more direct, concrete and focused way by examining their interrelationship and potential contribution to a secure and sustainable future. In the final debriefing, the facilitator might ask the following questions:

- To what extent are mitigation and adaptation 'opposite sides of the same coin'?
- Do proposals for mitigation and adaptation seem equally achievable and realistic?
- Are they about reforming or transforming society?
- Looking at the sets of statements clustered under the 'Mitigation' and 'Adaptation' headings, what implications does each set have for a working understanding of 'sustainable development'?
- How would your world look if the 'Mitigation' statements were put into effect?
- How would your world look if the 'Adaptation' statements were put into effect?

[Click to consult Handout 1](#) 

[Click to consult slides 3-4](#) 

6. Where the group thinks a statement is an example of both mitigation and adaptation or if they are unable to decide or if they can't agree, ask them to paste the statement over the line between the two columns, again adding a note of explanation.
7. If a group thinks an adaptation action might contribute to mitigation or vice-versa ask them to circle the statement and draw an arrow into the other column, with an explanations written along the arrow.
8. Have groups take turns reporting back on particular statements and their decisions, inviting other groups to agree or disagree by way of initiating a wider discussion of the statement.
9. After each statement has been reviewed, broaden the discussion to consider the potential contribution of climate change mitigation and adaptation to the prospects for sustainable development.

**10:30-10:45 Break**

**10:45-11:00 Input: Mitigating and Adapting to Climate Change**



Click to consult slide 5-9

- Revisit climate change mitigation and adaptation (slide 5)
- Explore mitigation examples and perspectives (slides 6 and 7)
- Look at the climate change adaptability/vulnerability interface (slide 8)
- Go through the general strategies for climate change adaptation (slide 9)

**11:00-12:00 Activity: Climate Change Mitigation Continuums**

**Time Needed**

- 60 minutes (15 minutes in pairs; 20 minutes in groups of six; 25 minutes for whole group feedback and discussion)

**Objectives/Explanation**

- To understand that there are immediate or existing driving forces behind climate change as well as more fundamental driving forces
- To recognize that mitigating climate change by addressing immediate driving forces is itself complex, costly and demanding in that it calls for a transformation in assumptions, expectations, lifestyles and dominant world view
- To consider individual and community change advocacy and activities with regard to mitigating fundamental climate change driving forces

**Materials Needed**

- One cut-up set of twelve Climate Change Mitigation Strategies? (Handout 2) per two participants
- One strip of paper (made by cutting chart paper lengthwise into two halves), marker and glue stick per two participants

**Procedure**

1. Hand out a strip of paper and marker to each pair of participants and ask them to draw a line along the length of their strip.

**Facilitation Guidance**

The 'Mitigation Strategies' laid out on the cards recall the points made in slides 6 and 7 concerning a potential spectrum of strategies that respond to clearer and more immediate climate change driving forces, as well as those that respond to deeper or more underlying driving forces. The range of criteria used and the process of having pairs rethink them according to different criteria are intended to elicit the problems arising from both types of strategy.

For example, are mitigation strategies that focus on greenhouse gas emissions informed by a 'business as usual' mind-set that avoids fundamental changes? In focusing on the scientific and technological is there avoidance of the ethical and justice dimensions of climate change? What kinds and level of resistance will these strategies encounter? From what source(s)? Do the mitigation strategies that focus on what are seen as deeper socio-economic and psychological driving forces of climate change pose such a challenge to the existing global fabric of society that they are out of the question? What kinds and level of resistance will they encounter? From what source(s)? Or, are there ways they could be pursued? What spectrum of mitigation challenges should be taught in school? What skills and capacities do schools and communities need to develop so that they can contribute to climate change mitigation? The facilitator should draw on these questions in the closing debate and discussion.



Click to consult Handout 2

2. Distribute a cut-up set of Climate Change Mitigation Strategies? to each pair and explain that the task is to consider where they would place each strategy on a continuum.
3. Allot each pair criteria for making their decisions from those laid out in slide 10, ensuring that the sets of criteria are equally used across the pairs.
4. When they have reached agreement about where to position the strategies, have them stick the strategies along the line. Say that careful positioning of strategies relative to one another matters. If, as a pair, they cannot reach agreement about the positioning of any of the strategies, they should write notes on the strip explaining their disagreement(s).
5. When the task has been completed, ask each pair to get together with two other pairs ensuring that all three pairs worked with different criteria.
6. Ask each pair in the group of six to explain and justify their positioning decisions. The other two pairs should serve as 'critical friends'.
7. After this, invite the group of six to engage in a discussion about how and why the criteria they worked with influenced their positioning of strategies.
8. In a whole group session, first, invite groups to provide feedback on the activity itself, and second, open the session to general debate and discussion.

Click to consult  
slide 10 

## 12:00-13:00 Lunch

## 13:00-13:50 Activity: Adaptation Stories

### Time Needed

- 50 minutes (10 minutes for reviewing the stories and writing responses; 10 minutes as a group of six; 10 minutes in pairs; 10 minutes as a reconvened group of six; 10 minutes of summary discussion)

### Objectives/Explanation

- To identify the characteristics of effective climate change adaptation

### Materials Needed

- Set of Climate Change Adaptation Stories (Handout 3) already distributed to participants
- 4 slips of paper per participant
- Additional sheets of paper
- Flip chart and marker

### Procedure

1. Give participants a short while to reacquaint themselves with the collection of Climate Change Adaptation Stories that were given as overnight reading.
2. Working quietly on their own, have them reflect on the stories and write four short paragraph responses to the stories, one response per slip of paper, each beginning 'Effective climate change adaptation is about...'
3. Invite participants to form groups of six and sit in a circle around a table or on the floor. Request one member of each group to collect in the 24 responses, shuffle them, and then deal them out again as in a game of cards.
4. Ask everyone to look at their 'hand', discarding into a central pool any responses they wrote and any about which they have reservations. They should continue to discard into and pick up from the central pool until they are satisfied with their 'hand'. Say that the aim is for each group member to end up with a final 'hand' of up to three reactions that, to repeat, (a) they did not write themselves and (b) with which they fully agree.
5. Invite groups to break into pairs, to read their chosen paragraphs to each other, and to explain why they chose them.

### Facilitation Guidance

This activity offers a format for sharing of reflections on climate change adaptation in a thorough yet time efficient way. Participants are asked to critically reflect on the stories, to critically reflect on the perspectives of colleagues on the stories, and to try to reach a joint agreed position on what makes for effective climate change adaptation. It is important that the facilitator sets a brisk business-like pace for the activity. A detailed debriefing in this case is not essential; rather let the learning that emerges 'sink in'.

Click to consult  
Handout 3 

6. Ask pairs to negotiate and write a composite one-paragraph statement beginning 'Effective climate change is about...' Alternatively, if the pair cannot agree, they write a paragraph explaining their disagreement(s).
7. Invite the groups of six to regroup, share, explain and discuss their composite statements.
8. Lead a short whole group discussion asking each group, one by one, to identify up to three key criteria and elements of effective climate change adaptation, noting their contributions on the flip chart.

### 13:50-14:05 Input: Disaster Risk Reduction



Click to consult slides 11-20

- Explain that Disaster Risk Reduction (DRR) is a relatively new approach concerned with pre-empting or lessening the effects of natural disasters (earthquakes, floods, landslides, volcanic eruptions) on people and communities.
- Explain that there are clear links between DRR and climate change (slides 11 and 12).
- Discuss some DRR definitions and insights (slide 13-15), and introduce the idea of vulnerability.
- Display the disaster risk calculation and global disaster numbers and trends (slide 16-17).
- Offer an overview of the categories of DRR strategies (slide 18).
- Give an overview of potential child and youth contributions to DRR (slides 19-20).

### 14:05-14:50 Activity: Categories of Disaster Risk Reduction

#### Time Needed

- 45 minutes (30 minutes in groups; 15 minutes whole group discussion)

#### Objectives/Explanation

- To introduce a range of examples of school-based/focused and community focused DRR initiatives
- To have participants organize them according to the genre of DRR strategies, genre of child contributions to DRR, and modes of child/youth contribution to DRR
- To build appreciation of the overlapping nature of the three genres and of the different categories under each genre

#### Materials Needed

- One cut-up Set of Disaster Risk Reduction in Action descriptions (Handout 4) per group of 3 participants
- Cut-up sets of Disaster Risk Reduction Strategies labels (Handout 5), Children's Contributions to DRR labels (Handout 6) and Modes of Child and Youth DRR labels (Handout 7) per group
- 10 lengths of thin string per group
- Blank slips of paper

#### Procedure

1. Invite participants to form groups of three and sit at tables or on the floor.
2. Hand out a set of Disaster Risk Reduction in Action descriptions to each group and have them read them through.
3. Invite them to use the blank slips available to write additional disaster risk reduction descriptions out of their own experience, especially but not exclusively those connected to climate change.

#### Facilitation Guidance

This is a busy and deceptively simple activity. The use of string allows for a group to revise the placement of descriptions so as to flexibly represent their new thinking as it emerges. They will find that the overlap of two or more loops may have a positive reinforcing effect on the other strategy categories! In a time-efficient way, the activity familiarizes participants with key DRR approaches and the potential for student engagement in DRR. It is important for the facilitator to be a helpful timekeeper so that approximately a third of group time is spent on each of the three sorting tasks. It is a good idea to begin the briefing with questions on what participants have learned but special attention should be given to new categories (labels) created, and why, and examples of DRR that were added to the descriptions out of their own experience.



Click to consult Handout 4

4. Then hand out the lengths of string and a set of Disaster Risk Reduction Strategies labels (Handout 5) to each group.
5. With slide 18 showing, ask them to make string loops on their tabletop or on the floor and place a label in each hoop. Their task is to go through the Disaster Risk Reduction in Action descriptions once again and decide in which hoop (i.e. under which strategy category) each statement fits.
6. Explain that if they feel that a description falls under more than one strategy category then they can overlap one – or more – loops and place the description in the common space created.
7. Also explain that for this task there are extra pieces of string per group. Advise participants that they can use these for adding strategy categories of their own making using the blank labels available for this purpose.
8. Once finished, ask them to disassemble the loops and put away the labels but retain the descriptions. With slide 19 showing, distribute the Children’s Contributions to DRR (Handout 6) labels and ask them to repeat the process using the new categories. Again, the extra pieces of string and blank labels are there so participants can add their own categories.
9. Show slide 20 and distribute the Modes of Child and Youth DRR labels (Handout 7) and ask groups to repeat the process a third time with the new categories.
10. Facilitate a whole group reflection on the exercise.

[Click to consult Handout 5](#) 

[Click to consult slide 18-20](#) 

[Click to consult Handout 6](#) 

[Click to consult Handout 7](#) 

### Variation

- If time is short, have half the groups attempt step 8 above and half attempt step 9, sharing the experiences of the two groups in the debriefing.

**14:50-15:05 Break**

**15:05-16:00 Activity: The Climate Change Awareness School Committee**

### Time Needed

- 55 minutes (5 minutes introduction; 25 minutes ‘in committee’; 25 minutes reporting back and discussion)

### Objectives/Explanation

- To introduce the idea of a whole-school and school-in-community approach to climate change education for sustainable development
- To pool concrete ideas for a climate change education for sustainable development whole school and school-in-community approach

### Materials Needed

- One of the four Task Cards (Handout 8) per group so that all Task Cards are being used
- One sheet of chart paper, marker and some pins per group
- Pins or adhesive tape

### Procedure

1. Briefly introduce the idea of a whole school approach to CCESD (slide 21 and Conceptual Framework, p. 14-15).
2. Invite participants to form groups of 5 or 6.
3. Distribute one Task Card per group, the chart paper, pins and markers.

[Click to consult Handout 8](#) 

[Click to consult slide 21](#) 

### Facilitation Guidance

The facilitator’s role in creating a lively atmosphere is very important here. An example needs to be set by going into role in a convincing and entertaining way. The facilitator should imagine the kind of style a Ministry official would adopt at such a meeting and adopt the style herself/himself so it is recognizable to participants. Participants should be encouraged to enhance their role by adding detail (for instance, a parent might also be an environmentalist; a teacher might be either quite conservative or quite progressive). The tight time schedule for committee deliberations and the hearing is intended to create an energetic excitement. This should be a lively end to the day. Note: the cards can be adjusted to suit local circumstances.

## Day Three: Learning for Climate Change Adaptation and Mitigation

4. Announce that each group is made up of members of the Climate Change Awareness School Committee of the school introduced on their card. They are to give the school a name, determine who will take which role, and decide on some concrete (fictional) detail concerning the underscored items on their card.
5. Tell groups that they have about 20 minutes to come up with outline ideas for a whole school and school-in-community approach to CCESD for their school before they deliver an oral report on their proposals at a special meeting chaired by a Ministry of Education representative who has been charged with finding the best ideas for CCESD.
6. After about 20 minutes, enter into the role of Ministry representative and call the meeting to order. Ask each group to make their presentation (first introducing their school and its environment). Allow a maximum of three questions from other participants (with everyone staying in role). After the conclusion of all the presentations, chair further discussion with everyone still in role. Then allow several minutes of reflection out of role on interesting learning from the activity.
7. Hang the committee charts on the wall or pin board for future consultation.

### 16:00 Close



- Ask participants to complete a feedback sheet for Day Three (Handout 9).
- Remind participants to read through the Classroom Activities for the day and to bring any questions to the next day's workshop.
- Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Three.



United Nations  
Educational, Scientific and  
Cultural Organization



## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY THREE HANDOUTS

## Handout 1. Climate Change Actions?

 Click to consult Factsheet information on Climate Change Mitigation and Adaptation

<p><b>'Roll back malaria' campaigns</b></p> <p>As temperate zones become hotter and the malarial mosquito migrates north and south, a 'roll-back malaria' campaign is put in place to stop malaria epidemics from breaking out in countries like Argentina and New Zealand.</p>	<p><b>Coastal defences</b></p> <p>Coastal defences in New Orleans are built up so that rising sea levels coupled with storm surges – both likely effects of global warming – don't lead to a repeat of the events that occurred when Hurricane Katrina struck in 2005.</p>
<p><b>Drought-resistant seeds</b></p> <p>Scientists develop new strains of seed that will give a good crop yield even in drought conditions.</p>	<p><b>Air travel restrictions</b></p> <p>Strict limits are placed on frequency of air travel and flying is also made much more costly for the traveller.</p>
<p><b>International disaster force</b></p> <p>The United Nations sets up a specialized international disaster force that is on standby to help nations and communities overrun by climate-induced disaster.</p>	<p><b>Harnessing wave and tidal power</b></p> <p>Wave and tidal energy farms are set up along coastal areas to harness the energy of waves and tides and generate clean electricity.</p>
<p><b>Locally sourced food</b></p> <p>Growing and eating locally grown and seasonal food is encouraged in high income nations to cut down on food air-freight miles and to make people less reliant on food from other countries, the supply of which may dry up eventually as climate change intensifies.</p>	<p><b>Shrinking beef industry</b></p> <p>The tax on beef goes up and up so that beef burgers and steaks get more and more costly and the beef industry shrinks. [Beef cattle are often reared in areas of deforested areas that would have soaked up CO<sub>2</sub> and belching cattle emit a significant amount of methane (CH<sub>4</sub>), a powerful greenhouse gas, into the atmosphere.]</p>
<p><b>Capturing carbon</b></p> <p>Technologies are developed to recover carbon from the atmosphere and seal it permanently away in deep underground reservoirs.</p>	<p><b>Community classes for adaptation</b></p> <p>At local community centres, classes are held to teach community members how to protect themselves from extreme weather events.</p>
<p><b>Stricter building insulation standards</b></p> <p>To cut energy losses from buildings, new regulations are brought in that require owners to insulate their buildings to the highest standards at their own cost, thus reducing personal and national energy consumption and CO<sub>2</sub> emissions.</p>	<p><b>Emergency food stockpiling</b></p> <p>Governments build massive stockpiles of food for emergency consumption in the event that the effects of climate change – inland drought and wild fires, lowland and coastal flooding – lead to food shortages.</p>
<p><b>Flood management initiatives</b></p> <p>New flood protection and drainage systems are put in place to protect communities that have experienced flooding following heavy rainstorms.</p>	<p><b>Voluntary simplicity</b></p> <p>A 'voluntary simplicity' movement encourages people everywhere to live a more simple life with few possessions and in ways that don't exploit and destroy the environment.</p>
<p><b>Species protection</b></p> <p>Deep water-preserving ditches are created to protect rare birds from extinction. The birds feed on insects that need water for breeding - water that has started drying up in the summer heat. Their food source protected, the birds can survive in a warming climate.</p>	<p><b>Reducing car usage</b></p> <p>The decline in oil supplies and the climate threat encourage governments to use taxes and restrictions to phase-out gas-powered vehicles while offering big tax breaks to 'car-less' families and some concessions to families with electric cars.</p>
<p><b>Education for sustainable consumption</b></p> <p>Schools introduce lessons to encourage students to consume more sustainably given that the global consumer economy is seen as a major cause of climate change.</p>	<p><b>Capping carbon dioxide</b></p> <p>Over a ten-year period factories and industries are forced by law to reduce the amount of carbon dioxide released into the atmosphere by 50% with stiff penalties for failure to comply.</p>

[↩ back to Facilitation Guide: Climate Change Mitigation and Adaptation](#)

## Handout 2. Climate Change Mitigation Strategies?

Reduce unsustainable consumption habits, replacing them with forms of <b>personal satisfaction</b> that have a smaller impact on the environment.	<b>Stop/ban the logging</b> of old-growth forest and promote widespread reforestation.
Introduce laws for high standards of <b>building insulation</b> and link new buildings to local <b>renewable energy</b> installations.	Reduce road and air travel by penalizing car ownership and air travel with <b>'fuel-guzzler' taxes</b> .
De-urbanize and return to self-sufficient, <b>sustainable rural lifestyles</b> .	Take measures to reduce or even reverse, <b>global population growth</b> .
Return to <b>local food economy</b> with consumption of locally-sourced food with low 'food mileage.'	<b>Cap manufacturing emissions</b> and otherwise 'clean up' industry.
Change to <b>climate-friendly modes of transport</b> , such as electric cars and more energy-efficient airplanes.	Move away from coal-generated energy to <b>renewable energy</b> .
Create a 'level playing field' between high income and low income countries with high income countries paying <b>climate change development reparations</b> for their historically high greenhouse gas emissions.	Reduce, halt or reverse the economic growth model in favour of a <b>'steady-state' economy</b> (replacing 'Gross National Product' with 'Gross National Happiness' as the measurement of national wellbeing).

Click to consult  Factsheet information on Climate Change Mitigation

[↩ back to Facilitation Guide: Climate Change Mitigation Continuums](#)

## Handout 3. Stories of Adaptation

 Click to consult Factsheet information on Climate Change Adaptation

### Story 1

#### Floating houses: Architecture of the future in especially threatened areas?

Dutch architects and planners developed concepts for ‘amphibian houses’ as a strategy for adapting to steadily rising sea levels. The planners’ idea is that houses need not be built on solid ground; they can also be built on water. The first project of this kind has been built close to the city of Maasbommel. Dura Vermeer, the largest building company in the Netherlands, built 46 houses that are anchored to the seabed and can move with the tides.

There are other concepts of water architecture to be explored, such as houses on stilts and waterproof houses. Like ‘amphibian houses’, these would be connected to the power grid and water supply. Especially since the 2005 Request for Proposals from the Ministry of Housing, Spatial Planning and the Environment (VROM), interest in floating houses and cities as a way to adapt to the impacts of climate change has greatly increased. Such houses are also being tested in other cities, such as London and Hamburg. The two cities have built an alliance with the city of Dordrecht in Holland within the framework of an Urban Flood Management (UFM) project, which is co-financed by the Dutch Living with Water Programme. A key concern of the three cities is to transfer knowledge of risk assessments and management.

Source: Taken from: Hans-Peter Meister, Inga Kroger, Martina Richwien, Wilson Rickerson, and Chad Laurent (2009). *Floating Houses and Mosquito Nets: Emerging Climate Change Strategies Around the World*, MEISTER Consultants Group, pp. 92-93.

### Story 2

#### An Experience in Perpetual Adaptation

Namari Peuhl is a small village located in northeast Niger, a short distance from the Sahara Desert. The droughts of the 1980s profoundly disrupted the herding practices and socio-cultural values of nomadic peoples. The 1984 drought was the worst of all. Decimation of the cow and sheep herds exposed their vulnerability and sent a genuine shockwave through the Namari community. More than 90% of the herd animals died and the rest were in a critical state.

The extent of the drought phenomenon made it impossible to follow long routes. Tribal chiefs were forced to make the historic decision to remain in the lowlands, which were still humid, and transform their herding practice into an agro-pastoral system based on household vegetable and animal production. As they said: ‘If we leave the hillsides, we will lose the rest of our herds; the droughts no longer allow us to make our living from nomadic herding.’

The survival strategy was to convert to pastoral farming and the priority was food crop production. Survival came first; if possible, the herd could be rebuilt later. Staying in the lowlands made it possible to remain close to waterholes and diversify agricultural production. Market gardening was practiced in addition to rainy season farming.

Djibo Mego, the chief of the Namari and former herder, had abandoned animal husbandry after repeated droughts destroyed pasturelands and made nomadic grazing difficult. However, when many people from the village migrated, he decided to stay to support his parents. He turned to rain-fed agriculture. However, the long hungry season following the brief rainy season obliged him to rethink his plan and look at other types of crops that could be grown during the nine-month dry season. Market gardening provided him with that opportunity.

Market gardening made it possible to fully integrate with the agrarian system of the region. The herders’ villages became permanent and adapted to the socio-economic realities of the zone located in the heart of the Sahel region. The local authorities recognized and supported the integration of herding into the local land management system, and adaptation of cultural values to the new context was ensured.

Many members of the community who had refused to stay, believing they could save their herds by crossing the great Sahel, returned without a single animal. Djibo took them in, helped them settle in the village, and made them welcome. But he was saddened to recall that others had left, never to be heard from again.

Today, vegetable crops combined with rain-fed crops enable the people of Namari to grow a surplus of produce, which they can sell. This spark of hope reminds the hardworking people, and Djibo Mego most of all, of some of the difficult days of their history. However, it also shows them that they are the architects of their own collective change.

Agro-pastoral practices have not affected their cultural values. In fact, the community is beginning to be called on frequently by the local authorities to mediate in conflicts between herders and farmers in other zones.

Source: This story is from *Adaptation Stories*, by Denton, F. et al. © 2010 IDRC. The collection was produced with support from Canada's International Development Research Centre and the United Kingdom's Department for International Development, through the Climate Change Adaptation in Africa programme.

### Story 3

#### Relocation and Rehabilitation: Climate Change Adaptation in Rwanda

Once home to populations of chimpanzees and golden monkeys, the sloping terrain of Rwanda's Gishwati Forest has in recent decades suffered severe environmental degradation exacerbated by devastating climatic disasters. Landslides, floods and torrential rain have claimed lives, demolished human settlements, and destroyed thousands of hectares of forest and farmland. The 1994 genocide displaced many thousands of people, which led to further land clearing and extensive degradation as desperate people were forced to settle on steeply sloping land in this densely populated country.

The UNEP/UNDP Climate Change and Development – Adapting by Reducing Vulnerability (CC DARE) programme provided Rwanda with funding to develop a Land Suitability and Land Use Plan. This helped guide the relocation of human settlements from high-risk zones, as well as the rehabilitation of vacated land, so as to reduce the vulnerability of local communities and ecosystems. Risk assessments showed that if further erosion of the Gishwati forest was to be avoided, 43 per cent of the terrain – around 2844 hectares – should be used for pasture, forest plantation and fruit trees. Of this, 1393 hectares should be preserved and invasive human activities forbidden.

CC DARE showed that small, flexible and targeted funding works. Working with the Rwandan Ministry of Environment, local government, districts and communities, and with \$150,000 in funding from the Danish Ministry of Foreign Affairs, UNEP provided timely and focused support for the planning that is vital for moving communities and rehabilitating land. The project also developed manuals that enabled a proper assessment of land use – guiding communities and authorities on carbon storage, high value crops, soil resilience, sustainable farming systems, bridging periods of food insecurity, and strategies to cope with climate variability. The programme attracted national government interest and inspired larger interventions. The relocation of communities to safer areas was implemented by local government and supported by national funds, demonstrating local fast tracking of climate change adaptation while keeping actions within national development programmes.

The updated Land Suitability and Land Use Map and Plan for Gishwati has had an enormous impact, paving the way for innovative action on climate change adaptation in Africa's most densely populated country. The initial investment has enabled the Rwandan Ministry of Agriculture to access monies for the resettlement of returnees displaced by the 1994 genocide, and for the rehabilitation of land where the risk of landslides and flooding is greatest. Rehabilitation will, in turn, enable Rwanda to play a bigger role in global carbon trading through the establishment of new carbon sinks in Gishwati. The success of the project has helped Rwanda leverage funds from other international sources, and enabled other climate change adaptation programmes in the country to make substantial savings.

There is enormous potential for the project to be replicated elsewhere in Rwanda. There are plans to share the knowledge and experience the project has generated with other central African countries to encourage the approach on a small or large scale beyond Rwanda's borders.

Source: Taken from: UNDP/UNEP. The CCDARE: Climate Change Adaptation & Development Initiative website. <http://www.ccdare.org/Countries/Rwanda/tabid/29633/Default.aspx>

### Story 4

#### **Rainwater Harvesting in Schools: Demonstrating Adaptation to Climate Change in Schools in the Seychelles**

The Republic of Seychelles is vulnerable to particular climate change effects and challenges which include sea level rise, increases in sea surface temperatures and changes in rainfall patterns with short periods of heavy rainfall during the rainy season and severe droughts during the dry season being a common occurrence. Traditionally, Seychelles experiences one rainy and one dry season. During the rainy season, most of the excess rainwater is lost through surface runoff as there is no elaborate rainwater-harvesting scheme. When the dry season sets in, water is scarce and is not enough to meet demand. This problem of water scarcity is made worse by the ever-increasing demand for water as a result of increased economic and social development as well as population growth.

School demand for water has been increasing steadily resulting in high water bills. This, coupled with the effects of persistent severe droughts and artificial water shortages with the government restricting water use during the dry season, made the rainwater harvesting in schools project a timely climate change adaptation initiative while demonstrating how schools facing similar challenges can adapt to climate change.

The project objectives were to:

- Harvest rain water so as to meet the needs of selected schools and to reduce the cost of water bills
- Educate school children on the impact of climate change on water resources and on methods used to adapt to climate change
- Raise awareness among the general public about climate change impacts on the Seychelles and about rainwater harvesting as a means of adapting to water problems caused by climate change

The installation of rainwater harvesting equipment, that includes water tanks and roof gutters in some cases, covered 10 schools in the Seychelles.

The project organized exhibitions for the general public and training and capacity building workshops for the school children and their teachers. Two exhibitions were organized for the general public attracting more than 3200 people. Exhibition materials were books, paintings and films on climate change and its effect on the water sector. Training and capacity building workshops involved teaching and non-teaching staff from 6-7 schools. Over 400 teachers attended the presentations on climate change and its impact on the water sector. In the participating schools, the children had the opportunity to participate in a variety of climate change activities that helped them better understand the relationship between climate change and water.

As a result of the projects' success, rainwater harvesting has now been included in the national climate change strategy and is also being incorporated into the Environment Management Plan for the Seychelles. In addition, a bill to include rainwater-harvesting systems as part of the building codes is under consideration by the Seychelles legislature. This is an indication that rainwater harvesting is a sustainable intervention against climate change to the extent that it can be incorporated into the environmental management strategies of a country. The economic implications of this project cannot go unmentioned. A direct benefit of this project has been a saving of US\$ 250 on water bills registered by the schools. These funds can now be

invested in the improvement of the schools' teaching and learning resources.

Source: Taken from: UNEP/UNDP. The CCDARE: Climate Change Adaptation & Development Initiative website. *Rainwater harvesting in schools: demonstrating adaptation to climate change in schools in the Seychelles- A Summary Report*. For the full report, visit: <http://www.ccdare.org/Outputs/Seychelles/tabid/7195/Default.aspx>

## Story 5

### Adaptation Technologies for Reducing Community Vulnerability

Some 80 per cent of Nepalese people follow traditional cultivation practices and depend on agriculture for their livelihoods. These practices rely on rainwater and the seasons. Many mountain dwellers have observed unusually erratic heavy monsoon rains in recent years. Farmers have noticed delays in the monsoon season, changes in rainfall intensity and duration, reduced productivity, changing vegetation composition and more soil erosion. With less rainfall, rivers and springs have dried up.

Shifting cultivation is still an important land use system for some ethnic groups in Nepal. The system involves clearing a piece of land and growing trees or crops on it until the soil loses fertility and productivity falls. The land is then left and reclaimed by natural vegetation or used for other farming practices. Shifting cultivation is at risk from flooding, soil erosion, landslides and other forms of land degradation resulting from heavy monsoon rains.

With financial support from the Hill Agriculture Research Project, LI-BIRD (the non-government institute called Local Initiatives for Biodiversity, Research and Development) designed and implemented a project to introduce hedgerows in areas where shifting cultivation occurred. The project helped some of the poorest and most vulnerable communities in Nepal, known as Chepang, to develop strategies to cope with adverse climate change impacts and improve their livelihoods by reducing their vulnerability. It demonstrates a community-based adaptation technology suitable for shifting cultivation areas on sloping land in Nepal.

Planting hedgerows in the project areas helped stabilize the soil and thus enhance food production and income. Soil quality improved markedly in project areas and many of the plots with hedgerows are being transformed into terraces. Soil erosion has decreased by 40 per cent in the past four years of the project. The technology has also reduced the workload of women who collect fodder by 30 per cent and has helped other poor and marginalized communities generate income. Such conservation farming practices are gradually replacing traditional slash and burn practices, thus reducing the burning of forested areas.

Source: Taken from: Bimal Regmi, *Community Action in Nepal*, Tiempo, Issue 68, July 2008, pp. 11-14. For the full text, visit: <http://www.tiempocyberclimate.org/portal/archive/pdf/tiempo68low.pdf>

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Adaptation Stories](#)

## Handout 4. Disaster Risk Reduction in Action

### Communicating Disaster Risk Reduction Messages, India

To convey disaster risk reduction messages, school communities in Uttar Pradesh used street theatre, magic shows and puppetry. Creative and educational scripts were written in collaboration with performing artists and disaster risk reduction experts.

### School Relocation, the Philippines

When students in San Francisco municipality learned that their high school was going to be relocated to a landslide risk area, they debated whether and where to relocate the school. A community-wide referendum was held. Students organized a campaign and their proposal for relocating the school to a safer location won in the vote.

### Child-Led Emergency Drill, the Philippines

During the Children’s Summer Camp, a student-led emergency drill was conducted using a drill scenario of a 7.5 magnitude earthquake and an incipient fire with mass casualties.

### Developing School Protection Plans, El Salvador

A pilot project called ‘Youth Participate in Disaster Prevention’ by Plan, an international NGO, aimed at helping local schools and communities reduce their vulnerability to hazards. Capacity and vulnerability assessment workshops were conducted and school risk maps and emergency kits prepared by students and parents. The schools developed School Protection Plans.

### Safe School Buildings, Madagascar

By means of a government development fund, 2,041 cyclone-resistant school buildings in Madagascar have been constructed or retrofitted to withstand cyclone winds of up to 250 km/hour.

### Planting Trees, Haiti

Local children in Thiotte took part in a ‘Risk Reduction Day’ and planted trees in order to help reduce the risk of mud/landslides during flood incidents.

### Participatory Vulnerability Analysis (PVA), Ghana

Participatory Vulnerability Analysis conducted with local communities helped them to analyse how their behaviours could influence the likelihood of disasters, and how behaviour change could reduce the risks they face.

### Community Map, Thailand

As part of Disaster Risk Reduction training programme, students in Phayao province created a community map, which identified risks and safe areas. The map also identified families with children and elders in the community. They learned how to help them in case of a disaster.

### Student Risk Ambassadors, France

In order to motivate students to understand and be involved in helping solve local risks (e.g. floods, industrial accidents), a programme of ‘Student Risk Ambassadors’ was launched in a local high school and was later replicated in other schools.

### Awareness Raising through Radio, the Solomon Islands

The Solomon Islands Red Cross worked with the national disaster management office to design an FM radio quiz for schools for World Disaster Reduction Day on how to reduce disaster risk and impact. It was broadcast in the afternoon when students were at home to the capital Honiara as well as further afield. Messages about climate change were integrated into the program.

### Early Warning, Bangladesh

Bangladesh acted upon early warnings when Cyclone Sidr drew near the country in 2007. Red Crescent volunteers used megaphones to instruct people on what to do to prepare for the onslaught.

### Measuring rainfall, Brazil

Children are taught to measure rainfall to give an early warning of floods or landslides.

<p><b>Hazard Awareness Raising in Schools, Jamaica</b></p> <p>Jamaica runs a multi-hazard awareness programme in schools and its elements include fire and earthquake drills, poster competitions and cultural competitions (e.g. song, dance, skit competitions, exhibitions and talks).</p>	<p><b>Use of Stories, Algeria</b></p> <p>In primary and secondary schools, Algerian students are taught about natural disasters through stories on earthquakes (e.g. the 2003 Boumerdes earthquake), floods and volcanoes at the rate of one lesson per school year.</p>
<p><b>School Roof Water Catchment and Storage, Sri Lanka</b></p> <p>Community participation with an NGO in Sri Lanka allowed inclusion of roof water catchment and storage in a school built to replace one destroyed by the Asian tsunami. This has improved everyday school water supply and provides an emergency water source for future disasters.</p>	

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- School Roof Water Catchment and Storage, Sri Lanka: Wisner, Ben (2006). *Let Our Children Teach Us! A Review of the Role of Education and Knowledge in Disaster Risk Reduction.*
- Safe School Buildings, Madagascar: Inter Agency Network for Education in Emergencies, Global Facility for Disaster Reduction and World Bank (2009). *Guidance Notes on Safe School Construction.*
- Measuring rainfall, Brazil: Source: Save the Children (n.d.). *Reducing Risks, Saving Lives.*

[↩ back to Facilitation Guide:](#)  
[Categories of Disaster Risk Reduction](#)

### Handout 5. Disaster Risk Reduction Strategies

 Click to consult Factsheet information on Climate Change Adaptation

Setting up early warning systems	Awareness raising in the community
Putting emergency preparedness plans in place	Developing coping mechanisms
Building personal and community resilience	Dissemination and advocacy (communicating and sharing good practice)

[↩ back to Facilitation Guide: Categories of Disaster Risk Reduction](#)

## Handout 6. Children's Contributions to DRR

Children as analyzers of risk and risk reduction activities	Children as constructors of social networks and capital
Children as communicators of risks and risk management options	Children as mobilizers of resources and action for community based resilience
Children as designers and implementers of DRR interventions at community level	

Source: Beck, E., Cameron, C., and Tanner, T. (2009). *Children and Disaster Risk Reduction: Taking Stock and Moving Forward: Research Report*. Children in a Changing Climate, Brighton: IDS. 36.

[↩ back to Facilitation Guide:  
Categories of Disaster Risk Reduction](#)

### Handout 7. Modes of Child and Youth DRR

Creative and performance arts (including street theatre, puppetry, art displays, song and dance)	Using the Internet to connect with youth around the world and share ideas on disaster risk reduction
Using photography and video to illustrate risks	Writing pamphlets, notices, newspaper pieces
Campaigning, petitioning, writing to local and national leaders	Working with community-based organizations
Studying DRR in the school curriculum	

[↩ back to Facilitation Guide: Categories of Disaster Risk Reduction](#)

## Handout 8. The Climate Change Awareness School Committee – Task Cards

### SCHOOL 1

In these times of climate change, the Ministry of Education has announced that developing whole school approaches and school/community partnerships for climate changed education for sustainable has become a matter of priority.

You are members of the committee that your school has formed to come up with practical ways in which your school can show its climate change awareness through its curriculum, its buildings and campus, and its partnerships with, and initiatives in, the community.

Your school is a rural school. The local population is not generally wealthy. People have already had to adapt to climate change and there is a need for the community and school to put in place disaster risk reduction strategies.

Your group includes: two teachers, a local community member, a representative of the students, and one or two parents.

### SCHOOL 2

In these times of climate change, the Ministry of Education has announced that developing whole school approaches and school/community partnerships for climate changed education for sustainable has become a matter of priority.

You are members of the committee that your school has formed to think of practical ways in which your school can show its climate change awareness through its curriculum, its buildings and campus, and its partnerships with, and initiatives in, the community.

Your school is an urban school. The local population is poor. The community has some significant social problems. Climate change has not directly affected the community yet but there are potential threats from climate change.

Your group includes: two teachers, a local community member, a representative of the students, and one or two parents.

### SCHOOL 3

In these times of climate change, the Ministry of Education has announced that developing whole school approaches and school/community partnerships for climate changed education for sustainable has become a matter of priority.

You are members of the committee that your school has formed to think of practical ways in which your school can show its climate change awareness through its curriculum, its buildings and campus, and its partnerships with, and initiatives in, the community.

Your school is a rural school. The local area has a mix of economically wealthy and less wealthy people. There have been serious seasonal effects of climate change that are worsening every year. Disaster risk reduction measures are in place but have not so far involved the school.

Your group includes: two teachers, a local community member, a representative of the students, and one or two parents.

#### **SCHOOL 4**

In these times of climate change, the Ministry of Education has announced that developing whole school approaches and school/community partnerships for climate changed education for sustainable has become a matter of priority.

You are members of the committee that your school has formed to think of practical ways in which your school can show its climate change awareness through its curriculum, its buildings and campus, and its partnerships with, and initiatives in, the community.

Your school is an urban school. The local population is quite affluent. People are aware of climate change but have so far been protected by living in a city. They know, however, that other parts of the country are being affected by climate change. There is some awareness that what is happening there will eventually affect them, and there is a sense of solidarity with the suffering of fellow citizens. There are climate change mitigation initiatives in the community but the school is so far not involved.

Your group includes: two teachers, a local community member, a representative of the students, and one or two parents.

[↩ back to Facilitation Guide:  
Climate Change Awareness School Committee](#)

## Handout 9. UNESCO Teacher Education Course on Climate Change Education for Sustainable Development: Feedback Sheet

Workshop Day No: 1, 2, 3, 4, 5, or 6 (please circle as appropriate)

This is to help the workshop facilitator(s) know how the programme is being received. They will take account of your comments in adjusting the course or their facilitation.

1. What I liked about today's workshop

2. What I think could be improved in how the workshop is being conducted

3. What questions and concerns the day has left me with

4. My other comments

Thank you very much!

[↩ back to Facilitation Guide: Close](#)

## Summary of what is learned on Day Three

### 1. Pedagogies

Climate Change Mitigation & Adaptation Actions	
Critical Engagement	e.g.: Engage in critical perspective while sharing with peers (Facilitation guide: Categories of DRR, pp. 6-7)
Discerning Media to Interpret Climate Change Adaptation	e.g.: Photograph interpretation and responses (Classroom Activities Day 3: Climate Change Picture Gallery)
Developing Change Agency Roles	e.g.: Practicing leadership role to create DRR strategies for schools/community partnerships (Handouts: Climate Change Awareness School Committee Task Cards, pp. 22-23)
Analyzing Global Climate Change Policy	e.g.: Discuss global policies on Climate Change mitigation, varying by region (Regional Resource Pack, Section C)

 Click to consult Factsheet information on Climate Change mitigation policy

### 2. Definitions

Disaster Risk Reduction
Mitigation
Adaptation

### 3. Interdisciplinary Knowledge Systems

Knowledge from Natural Sciences	Knowledge from Social Sciences	Knowledge from Humanities
<b>Technological Science</b> <ul style="list-style-type: none"> <li>Considering ethical principles while assessing DRR strategies for climate change</li> </ul>	<b>Economics</b> <ul style="list-style-type: none"> <li>Consumerism effects, globalization, access to resources</li> </ul>	<b>Integrating Whole School Approach to CCESD</b> <ul style="list-style-type: none"> <li>Applying holistic perspective to climate change</li> </ul>
<b>Climate Change</b> <ul style="list-style-type: none"> <li>Greenhouse gas emissions, carbon dioxide, fossil fuels, global warming</li> </ul>	<b>Climate Change Education</b> <ul style="list-style-type: none"> <li>Sustainable living, adaptation, restoring protection</li> <li>Draw from socio-economics, psychology of climate change to understand global mitigation challenges</li> </ul>	<b>Sustainable Lifestyles</b> <ul style="list-style-type: none"> <li>Link climate changed future with Education for Sustainable Development (ESD) and lifestyles</li> </ul>

<b>Ecology</b> <ul style="list-style-type: none"> <li>Biodiversity loss, deforestation, rebuilding ecosystems</li> </ul>		
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#### 4. International Frameworks

<b>MDGs</b>	<b>Disaster Risk Reduction (DRR)</b>
<b>Human Rights</b> <ul style="list-style-type: none"> <li>Equal access to resources, food security, poverty</li> </ul>	<b>Link DRR with Climate Change</b> <ul style="list-style-type: none"> <li>Overview of Strategies, categories and definitions of DRR</li> </ul>
<b>Global Development</b> <ul style="list-style-type: none"> <li>Address special needs of poor/less developed countries to face climate change</li> </ul>	<b>Role of youth actions on DRR</b> <ul style="list-style-type: none"> <li>Modes of child/youth contribution to DRR</li> <li>Analysis, design, implementation, communication, mobilization, construction</li> </ul>
<b>Environmental Resources</b> <ul style="list-style-type: none"> <li>Skills to address living simply, reducing/reversing negative impact on environment</li> </ul>	

#### 5. Skills

<b>Consensus building and negotiation</b> <ul style="list-style-type: none"> <li>Adaptation stories</li> </ul>
<b>Ethical Judgment</b> <ul style="list-style-type: none"> <li>Climate change mitigation continuums</li> </ul>
<b>Advocacy/Change Agency</b> <ul style="list-style-type: none"> <li>Individual and community levels to mitigate climate change driving forces</li> </ul>
<b>Forecasting, Extrapolating, Envisioning</b> <ul style="list-style-type: none"> <li>Linking DRR with climate change to understand future climate hazards</li> <li>Potential of youth-focused climate change DRR</li> </ul>
<b>Strategy-building, Conflict Management</b> <ul style="list-style-type: none"> <li>Mitigation and Adaptation</li> </ul>
<b>Empowerment</b> <ul style="list-style-type: none"> <li>positive criticism on perspectives, finding common ground</li> </ul>
<b>Simple Living</b>

[↩ back to Facilitation Guide: Introduction](#)

## Day Three PowerPoint Slides

Click to consult Factsheet information on Climate Change Mitigation and Adaptation



1

2

3

### Climate Change Mitigation

- Climate change mitigation concerns reducing the future severity of climate change by transforming the way we live our lives now
- The types of lifestyle change suggested mainly involve reducing greenhouse gas emissions, especially carbon dioxide (CO<sub>2</sub>), into the atmosphere by burning less fossil fuels (coal, oil, natural gas)
- Climate change mitigation also includes ways of taking CO<sub>2</sub> out of the atmosphere to reduce global warming

4

### Climate Change Adaptation

- Climate change adaptation involves modifying the social and natural environment so that the effects of climate change hazards do not affect us, and our way of life, so severely
- It can also involve making the most of positive aspects of climate change
- But adaptation is mainly about responding to potential hazard by reducing our vulnerability to climate change impacts

[↩ back to Facilitation Guide: Climate Change Mitigation and Adaptation](#)

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### Mitigation and Adaptation

- MITIGATION focuses on avoiding, reducing or, at least, delaying climate change mainly by reducing greenhouse gas emissions into the atmosphere
- ADAPTATION is necessary for responding to climate change that is already unavoidable because of past greenhouse gas emissions (there is considerable time lag before an emission contributes to global warming)
- MITIGATION and ADAPTATION are, thus, complementary aspects of a coherent climate change strategy. Both call for lifestyle change. Both have to be factored into sustainable development plans

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### Climate Change Mitigation (I)

- Mitigation efforts focus upon reducing greenhouse gas emissions. For instance:
  - Curtailing emissions released from burning fossil fuels by power stations, factories, buildings, motor vehicles and airplanes
  - Reducing deforestation (including burning and decomposing of wood)
  - Using alternatives to fertilizers that release greenhouse gases
  - Capturing greenhouse gases released from garbage and human waste
  - Reducing meat eating in that cattle and farm animals emit methane (the second most important greenhouse gas)

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## Climate Change Mitigation (2)

- But some argue that ‘deep mitigation’ strategies are needed that address the underlying driving forces behind high levels of greenhouse gas emissions:
  - Rolling back mass consumerism, especially in high income nations
  - Moving away from a growth economy that exploits more and more natural resources
  - Prioritizing localism as an antidote to globalization and the continual movement of people and goods around the world
  - Educating for a reconnected, non-exploitative relationship with nature

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## Climate Change Adaptability and Vulnerability

- Adaptability is the degree to which a system (e.g. community, region) can adjust in response to or anticipation of climate changed condition
- Adaptability can reduce vulnerability, i.e. the extent to which climate change may damage or harm a system (e.g. community, region)
- Vulnerability is made worse by other stresses such as poverty, unequal access to resources, food insecurity, economic globalization, conflict and disease
- Tackling such stresses is different from building a sea wall, so adapting to existing threats has to go hand in hand with transforming underlying conditions (achieving sustainability)

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## Six Strategies for Climate Change Adaptation

- **Taking steps in advance to prevent losses**, for example building barriers against sea-level rise or reforesting hillsides to stop landslides
- **Taking steps to reduce losses**, for example using drought resistant plants in case of drought
- **Spreading or sharing losses**, for example setting a national disaster relief tax after a disaster
- **Changing how an activity is done**, for example mulching soil to reduce water loss
- **Changing the site of an activity**, for example relocating farming away from steep hill slopes and/or to where there is a surer source of water
- **Restoring a site with fit-for-purpose protection**, for example rebuilding a sacred site in a hazardous location with protective barriers
  - Inspired by: UNEP & UNFCCC, (2002). Climate Change Information Kit, Climate Change Information Sheet 9.

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## Climate Change Mitigation Continuums

- ACCEPTABLE ←————→ UNACCEPTABLE
- PRACTICABLE ←————→ NOT PRACTICABLE
- DESIRABLE ←————→ UNDESIRABLE
- REALISTIC ←————→ UNREALISTIC
- JUST ←————→ UNJUST
- EFFECTIVE ←————→ INEFFECTIVE

[↩ back to Facilitation Guide: Mitigating and Adapting to Climate Change](#)

[↩ back to Facilitation Guide: Climate Change Mitigation Continuums](#)

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## Linking Climate Change and Disaster Risk Reduction (1)

- ‘Climate change and disaster risk reduction are linked in that more extreme weather related hazards will increase the frequency and intensity of natural disasters and the methods and tools developed by disaster risk reduction are of vital importance for climate change adaptation.’
  - International Strategy for Disaster Reduction (ISDR) (n.d). Climate Change and Disaster Risk Reduction: Briefing Note 01.

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## Linking Climate Change and Disaster Risk Reduction (2)

- Climate change will affect disaster risks in two ways.
  - *First*, through the likely increase in weather and climate hazards.
  - *Second*, by increasing the vulnerability of communities to natural hazards, particularly through ecosystem degradation, reduction in water and food availability, and changes to livelihoods.
  - *Climate change will add yet another stress* to those of environmental degradation and rapid unplanned urban growth, further reducing communities’ abilities to cope with even the existing levels of weather related hazards.
    - Edited from the International Strategy for Disaster Reduction (ISDR) (n.d). Climate Change and Disaster Risk Reduction: Briefing Note 01.

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### Disaster Risk Reduction: Definitions and Insights (1)

- 'Disaster Risk Reduction encompasses the prevention and mitigation of, and preparedness for, natural disasters.'
- ActionAid. (2006). Disaster Risk Reduction

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### Disaster Risk Reduction: Definitions and Insights (2)

- 'Disaster Risk Reduction (DRR) is any activity carried out by a village, community, aid agency or government that helps prepare for, reduce the impact of, or prevent disasters. These activities can be policies, strategies, or practices that are developed and applied to minimize vulnerabilities and disaster risks throughout a society.'
- Save the Children (n.d.) Reducing Risks, Saving Lives.

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### Disaster Risk Reduction: Definitions and Insights (3)

- 'Natural hazards by themselves do not cause disasters – it is the combination of an exposed, vulnerable and ill-prepared population or community with a hazard event that result in a disaster.'
- International Strategy for Disaster Reduction (ISDR) (n.d). Climate Change and Disaster Risk Reduction. Briefing Note 01.

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### Disaster Risk Calculation

- Disaster risks multiply with the intensity of the hazard and with social and environmental vulnerabilities of the society and the environment. In turn, they may be reduced by society's ability to cope with the hazard, as shown in the following equation:

$$\text{Disaster Risk} = \frac{\text{Natural Hazard} \times \text{Vulnerability}}{\text{Capacity of Societal System}}$$

- Disaster Risk =

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### Categories of Risk Reduction Strategies

- Awareness-raising in the community
- Setting up early warning systems
- Putting emergency preparedness plans in place
- Developing coping mechanisms
- Building personal and community resilience
- Dissemination and advocacy (communicating and sharing good practice)

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### Children's Contributions to Disaster Risk Reduction

- As **analyzers** of risk and risk reduction activities
- As **designers and implementers** of DRR interventions at community level
- As **communicators** of risks and risk management options (especially communications to parents, adults or those outside of community)
- As **mobilisers** of resources and action for community based resilience
- As **constructors** of social networks and capital
  - Beck, E., Cameron, C., and Tanner, T. (2009), Children and Disaster Risk Reduction: Taking Stock and Moving Forward: Research Report. Children in a Changing Climate, Brighton: IDS. 36

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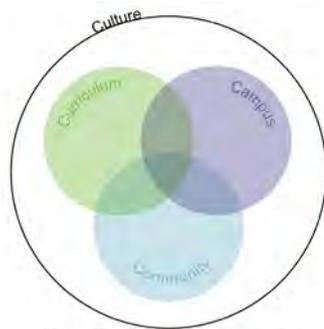
### Youth Contributions to Disaster Risk Reduction

- Rich Potential for Youth-focused and Youth-led Climate Change DRR:
  - Creative and performance arts (including street theatre, puppetry, art displays, song and dance)
  - Writing pamphlets, notices, newspaper pieces
  - Using photography and video to illustrate risks
  - Using the Internet to connect with youth around the world and share ideas on DRR
  - Studying DRR in the school curriculum
  - Working with community-based organizations
  - Campaigning, petitioning, writing to local and national leaders

[↪ back to Facilitation Guide: Disaster Risk Reducton](#)

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### A Whole School Approach to CCESD



[↪ back to Facilitation Guide: The Climate Change Awareness School Committee](#)

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### End of Day 3 – See you tomorrow

- Please don't forget to:
- Fill out and submit your feedback form
  - Read through *Classroom Activities* for the day and bring any questions to tomorrow's workshop
  - Write your reflective workshop diary entry for the day and bring the diary to Day 4

[↪ back to Facilitation Guide: Introduction](#)

# Get the Facts:

## CLIMATE CHANGE ADAPTATION & MITIGATION

### Mitigation and Adaptation - A two-pronged approach

Proactive efforts to reduce greenhouse gas (GHG) emissions — **mitigation** — and lessen the harm of climate change impact — **adaptation** — are two different but complementary approaches towards dealing with climate change. Mitigation tackles the causes of climate change while adaptation tackles its effects on society and the environment.

Mitigation is necessary as a means to avoid climate change impacts. The idea that less mitigation now will result in greater climatic change and consequently require more adaptation later is the basis for the urgency surrounding GHG emission reductions. If no action is taken to reduce emissions, the concentration of GHGs in the atmosphere could reach double that of pre-industrial levels by 2035, virtually binding the planet to a global average temperature rise of over 2 °C. In the long term, there would be a greater than 50% chance that the temperature rise would exceed 5 °C. This rise is equivalent to the change in average temperature from the last ice age (10,000 to 12,000 years ago) to today. Such a radical change would lead to major changes to where people live and how they live their lives. It would also mean radical changes that will touch each of the world regions.

Adaptation to observed and projected future climate change is already taking place, though only on a limited basis. Some examples of adaptation measures that are being implemented include the introduction of drought tolerant crops, building of houses which are more resistant to weather events, introduction of flood and coastal defences, and restoring mangroves to reduce vulnerability to storm surges and sea level rise.

### Mitigation - Ways to reduce GHGs

Greenhouse gas emission reductions can be achieved using a combination of techniques, technologies, and other measures including:

- use of low- or no-carbon energy sources,
- increased energy saving and efficiency of energy use,
- carbon capture and storage and extension of carbon sinks,
- low carbon lifestyles and consumption choices.

Newly developed and currently available **low- or no-carbon energy sources** and techniques include renewables (solar power, wind power, geothermal power, hydro, tidal and ocean energy), biofuels and biomass, fuel switching (i.e. from coal to natural gas), and, more controversially, nuclear power.

**Energy efficiency techniques and technologies** can be integrated into various major GHG emitting economic sectors so that they can produce the same goods and provide the same services using less energy, or make use of currently untapped energy potential. These include, among others, insulation and energy-saving lighting, heating and cooling design in buildings; improving transport fuel efficiency or changing the power source of vehicles (e.g. hybrid, plug-in hybrid, biofuels); shifts in goods and personal transport from road to rail; waste incineration and landfill methane capture with energy recovery; and heat/power recovery in industry.

**Carbon capture and storage** seek to trap emissions at their source before they climb in the atmosphere to the elevation where they do harm and keep them permanently locked away. Point sources such as central power plants are ideal for this, as yet, non-commercialised technique. Using biomass such as forests as **carbon sinks** is already in place as a proven and operational carbon sequestration technique. Research is underway to increase the carbon sequestration performance of certain tree species. Maintaining the existing stock of forests is also a key component of effective sequestration, though with increasing dry periods in some areas as a consequence of climate change, forest fires pose a risk to this strategy.

The main driver of greenhouse gas emissions is human consumption — that is, if there was no consumption of goods and services, there would be no anthropogenic GHG emissions. However, the increasing global population and wealth coupled with a trend towards western-style consumption is compounding the already long list of environmental pollution problems affecting land, water and, of course, the atmosphere. **Lifestyle changes** and low-carbon consumption choices like buying local goods, eating less meat, and using public or non-motorized transport are all practical ways for individuals to take action on GHG emission mitigation (see Figure 1, next page).



Mitigation action must combine, coordinate, and balance all the available means for an optimum and cost-effective end result. Indeed, mitigation must not necessarily be seen as a cost, but there are many potential benefits to the above-mentioned actions for economic development, market creation, health, and technology development in addition to the associated GHG reductions.

### Additional Resources

1. Intergovernmental Panel on Climate Change. <http://www.ipcc.ch/>
2. United Nations Environment Programme. <http://www.unep.org/climatechange/>
3. United Nations Framework Convention on Climate Change. <http://unfccc.int/2860.php>

## Mitigation - Policy options to promote reduction

A variety of strategies are available today that, if implemented quickly, could reduce greenhouse gas (GHG) emissions, and consequently help to mitigate the most severe consequences of climate change.

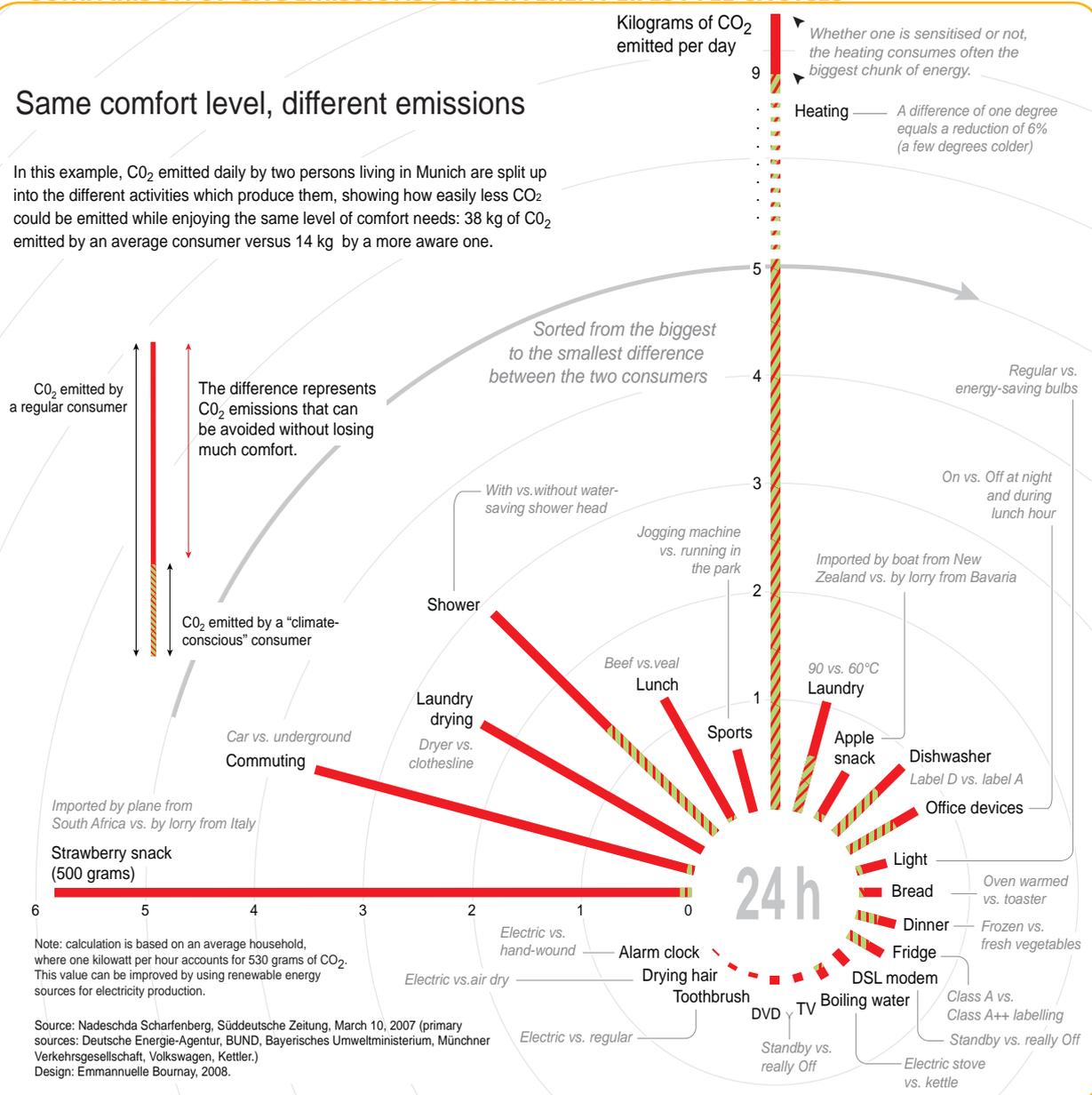
Policy-makers have a crucial role to play in creating the institutional, policy, legal and regulatory frameworks necessary to enable and incentivize significant emission reductions. The right mix of well-designed policies including regulations and economic instruments can overcome economic, technological, informational and behavioural barriers in the marketplace.

### COMPARISON OF GHG EMISSIONS FOR DIFFERENT LIFESTYLE CHOICES

FIGURE 1

#### Same comfort level, different emissions

In this example, CO<sub>2</sub> emitted daily by two persons living in Munich are split up into the different activities which produce them, showing how easily less CO<sub>2</sub> could be emitted while enjoying the same level of comfort needs: 38 kg of CO<sub>2</sub> emitted by an average consumer versus 14 kg by a more aware one.



Zöi Environment Network and GRID-Arendal 2009

# Get the Facts:

## CLIMATE CHANGE ADAPTATION & MITIGATION

### Policy Instruments

**Integrated policies** include climate change as a factor in broader policy development to facilitate implementation of mitigation mechanisms.

**Regulatory standards** provide certainty and consistency on emissions levels, and send a clear signal that discourages a 'business as usual' approach. By mandating standards, governments could ban or attempt to alter the use of materials and equipment considered to be damaging to climate. For example, standards can be applied to buildings (energy efficiency), fuel use by motor vehicles, energy efficiency of household durables, and the content of fuels.

**Reducing Emission for Deforestation and Degradation (REDD+)** refers to policy approaches and positive incentives on issues relating to reducing GHG emissions from deforestation and forest degradation, as well as the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

**Voluntary agreements** between industry and government are a means to engage industry partners to take action on environmental and other issues and are often a precursor to regulations. Theoretically, industries should be compelled to undertake steps to reduce GHG emissions if they fear more costly regulatory controls.

**Voluntary actions** (corporations, governments, non-profits and civil groups) can act to stimulate action and innovation. (See Voluntary Action... text box)

### Economic Instruments

**Taxes and fees** impose a charge or cost to emitters for each unit of pollutant discharged. For example, a carbon tax is an environmental tax levied on the carbon content of fuels. It can be implemented by taxing the burning of fossil fuels — coal, petroleum products such as gasoline and aviation fuel, and natural gas — in proportion to their carbon content, thus making them more expensive to use. Accordingly, a carbon tax increases the competitiveness of non-carbon technologies (i.e. wind, sunlight, hydropower and nuclear) which helps protect the environment while raising revenues. Important here is that the tax and fee levels are set high enough to provoke a change in consumption behaviour, and not merely raise revenue.

**Financial incentives** such as rebates and tax breaks can be used to stimulate new markets for innovative technologies. For example, a sales tax refund on the purchase and installation of solar panels can spur households and businesses to make the investment to install this technology (see 'Creating a Financial...' text box).

**Tradable permits** create a market and a market value (price) for pollution, in this case, carbon. An overall limit to the amount of allowable emissions is set and this amount is distributed to the authorized emission sources (industries) in the form of permits. The permit owners can then either use the permits, or buy and sell them in the market, similar to the traditional stock market. Governments or firms that need to increase their emissions must buy permits from those who require fewer permits. In effect, the buyer is paying a charge for polluting, while the seller is being rewarded for having reduced emissions. Thus, those who can reduce

### Voluntary Action by U.S. Mayors

#### U.S. Conference of Mayors Climate Protection Agreement

On February 16, 2005 the Kyoto Protocol, the international agreement to address climate disruption, became law for the 141 countries that have ratified it to date. On that day, Seattle Mayor Greg Nickels launched this initiative to advance the goals of the Kyoto Protocol through leadership and action by at least 141 American cities. In May of 2007, Tulsa Mayor Kathy Taylor became the 500th mayor to sign on. Under the Agreement, participating cities commit to take following three actions:

- Strive to meet or beat the Kyoto Protocol targets in their own communities, through actions ranging from anti-sprawl land-use policies to urban forest restoration projects to public information campaigns;
- Urge their state governments, and the federal government, to enact policies and programs to meet or beat the greenhouse gas emission reduction target suggested for the United States in the Kyoto Protocol -- 7% reduction from 1990 levels by 2012; and
- Urge the U.S. Congress to pass the bipartisan greenhouse gas reduction legislation, which would establish a national emission trading system

<http://www.usmayors.org/climateprotection/agreement.htm>



emissions at a lower cost than the cost of buying permits will do so, achieving pollution reduction at the lowest cost to society.

Many of these policies place real or implicit prices on carbon, which creates significant incentives for producers and consumers to invest in lower carbon products, technologies and processes. As fossil fuel prices increase, more

### **Creating a Financial Incentive for Solar Water Heating Installation**

Sometimes the best rate of interest is also in the best interest of the planet: clean technology.

Despite solar powered-water heaters being an obvious energy-saving solution in hot and sunny countries, the cost of buying them is often prohibitive for many people. Banks are often unfamiliar with the costs and benefits of clean energy, so loans are often not widely available. Yet, solar hot-water systems can earn back the investment in as little as four years, offering years of 'free' hot water after that.

An average four-person household with an electric water heater is responsible for about eight tonnes of CO<sub>2</sub> emissions annually, almost double that generated by a typical modern car.

Enter Prosol— a joint initiative between UNEP, the Italian Ministry for Environment, Land and Sea and the National Agency for Energy Conservation — which has helped 105,000 Tunisian families get their hot water from the sun based on loans of over \$60 million — a substantial leverage on Prosol's initial \$2.5 million initial cost. The solar water-heater market in Tunisia showed a dramatic increase when low-interest loans were made available to householders, with repayments collected through regular utility bills.

This reduced the risk for local banks while simultaneously showing borrowers the impact of solar heating on their electricity bills. Its success has led the Tunisian government to set an ambitious target of 750,000m<sup>2</sup> of solar water heaters for 2010-2014, making the country comparable to Spain or Italy with populations several times higher. Jobs have been created: 42 suppliers and more than 1000 installation companies have sprung up. The tourism and industry sectors are also now involved, with 47 hotels engaged by late 2009, and there are plans to encourage industry to make greater use of the sun's energy.

Reproduced from the 2010 UNEP Annual Report.  
<http://www.unep.org/annualreport/2010/>

low- and no-carbon alternatives will become competitive.

### **Stern Review: The economics of early action on climate change**

"This Review has assessed a wide range of evidence on the impacts of climate change and on the economic costs, and has used a number of different techniques to assess costs and risks. From all of these perspectives, the evidence gathered by the Review leads to a simple conclusion: the benefits of strong and early action far outweigh the economic costs of not acting.

Climate change will affect the basic elements of life for people around the world — access to water, food production, health, and the environment. Hundreds of millions of people could suffer hunger, water shortages and coastal flooding as the world warms.

Using the results from formal economic models, the Review estimates that if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more.

In contrast, the costs of action — reducing greenhouse gas emissions to avoid the worst impacts of climate change — can be limited to around 1% of global GDP each year.

The investment that takes place in the next 10-20 years will have a profound effect on the climate in the second half of this century and in the next. Our actions now and over the coming decades could create risks of major disruption to economic and social activity, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century. And it will be difficult or impossible to reverse these changes.

So prompt and strong action is clearly warranted. Because climate change is a global problem, the response to it must be international. It must be based on a shared vision of long-term goals and agreement on frameworks that will accelerate action over the next decade, and it must build on mutually reinforcing approaches at national, regional and international level."

An excerpt from the Executive Summary of the review published by Sir Nicholas Stern, Head of the Government Economic Service and Adviser to the Government on the economics of climate change and development in 2007.

[http://www.hm-treasury.gov.uk/media/9/9/CLOSED\\_SHORT\\_executive\\_summary.pdf](http://www.hm-treasury.gov.uk/media/9/9/CLOSED_SHORT_executive_summary.pdf)

# Get the Facts:

## CLIMATE CHANGE ADAPTATION & MITIGATION

### The need for early action

Countries can use different strategies to reduce GHG emissions, but early action increases the likelihood of avoiding the most severe consequences of global climate change. Setting effective carbon prices, strengthening regulations such as efficiency standards, and increasing government funding for research, development and demonstration of low- and no-carbon energy sources could encourage climate solutions.

Delaying the implementation of mitigation strategies and continuing on a 'business-as-usual' path will almost certainly lock us into a more emission-intense future, greatly increasing the risk of more severe and irreversible climate change impacts. The longer we wait to act, the more costly it becomes to limit climate change and to adapt to the unavoidable consequences. (See Stern Review text box, previous page).

### Additional Resources

1. Intergovernmental Panel on Climate Change. <http://www.ipcc.ch/>
2. United Nations Framework Convention on Climate Change. <http://unfccc.int/2860.php>
3. United Nations Environment Programme. <http://www.unep.org/climatechange/>

[↩ back to Summary of what is learned on Day 3](#)

[↩ back to Handout 2](#)

### Adaptation - Facing a new reality

Climate variability and climate change result in impacts that necessitate adjustments in both human and natural systems. Adaptation refers to such adjustments which moderate harm or exploit beneficial opportunities. Although individuals and communities have always been adapting to variations in the climate, this experience is often no longer sufficient to respond to the scale of climate changes occurring today and in the future.

**EXAMPLES OF ADAPTATION OPTIONS**

**TABLE 2**

		Anticipatory	Reactive
Human systems	Public	<ul style="list-style-type: none"> <li>- Purchase of insurance</li> <li>- Construction of houses on stilts</li> <li>- Redesign of oil rigs</li> </ul>	<ul style="list-style-type: none"> <li>- Changes in farm practices</li> <li>- Changes in insurance premiums</li> <li>- Purchase of air-conditioning</li> </ul>
	Private	<ul style="list-style-type: none"> <li>- Early-warning systems</li> <li>- New building codes, design standards</li> <li>- Incentives for relocation</li> </ul>	<ul style="list-style-type: none"> <li>- Compensatory payments, subsidies</li> <li>- Enforcement of building codes</li> <li>- Beach nourishment</li> </ul>
Natural systems			<ul style="list-style-type: none"> <li>- Changes in length of growing season</li> <li>- Changes in ecosystem composition</li> <li>- Wetland migration</li> </ul>

Klein et al, 2005

**ADAPTATION OPTIONS FOR SELECTED CLIMATE-RELATED STRESSES**

**TABLE 1**

Climate-related stress	Examples of adaptation options
Drought	Rainwater harvesting; Water conservation and loss reduction; Ecosystem restoration; Altered farming practices e.g. changes to drought-resistant crops and inter-cropping; Grain storage; Economic diversification
Flood	Restoration of vegetation around river beds; Raised houses and other buildings (schools, hospitals); Flood-resistant roads; Changes in crops; Land use planning; Early-warning systems
Sea level rise	Protection and restoration of coastal wetlands, marshes and mangroves; Coastal defences and sea walls; Consideration of climate change impacts in infrastructure planning
Extreme temperatures	Adjustment of grazing times and areas; Planting of shade trees; Changes to heat-resistant crops; Improvements in public health; Disease control and eradication
Strong winds, cyclones	Wind-resistant housing and infrastructure; Reforestation; Planting of wind breaks; Early-warning systems



Adaptation options can be designed to provide benefits under all plausible future scenarios, including the absence of climate change (these are known as ‘no regrets’ measures) or can consist of measures taken specifically to

anticipate climate change (known as ‘climate justified’ measures). Table 1 gives some examples of possible adaptation measures responding to different climate-related stresses.

[↩ back to Handout 3](#)

[↩ back to Handout 5](#)

## Lesotho’s National Adaptation Programme of Action (NAPA)

Lesotho’s National Adaptation Programme of action is to identify and prioritise national needs so that effective implementation measures may be put into place to combat the adverse effects of climate change.

The NAPA process identified eleven adaptation options outlined below in their order of priority.

### Option 1:

Improve Resilience of Livestock Production Systems Under Extreme Climate Conditions in Various Livelihood Zones in Lesotho

### Option 2:

Promoting Sustainable Crop Based Livelihood Systems in Foothills, Lowlands and Senqu River Valley

### Option 3:

Capacity Building and Policy Reform to Integrate Climate Change in Sectoral Development Plans

### Option 4:

Improvement of an Early Warning System Against Climate Induced Disasters and Hazards

### Option 5:

Securing Village Water Supply for Communities in the Southern Lowlands

### Option 6:

Management and Reclamation of Degraded and Eroded Land in the Flood Prone Areas (Pilot Project for Western Lowlands)

### Option 7:

Conservation and Rehabilitation of Degraded Wetlands in the Mountain Areas of Lesotho

### Option 8:

Improvement of Community Food Security Through the Promotion of Food Processing and Preservation Technologies

### Option 9:

Strengthening and stabilizing eco-tourism based rural livelihoods

### Option 10:

Promote Wind, Solar and Biogas Energy Use as a Supplement to Hydropower Energy

### Option 11:

Stabilizing Community Livelihoods which are Adversely Affected by Climate Change Through Improvement of Small Scale Industries

## What are NAPAs?

National adaptation programmes of action (NAPAs) provide a process for Least Developed Countries (LDCs) to identify priority activities that respond to their urgent and immediate needs to adapt to climate change – those for which further delay would increase vulnerability and/or costs at a later stage.

Excerpts from UNFCCC website.  
For further details, visit: [http://unfccc.int/national\\_reports/napa/items/2719.php](http://unfccc.int/national_reports/napa/items/2719.php)

Source: Excerpts from *Lesotho’s National Adaptation Programme of Action (NAPA) on Climate Change Under the United Nations Framework Convention on Climate Change*. p. vi.

# Get the Facts:

## CLIMATE CHANGE ADAPTATION & MITIGATION

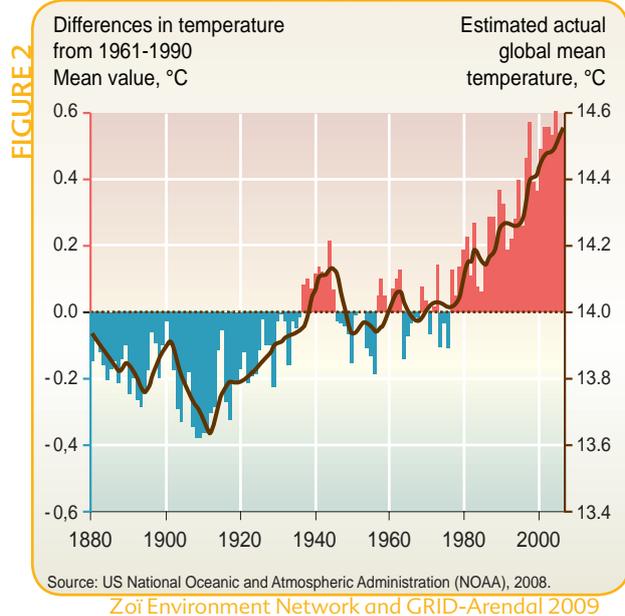
### Complementary nature of mitigation and adaptation

The observed increase of greenhouse gas (GHG) concentration since 1750 has most likely bound the world to a warming of 1.4 – 4.3 degrees Celsius above pre-industrial surface temperatures. Researchers suggest that 0.76 degrees Celsius of this committed warming has already occurred and that a further increase of 1.6 degrees Celsius will take place in the next fifty years and on throughout the twenty-first century (see Figure 2). Recent reports estimate a sea level rise of up to one metre occurring by the year 2100. Even with the most aggressive CO<sub>2</sub> mitigation efforts, further additions to warming can be limited but the associated climate change impacts to which we are already bound can no longer be reduced (see Figure 3).

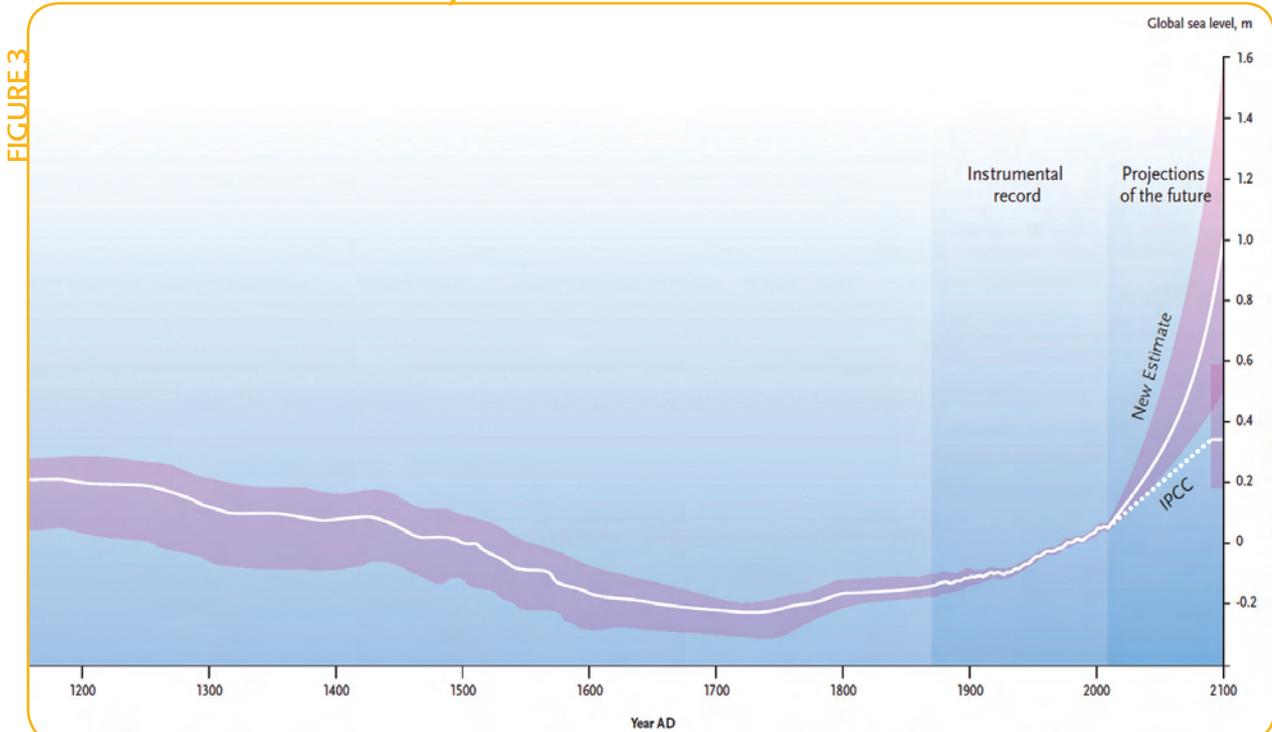
The already observed and anticipated changes to the global climate necessitate a dual response strategy of mitigation and adaptation in order to address both the underlying causes and associated impacts. **Mitigation** actions seek to reduce the extent of climate change by reducing GHG emissions or increasing their removal from the atmosphere. More mitigation undertaken today means less adaptation will be necessary in the future. Insufficient mitigation now also increases the risk of catastrophic outcomes – a point at which the adaptation costs are

unreasonably high or where adaptation capacities reach their utmost limits (e.g. the loss of the West Antarctic ice sheet implies a 5–15 metre sea level rise). **Adaptation** actions focus on improving our ability to cope with or avoid harmful impacts or take advantage of newly favourable conditions. The increased temperatures to which our world is already bound and the changes observable today as a consequence of climate change mean that adaptation strategies need to be put into action now.

### GLOBAL TEMPERATURE TREND



### SEA LEVEL RISE - MODEL PROJECTIONS TO 2100



AMAP, 2009. Summary – The Greenland Ice Sheet in a Changing Climate: Snow, Water, Ice and Permafrost in the Arctic (SWIPA) 2009. Arctic Monitoring and Assessment Programme (AMAP), Oslo.



Climate mitigation and adaptation are not separate alternatives, but function as a complementary set of actions that combine to form an overall strategy to reduce GHG emissions and climate change impacts. There are also ways to combine the mitigation and adaptation agendas, for example, planting mangroves along a coast sequesters carbon while at the same time providing a buffer against increased storm surges.

Mitigation efforts can also increase the resilience and capacity of communities to adapt to changes in local climate conditions. Reducing both loss of natural habitat and deforestation can have significant biodiversity, soil and water conservation benefits, and can be implemented in a socially and economically sustainable manner. For example, forestation and sustainable bioenergy plantations can restore degraded land, manage water runoff, retain soil carbon and benefit rural economies<sup>1</sup> thus improving their ability to adapt to adverse impacts of climate change.

### Additional resources:

1. OECD (2009) *Policy Guidance on Integrating Climate Change Adaptation into Development Co-operation*. <http://www.oecd.org/dataoecd/0/9/43652123.pdf>
2. USAID (2007) *Adapting to Climate Variability and Change: A Guidance Manual for Development Planning*. [http://pdf.usaid.gov/pdf\\_docs/PNADJ990.pdf](http://pdf.usaid.gov/pdf_docs/PNADJ990.pdf)
3. UNDP (2010) *Designing Climate Change Adaptation Initiatives: UNDP Toolkit for Practitioners*. [http://www.adaptationlearning.net/sites/default/files/Toolkit\\_for\\_Designing\\_Climate\\_Change\\_Adaptation\\_Initiatives\\_\\_November\\_2010.pdf](http://www.adaptationlearning.net/sites/default/files/Toolkit_for_Designing_Climate_Change_Adaptation_Initiatives__November_2010.pdf)
4. Schipper and Burton (2008) *The Earthscan Reader on Adaptation to Climate Change*
5. UNFCCC *Nairobi work programme on impacts, vulnerability and adaptation to climate change*: [http://unfccc.int/adaptation/nairobi\\_work\\_programme/items/3633.php](http://unfccc.int/adaptation/nairobi_work_programme/items/3633.php)
6. Eldis *Climate Change Adaptation*. <http://www.eldis.org/go/topics/dossiers/climate-change-adaptation>
7. WeAdapt. <http://www.weadapt.org>

<sup>1</sup> Intergovernmental Panel on Climate Change (2007). *Climate Change 2007: Synthesis Report*. Geneva, Switzerland.

## The Economy and Economics - Part of the problem and solution

### How do our economies contribute to climate change?

The choices that governments, companies, and individuals make when producing, marketing and consuming goods and services are the main drivers of anthropogenic or man-made climate change. A good example is the reliance, particularly in developed countries, on carbon-intensive transport, heating and electricity services based upon the combustion of fossil fuels. The economic decisions that give rise to such a scenario are determined not only by markets and prices, but are also influenced by environmental, social, cultural and political factors. At the national economy level, societies can contribute to climate change in three ways: **delinking economic growth from environmental deterioration, changes in technology, and population size.**

The production and provision of goods and services has traditionally caused environmental deterioration. However, advances in policy, technology, resource management, and business thinking have created the possibility for a 'green economy', which delinks economic growth from environmental damage (see 'Moving Towards...' text box).

### Moving Towards a Green Economy

The last two years have seen the idea of a 'green economy' float out of its specialist moorings in environmental economics and into the mainstream of policy discourse.

UNEP defines a green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive. In a green economy, growth in income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services.

**Towards a Green Economy** — the main output of the Green Economy Initiative — demonstrates that the greening of economies is not generally a drag on growth but rather a new engine of growth; that it is a net generator of decent jobs, and that it is also a vital strategy for the elimination of persistent poverty.

From <http://www.unep.org/greeneconomy>

# Get the Facts:

## CLIMATE CHANGE ADAPTATION & MITIGATION

### How is economics used to assess climate change impacts and contribute to policy responses?

#### Assessing climate change impacts

Accurate assessment of climate change impacts is crucial for good climate mitigation and adaptation policy-making: it enables governments to calculate the value of avoidable damages as well as the cost attributed to any given climate control action. It is possible to monetize certain climate change damages because they are associated with market prices or 'market impacts' (e.g. climate-related destruction of the physical assets of a business). Other aspects are difficult to monetize because they are not subject to market transactions; these are 'non-market impacts' (e.g. the **ecological** value of destroyed forest stocks, loss of human life, or a decrease in the number of people with access to clean drinking water). In other words, climate change may not only result in serious direct economic damage, but also indirectly limit economic development due to the damage inflicted on people and natural systems. Valuation of ecosystem services can also help decision making for both adaptation and mitigation.

The consequences for climate mitigation policies and action are very much dependent on the economic approach adopted for evaluating climate damages. This is why it is important to distinguish between two types of approach: **traditional/conventional models** and **new alternative ways of looking at the problem**.

#### Traditional/conventional models

Traditional economic models adopt one of two approaches: (1) focus only on market impacts; or (2) assign monetary values to as many impacts as possible and aggregate these under a single value.

If only market impacts are considered, overall climate damages would be grossly underestimated. For example, Stern<sup>2</sup> finds that the global economic cost of climate change rises steeply from 5% of GDP when only market impacts are evaluated, to around 20% of GDP when other non-market impacts are included. If non-market impacts are considered, these tend to be assigned arbitrary and controversial values, through the overuse of Cost-Benefit Analysis (CBA) in public policy-making. CBA compares the costs of controlling GHG emissions with the benefits of avoiding climate-induced damages.

2 The Economics of Climate Change. The Stern Review, N. Stern, Cambridge University Press, 2007.

The CBA approach has been questioned both on theoretical economic grounds and from ethical and social justice standpoints, because it distorts the meaning of values assigned to societal well-being.<sup>3,4</sup> Evidence has also shown that the use of the traditional economic approach leads to inaction on the climate policy front, leading people to do little later, rather than take strong action now. This occurs despite unequivocal scientific evidence of human-induced climate change that may have catastrophic consequences in the longer term, warranting immediate action.<sup>5</sup>

#### Alternative ways of looking at the problem

Alternative new thinking in the area of climate economics is emerging. One example is the **precautionary approach to climate control**, which does not require perfect information about potential damages and benefits (as required by traditional economics).<sup>6</sup>

Under this approach, climate policy can be based on insurance or risk principles, whereby investments are made to protect against events that do not usually happen, but could cause tremendous damage if they were to occur.

Another alternative being advocated is climate policy assessment based on multidimensional economic, social, environmental and institutional criteria.<sup>7</sup> In this case, avoided climate damages are assessed in their natural units depending on the type of impact being investigated. To provide an example, health impacts are expressed in the number of people at risk from a disease due to climate change, instead of estimating controversial dollar values for life and death (e.g. \$4 million for the life of a person). Such alternative

3 Cost-benefit analysis, for example, leads to the conclusion that toxic waste should preferably be dumped on to the developing world. After all, life is already short in the developing world, and the presence of low wages and poor productivity means that the dumping will be inexpensive in both action and consequence. <http://www.bmj.com/content/330/7499/1091.1.extract>

4 Priceless: On Knowing the Price of Everything and the Value of Nothing, F. Ackerman and L. Heinzerling, New Press, 2004.

5 'Summary for Policymakers', S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds) Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), Cambridge University Press, 2007.

6 'Reducing abrupt climate change risk using the Montreal Protocol and other regulatory actions to complement cuts in CO<sub>2</sub> emissions', M. Molina, D. Zaelke, K.M. Sarma, S.O. Andersen, V. Ramanathan and D. Kaniaru, Proc. Natl. Acad. Sci. USA, 106(49) 20616–21, 2009.

7 'Multi-criteria analysis for climate change: developing guidance for sound climate policy planning (MCA4climate)', undergoing project of UNEP's Energy Branch in the Division of Technology, Industry, and Economics, 2011. <http://www.mca4climate.info/>



approaches typically argue for immediate and fast climate action, whilst providing a more comprehensive picture of the costs, risks and opportunities involved (see ‘Developing Multi-criteria...’ text box).

### Policy criteria

Well-designed climate policies can contribute to effective climate mitigation and adaptation, and may also improve employment prospects, maintain economic growth, reduce poverty and achieve other social and environmental benefits. Policy action on the climate front could provide much sought-after opportunities to steer countries towards a ‘green economy’. The latter would translate into improved human well-being and reduced inequalities over the long term, while reducing exposure of future generations to significant environmental risks and ecological scarcities.<sup>8</sup> Factors that sustain our economies

<sup>8</sup> Green Economy Report: A Preview, United Nations Environment Programme (UNEP), 2007: <http://www.unep.org/GreenEconomy/>.

like employment, environmental quality, equity and social justice (i.e. overall quality of life) provide better criteria against which to measure policy performance, and should take precedence over economic growth targets.

### Additional Resources

1. *Green Economy Report: A Preview*. UNEP, 2007. <http://www.unep.org/GreenEconomy/>
2. ‘Multi-criteria analysis for climate change: developing guidance for sound climate policy planning (MCA4climate)’. On-going project of UNEP / DTIE - Energy Branch, 2011. <http://www.mca4climate.info/>
3. *The Economics of Climate Change*. The Stern Review, N. Stern, Cambridge University Press, 2007. <http://siteresources.worldbank.org/>

[↩ back to Handout 1](#)

### Developing Multi-criteria Analysis

Climate change is a pervasive and complex problem, with uncertainty surrounding its multi-faceted impacts. Setting priorities is hampered by the lack of a systematic and comprehensive description of the issues concerned, the links amongst them, and the trade-offs involved. Structured guidance is needed to underpin long-term policy planning in the area of climate change, which would systematically consider the direct and indirect economic, social, environmental, and institutional costs and impacts.

The goal of the MCA4climate project and approach is to help fill this gap by putting forward methodological guidance enabling national governments (particularly from developing countries) to identify low-cost, environmentally effective and pro-poor climate mitigation and adaptation policy choices. It seeks to diffuse the perceived fear of high mitigation and adaptation costs associated with climate action. The methodology developed is based on a multi-criteria approach (MCA) and offers a useful planning tool for prioritizing and populating with concrete measures and economy-wide climate strategies.

From <http://www.mca4climate.info>



## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

**CLIMATE  
CHANGE**  
IN THE  
CLASSROOM



## Day Four At-A-Glance

Sample Schedule (Duration)	Session	
9:00 - 9:30 (30 minutes)	Revisiting Day Three	<ul style="list-style-type: none"> <li>• PowerPoint slide 2</li> </ul>
9:30 - 9:55 (25 minutes)	Activity: 'Bouncing Back'	<ul style="list-style-type: none"> <li>• A bendy ruler or stick, a rubber band, a rubber ball, an eraser and/or other everyday objects that, if bent, pulled or squeezed out of shape, return to their original shape when released</li> <li>• Flip chart and marker</li> </ul>
9:55 - 10:45 (50 minutes)	Activity: Building a 'Culture of Safety and Resilience'	<ul style="list-style-type: none"> <li>• Two sheets of chart paper and two markers of different colours per group of four.</li> <li>• PowerPoint slides 3-9</li> </ul>
10:45 - 11:00 (15 minutes)	Break	
11:00 - 12:00 (60 minutes)	Activity: Field Trip Preparation  Alternative: Guest speakers or lecturers from the community	<ul style="list-style-type: none"> <li>• Nine slips of blank paper per participant</li> <li>• One copy of Handout 1 per participant</li> <li>• Sheets of chart paper and a marker per group of 4-5</li> <li>• PowerPoint slides 10-13</li> </ul>
12:00 - 13:00 (60 minutes)	Lunch (and travel into the local community)	
13:00 - 15:00 (A maximum of 120 minutes, including time to return to the training room)	Activity: Field Trip	<ul style="list-style-type: none"> <li>• One clipboard and paper, or notebook per participant</li> <li>• Local maps and directions (if necessary)</li> </ul>
15:00 - 16:00 (60 minutes)	Activity: Field Trip Debriefing	<ul style="list-style-type: none"> <li>• Flip chart</li> </ul>
16:00	Close	<ul style="list-style-type: none"> <li>• Participants asked to complete Handout 2</li> <li>• Remind participants to read through Day Four 'Classroom Activities' and bring any questions to the next day's workshop</li> <li>• Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Four</li> </ul>

## Day Four Facilitation Guide

This module focuses on local community and school-based climate change learning. It begins by revisiting resilience and vulnerability in greater depth, including an exploration of how schools and communities can work to build a ‘culture of safety and resilience’. Participants prepare for a field trip in the local community. The afternoon is largely dedicated to the field trip itself.

Back at the training centre, participants exchange and discuss their experiences before taking time to reflect on lessons learned about organizing and facilitating climate change-related school field trips. An alternative to the field trip activity would be to bring in guest lecturers or speakers from the community who work in climate change related activities.

[Click to consult the Summary of what is learned on Day Four](#) 

[Click to download the Powerpoint slides in pptx format for Day Four](#) 

[Click to consult the Powerpoint slides for Day Four](#) 

### 9:00-9:30 Revisiting Day Three

With slide 2 showing, facilitator leads a two-part discussion, opening each part with one of the following questions:

- As you wrote your reflections diary entry for Day Three did any issues and questions arise that you would like to raise with the group?
- Do you have any questions concerning the Classroom Activities for Day Three in your activities file?

### 9:30-9:55 Activity: ‘Bouncing Back’

#### Time Needed

- 25 minutes (15 minutes in pairs; 10 minutes brainstorming followed by brief initial input on resilience)

#### Objectives/Explanation

- To explore the qualities and capacities that make up personal resilience as a springboard for going on to consider community resilience

#### Materials Needed

- A bendy ruler or stick, a rubber band, a rubber ball, an eraser and other everyday objects that, if bent, pulled or squeezed out of shape, return to their original shape when released
- Flip chart and marker

#### Procedure

1. Use the bendy/stretchable objects brought to the session to demonstrate the capacity to ‘bounce back’ by bending and stretching them.
2. Ask participants to form pairs and move their chairs so they face each other. Ask them to sit quietly for a few moments and think about times in their life when they have ‘bounced back’ from difficult times and then reflect on the qualities they needed to show during those times.
3. Ask participants to nominate person ‘A’ and person ‘B’. Ask ‘B’ to tell ‘A’ those personal ‘bouncing back’ stories they feel comfortable sharing. ‘A’ should adopt the role of active listener. After two minutes, reverse the process so that ‘A’ tells her/his stories to ‘B’, who listens actively.
4. Then ask each pair to discuss the personal ‘bouncing back’ qualities demonstrated by their stories. Were similar capacities and characteristics shown in the stories? Or different ones in different circumstances?
5. Bring the whole group together for a brainstorming of qualities discussed, writing contributions on the flip chart. Follow this with open discussion.

#### Facilitation Guidance

This activity will help focus attention on the nature of resilience. The facilitator needs to be sensitive to the fact that the sharing of stories can be very emotional in its revelation of both strengths and vulnerabilities. For the closing whole group discussion, a critical question is how schools and teachers can help nurture and strengthen such qualities in the everyday teaching environment. Ideas can be captured on the flip chart.

**9:55-10:45 Activity: Building a ‘Culture of Safety and Resilience’**

**Time Needed**

- 50 minutes (25 minutes in groups; 25 minutes reporting back, discussion, and concluding input)

**Objectives/Explanation**

- To consider and concretize the concept of a ‘culture of safety and resilience’
- To arrive at a list of the qualities and capacities required and areas for action in building community resilience in the face of climate change
- To identify the contribution schools and other learning spaces can make to building a ‘culture of safety and resilience’
- To identify what is common in the qualities and capacities required for personal and community resilience
- To briefly consider at what level (local through national) resilience is likely to be best achieved in a climate-changed world

 Click to consult Factsheet information on coping capacity and the need to build resilience

**Materials Needed**

- Two sheets of chart paper and two markers of different colours per group of four

**Procedure**

1. Showing slide 3, speak about resilience, especially noting that resilience, the ability to ‘bounce back’, applies not just to individuals but also to societies and natural systems. For example, the redevelopment of a nation after war or the regeneration of an ecosystem after a forest fire or oil spillage. Stress, too, that climate change demands — or will in the future demand - high levels of resilience.
2. Briefly introduce the Hyogo Framework for Action (slide 4) and its Action Priority 3: ‘Use knowledge, innovation and education to build a culture of safety and resilience at all levels’. [The full text of the framework can be viewed at: <http://www.unisdr.org/we/inform/publications/19690.>]
3. Show slide 4 and invite pairs from the previous activity to join together to form a group of four to discuss the concept of ‘culture of safety’ as it applies to local community resilience to climate change. Have groups divide their first sheet of paper into five

 Click to consult slide 3-9

 Click to consult Factsheet information on building resilience through education

**Facilitation Guidance**

This activity seeks to deepen and enliven participants’ understanding of the qualities to be found in sturdy community resilience, of how those qualities can (and do) manifest themselves concretely, and of the contribution schools and learning institutions can (and do) make towards fostering a ‘culture of safety and resilience’. On the question of the contribution of schools, the facilitator might ask:

- How prepared are your schools for playing a significant role in building climate change resilience in the local community?
- What more could your schools do?
- What would need to happen for your schools to play a bigger role?
- What would be the obstacles to their playing a bigger role?
- How might those obstacles be overcome?

The facilitator might begin the concluding general reflection by asking participants whether the personal and community ‘bouncing back’ qualities and capacities revealed by the morning’s activities are similar. Are resilience qualities and capacities much the same whether the response to distress occurs in personal and local community spheres (and, indeed, at regional and national levels)?

A number of climate change experts maintain that large scale and centralized government is not the best place from which to handle the onset of multiple threats from climate change and that the local and regional levels are the most appropriate levels for developing resilience and risk reduction strategies and initiatives. This, some say, is particularly the case in that a great deal of uncertainty surrounds how climate change will manifest itself locally by locality. It is also argued that local, regional and indigenous knowledge is important for climate change defence, as is the ability to act quickly when disturbance or disaster hits. On the other hand, some argue, climate change is a new phenomenon and mundane traditional knowledge is not helpful unless combined with scientific insight (more often developed under the auspices of central government). In the latter part of the discussion, the facilitator should open up these issues and have the group briefly consider positive and negative consequences of having responses to climate change decentralized.

sections, one per dimension of resilience and write in qualities, capacities and initiatives that are needed to build a 'culture of safety and resilience' under each dimension. If group members are from the same local community, they should focus concretely on that community. If group members are from diverse communities, ideas specific to member's communities should be included.

4. Ask groups to similarly divide their second sheet of chart paper into five sections, one per dimension. On this sheet they should list contributions that their school(s) could make (or are making) to building a 'culture of safety and resilience' in pursuance of ideas noted on the their first chart.
5. Have groups report back on their ideas before engaging participants in a general reflection.
6. Conclude with an input on climate change resilience and vulnerability revisiting slides 3 and 4 but also using slides 6-9.

### 10:45-11:00 Break

### 11:00-12:00 Activity: Field Trip Preparation

**\*\* As an alternative to the field trip, one or several guest speakers or lecturers from the community could be invited to speak about their engagement in climate change activities. \*\***

#### Time Needed

- 60 minutes (25 minutes for individual and group interview question writing; 35 minutes for finalizing and sharing interviewing questions, working out interview timetables and assigning responsibilities)

#### Objectives/Explanation

- To prepare for a local field trip aimed at learning about local climate change understandings and perspectives, impacts and initiatives
- To develop interview questions to collect data on previous and current climate related challenges in the community, any existing community initiatives and resources, and current and potential future opportunities for school and school-in-community climate change initiatives
- To practice preparing for climate change-related field trips that include interviews and observation

#### Materials Needed

- Nine slips of blank paper per participant
- One copy per participant of Handout 1
- Sheets of chart paper and a marker per group of 4-5

#### Procedure

1. Introduce the idea of school climate change field trips as an effective means of alerting students to local contributions to greenhouse gas emissions, local climate change impacts, and mitigation, adaptation, risk reduction and resilience building initiatives, and as a possible precursor to school/community change partnerships.

#### Facilitation Guidance

Crucial for the success of this activity is the detailed preparation in advance of the field trip. It is vital that the facilitator should become familiar with the climate change situation in the area around where the training is taking place; i.e. any major contributions to global warming locally, any local impacts of climate change, any local climate change initiatives, any school and school-with-community initiatives. In the light of what is found, the activity may need adjusting.

The facilitator should liaise with community members, explaining the purposes of the field trip, and come up with a list of volunteers who will make themselves available for interview (individually or as part of a focus group) and/or will act as guides to participants as they visit local manifestations of the causes and effects of climate change). Locations should also be agreed and directions ascertained.

Beyond generally well-informed members of the local community, potential types of local people to approach would be:

- Climate change scientists (e.g. academics, officers from meteorological stations, agricultural/forestry/marine scientists).

[Continued, next page](#)

[Click to consult Factsheet information on local relevance of Education for Sustainable Development](#)

[Click to consult Handout 1](#)



2. Use slide 10 to explain to participants that the main purposes of the afternoon field visit are: to gather information on local challenges in the face of climate change; to find out about local initiatives for climate change mitigation, adaptation, risk reduction and resilience building; to collect views on potential school/ community climate change initiatives as well as data on any current initiatives.
3. Explain the key characteristics of semi-structured interviewing and offer some practical tips on conducting interviews (slides 11, 12).
4. Give nine slips of paper to each participant and ask them to write down three questions they would like to ask about each of the following areas: (1) local contributions to greenhouse gas emissions and/or local impacts and hazards arising from climate change; (2) climate change mitigation, adaptation, risk reduction and resilience building initiatives in the locality; (3) child and youth engagement with climate change in school and in the community (slide 13).
5. Have participants form groups of four or five to critically review each other's questions. Also ask them to list the genre of people they would optimally think of including in their inquiry into each of the three areas.
6. Reveal the pool of volunteer interviewees for the afternoon and details of their availability. Pin up availability sheets on which groups will sign up for a time slot with interviewees.
7. Distribute a copy of Handout 1 to each participant and ask groups to finalize their interview questions for each area by fusing their own questions with their choice of sample questions in the handout, and by shaping the questions according to whom they will be interviewing. Encourage them to also include new questions that come to mind.
8. Have all groups take turns in reporting on their plans for one area and then repeat the process for the other two areas.
9. Have groups revisit plans and finalize (1) which areas they will focus on (ask them to choose two or three areas), (2) who they will interview and when (they will have signed up on the appropriate availability sheets), (3) individual responsibilities (interviewers, interview note takers, observation note takers – if phenomena and initiatives in action are to be observed).
10. Explain that after the field trip there will be a session in which groups will report on their findings. Urge them to think through what they intend to report on ahead of the session.

- Those involved in climate change mitigation, adaptation, risk reduction and resilience building initiatives, such as: local government officers, environmental officers, members of environmental, development and sustainability non-governmental organizations, community leaders, youth leaders, religious leaders, local head teachers and school teachers, emergency officers, health workers, media representatives.
- Those with direct experience of climate change impacts, such as: older people, farmers, fishermen, women's groups, migrant minorities in the area.

If possible, a visit to an actual site contributing to greenhouse gases and/or a site affected by climate change hazards should be built into the programme with opportunities to observe and to speak with those living or working at the sites.

**12:00-13:00 Lunch**

**13:00-15:00 Activity: Field Trip**

#### Time Needed

- A maximum of 2 hours for fieldwork, including time to return to the training room

#### Objectives/Explanation

- To practice climate-change related fieldwork: interviewing and observing
- To experience some of the practicalities and logistics of organizing a climate-change related field trip

#### Facilitation Guidance

The facilitator should aim to achieve a good overview of group activities, joining different groups or planned events now and then as a silent observer.

- To learn of local experiences of, and perspectives on, climate change impacts and actual and potential climate change responses

### Materials Needed

- One clipboard and paper or notebook per participant
- Local maps and directions (if necessary)

### Procedure

1. Remind participants of the purposes of the field trip.
2. Remind them that are collecting data for a reporting back and analysis session back at the training location.
3. Initiate the session, emphasizing a punctual return to the collecting point or training location.

## 15:00-16:00 Activity: Field Trip Debriefing

### Time Needed

- 60 minutes (15 minutes for reviewing findings and observations in each of the three areas; 15 minutes' consideration of facilitating field trips)

### Objectives/Explanation

- To have groups report back, exchange and discuss their field trip findings and observations
- To reflect on lessons learned about organizing and facilitating climate-change related field trips

### Materials Needed

- Flip chart

### Procedure

1. Announce that there will be 15 minutes for reporting back on each of the field trip areas (show slide 13).
2. Start the session by asking one particular group to report back their main findings about the area under review. Break away from the reporting group now and then to ask if other groups want to add anything, qualify what has been said or have a different opinion or perspective. From time to time, switch to another group to continue the reporting back (it is not necessary for every group to assume the anchor reporting role under each area).
3. In the concluding 15 minutes, ask the whole group to discuss what useful things they have learned about organizing and conducting a climate change field trip from their school or learning institution (things to do; things not to do). Record key ideas on the flip chart.

Click to consult  
slide 13 

## 16:00 Close

- Ask participants to complete a feedback sheet for Day Four (Handout 2).
- Remind participants to read through the Classroom Activities for the day and to bring any questions to the next day's workshop.
- Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Five.

Click to consult  
Handout 2 



United Nations  
Educational, Scientific and  
Cultural Organization



## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY FOUR HANDOUTS

## Handout 1. Sample Interview Questions

### AREA 1: Local contributions to greenhouse gas emissions and/or local impacts and hazards arising from climate change

- What changes in the climate and environment have you observed in the locality?
- In your estimation how responsible is climate change for the environmental changes you have noticed?
- Is there anything in the community that you think is contributing to climate change and, if so, can you explain what you have in mind?
- What climate change hazards have occurred in the locality?
- How did they affect the community?
- What damages and losses occurred? What was the impact on peoples' lives?
- Do you think the area is vulnerable to future climate change hazard(s) and, if so, how and in what areas?
- Who are the people that are most vulnerable to climate change hazard?

Click to consult  
Factsheet  
information on  
community-  
based  
monitoring



### AREA 2: Climate change mitigation, adaptation, risk reduction and resilience building initiatives in the locality

- What is happening locally to limit the effects of climate change on the community?
- Who is involved in local climate change projects and initiatives? What do they do?
- How were the local projects and initiatives chosen? Does everybody agree with them?
- What resources and finance are there to support the projects and initiatives?
- What are the aims of local projects and initiatives? What will need to happen before they can be described as 'successful'?
- What have been the challenges, obstacles and successes so far?
- Are national and international partners involved in the initiatives?
- Are local schools involved in local actions?
- How is news about projects and initiatives spread around the community?

### AREA 3: Child and youth engagement with climate change in school and in the community

- How much are local schools and colleges involved in local climate change initiatives? In what ways are they involved?
- How do you think schools, teachers and young people might become more deeply involved?
- What could they contribute in general? What could they specifically contribute to projects you are involved with?
- What are the possibilities for new projects involving school/community partnerships? What kind of projects?
- How important is it to listen to the voice of children in discussing climate change?
- Do children and youth have a voice so far? In what arenas? Through what channels?

[↩ back to Facilitation Guide:  
Field Trip Preparation](#)

## Handout 2. UNESCO Teacher Education Course on Climate Change Education for Sustainable Development: Feedback Sheet

Workshop Day No: 1, 2, 3, 4, 5, or 6 (please circle as appropriate)

This is to help the workshop facilitator(s) know how the programme is being received. They will take account of your comments in adjusting the course or their facilitation.

1. What I liked about today's workshop

2. What I think could be improved in how the workshop is being conducted

3. What questions and concerns the day has left me with

4. My other comments

Thank you very much!

[↩ back to Facilitation Guide: Introduction](#)

[↩ back to Facilitation Guide: Close](#)

## Summary of what is learned on Day Four

### 1. Pedagogies

<b>Personal Capacities to build Community Capacities</b>	e.g.: Qualities and skills of personal resilience skills used to address culture of community resilience (Facilitation Guide: Building a Culture of Safety and Resilience pp. 4-5)
<b>Capacity Building as platform for Action</b>	e.g.: Youth take action and engage with community on nature of resilience/vulnerability (Classroom Activities & Handouts: Building a Culture of Safety & Resilience, pp. 4-5)
<b>Understanding Decision Making Processes</b>	e.g.: Students analyze effects of climate change policy decisions at different levels of 'community' (Facilitation Guide: Building a Culture of Safety & Resilience, pp. 4-5)
<b>Development of Action Competences</b>	e.g.: Practical governance training for youth on communicating climate change-related DRR message to target audience (Facilitation Guide: Building a Culture of Safety & Resilience, pp. 4-5)
<b>Initiating Social Participation</b>	e.g.: Youth interact directly with community in reflection and awareness raising on effects of climate change (Facilitation Guide: Building a Culture of Safety & Resilience, pp. 4-5)

### 2. Definitions

Resilience
Vulnerability

### 3. Interdisciplinary Knowledge Systems

Knowledge from Natural Sciences	Knowledge from Social Sciences	Knowledge from Humanities
<b>Ecology</b> <ul style="list-style-type: none"> <li>Biodiversity loss</li> <li>Redevelopment of ecosystem</li> </ul>	<b>Political Science</b> <ul style="list-style-type: none"> <li>Analyzing policy decisions at various levels of government</li> </ul>	<b>Culture</b> <ul style="list-style-type: none"> <li>Building a culture of safety and resilience</li> </ul>
<b>Earth Sciences</b> <ul style="list-style-type: none"> <li>Mapping, Physical geography</li> </ul>	<b>Anthropology/Sociology</b> <ul style="list-style-type: none"> <li>Field work, interviewing, data collection</li> </ul>	<b>Communication</b> <ul style="list-style-type: none"> <li>Best practices for mass outreach message</li> <li>Learning to draw and analyze information through interviewing</li> </ul>
<b>Climate Change</b> <ul style="list-style-type: none"> <li>Greenhouse gas emissions, global warming, local environment hazards</li> </ul>	<b>Climate Change Education</b> <ul style="list-style-type: none"> <li>Applying varying scales of governance to respond to hypothetical climate change issues of the future</li> </ul>	

### 4. International Frameworks

 Click to consult Factsheet information on educating for disaster risk reduction

MDGs	Disaster Risk Reduction (DRR)
<b>Human Rights</b> <ul style="list-style-type: none"> <li>Learners assess impact of climate change on people within local communities</li> </ul>	<b>Link DRR with Climate Change</b> <ul style="list-style-type: none"> <li>Concept of “culture of safety and resilience” concretized in the face of climate change</li> <li>Learners explore five different dimensions of resilience from unanticipated climate change events within diverse local communities</li> </ul>
<b>Innovation</b> <ul style="list-style-type: none"> <li>Students use and build knowledge to create action plans within local school networks</li> </ul>	<b>Role of youth actions on DRR</b> <ul style="list-style-type: none"> <li>Modes of child/youth contribution to DRR</li> <li>Analysis, design, implementation, communication, mobilization, construction</li> </ul>
<b>Sustainable development practices</b>	

### 5. Skills

<b>Advocacy</b>
<b>Adaptation/Risk Avoidance</b>
<b>Empowerment</b> <ul style="list-style-type: none"> <li>Opportunity to take on key role for practicing action within community</li> </ul>
<b>Envisioning</b>
<b>Planning and Strategy Development</b>
<b>Critical Perspective</b> <ul style="list-style-type: none"> <li>Building ability to listen, integrate, and synthesize varying perspectives into one soluble action plan</li> </ul>
<b>Organize and Process Information</b>

[↩ back to Facilitation Guide: Introduction](#)

# Day Four PowerPoint Slides

1

**CLIMATE CHANGE IN THE CLASSROOM**

UNESCO COURSE FOR SECONDARY TEACHERS ON CLIMATE CHANGE EDUCATION FOR SUSTAINABLE DEVELOPMENT

**Day 4** Climate Change Learning: A Local Focus

2

**Welcome to Day 4!**

Climate Change Learning: A Local Focus

3

## Resilience

- The ability of an individual, a community, society or ecosystem to withstand, survive and adapt to the stress and shock waves of some dramatic, traumatic and often unanticipated event or development. The ability to rebuild is a mark of resilience.
  - Adapted from Pike, G. and Selby, D. (2011) *In the Global Classroom*

4

## Priorities for Action

- **Five Priorities for Action in the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters**
  - **Priority Action 1:** Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
  - **Priority Action 2:** Identify, assess and monitor disaster risks and enhance early warning.
  - **Priority Action 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels**
  - **Priority Action 4:** Reduce the underlying risk factors.
  - **Priority Action 5:** Strengthen disaster preparedness for effective response at all levels

5

## Dimensions of Resilience

- The Five Dimensions of Resilient Well-being
  - Biological
  - Material
  - Social (including Cultural)
  - Cognitive (Knowing and Understanding)
  - Emotional
- After Williamson, J. & Robinson, M. (2006). 'Psychosocial programs or programs aimed at general well-being?'

6

## Vulnerability

- The degree to which an individual, a community, a society or ecosystem is unable to cope with the stress and shock waves of some dramatic, traumatic and often unexpected event or development.
  - Adapted from Pike, G. & Selby, D. (2011). *In the Global Classroom*

7

### Climate Change Vulnerability

- The degree to which a person, community or society or ecosystem is susceptible to and unable to cope with the threats, hazards, disasters, shocks and stresses brought about by dangerous climate change.
- Features/measures of vulnerability:
  - A sense of defencelessness
  - Physical breakdown
  - Cultural collapse
  - Emotional or psychological injury or inability to cope
  - Breakdown of social structures and social and environmental processes
  - Inability to adapt
  - Aggression and conflict

■ Adapted from Pike, G. & Selby, D. (2011). *In the Global Classroom*

8

### Climate Change Resilience

- The ability of a person, community or society or ecosystem to survive the threats, hazards, disasters, shocks and stresses brought about by climate change, and to rebuild itself in the aftermath.
- Features/measures of resilience:
  - Emotional, psychological and cultural sturdiness
  - The ability to remain positive and hopeful
  - The ability to adapt and transform
  - The rate and sturdiness of return to a stable condition.

■ Adapted from Pike, G. & Selby, D. (2011). *In the Global Classroom*

9

### Resilience vs. Vulnerability

- The degree of resilience and vulnerability will depend upon the nature and size of the climate threat and the extent to which individuals, communities and societies have considered the future and, especially, readied themselves to handle shock and uncertainty.

■ Adapted from Pike, G. & Selby, D. (2011). *In the Global Classroom*

10

### Field Trip: Purposes

- To gather information on local challenges in the face of climate change
- To find out about local initiatives for climate change mitigation, adaptation, risk reduction and resilience building
- To collect views on potential school/community climate change initiatives as well as data on any current initiatives.

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11

### Semi-Structured Interviews

- Have a structure of main questions but it is the job of the interviewer to listen closely to what is said and ask follow-up questions
- Use open-ended questions – questions starting with ‘Who’, ‘What’, ‘Why’, ‘Which’, ‘When’ ... that are not answered with a simple ‘Yes’ or ‘No’
- Do not have a fixed wording or order of questions (the interviewer should remain flexible and go with the flow of the interview)
- Avoid ‘leading questions’, i.e. questions encouraging a particular answer
- Can be with one person or with a group of people (a ‘focus group’)

12

### Conducting the Interview

- Explain the purpose of the interview before you interview someone
- Listen closely to what people say
- Make it as much like a conversation as possible
- Ask follow-up or probing questions (e.g. ‘Can you tell me more about that?’ or ‘Then what happened?’ or ‘Any other thoughts on that?’)
- Adjust the order of questions so that the next question seems to flow naturally from what the person being interviewed has just said

13

## Areas of Interview Questioning

- AREA 1: Local contributions to greenhouse gas emissions and/or local impacts and hazards arising from climate change
- AREA 2: Climate change mitigation, adaptation, risk reduction and resilience building initiatives in the locality
- AREA 3: Child and youth engagement with climate change in school and in the community

[↩ back to Facilitation Guide:  
Field Trip Preparation](#)

[↩ back to Facilitation Guide:  
Field Trip Debriefing](#)

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## End of Day 4 – See you tomorrow

Please don't forget to:

- Fill out and submit your feedback form
- Read through *Classroom Activities* for the day and bring any questions to tomorrow's workshop
- Write your reflective workshop diary entry for the day and bring the diary to Day 5

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# Get the Facts:

## CLIMATE CHANGE IN THE COMMUNITY

Poverty - Why are the world's poorest the most vulnerable?

### Different capacities to cope

The capacity of a country or region to successfully cope with climate change is highly dependent on its level of economic and human development. Disparities in development worldwide mean that countries are affected unequally by climate change impacts. According to the Fourth Assessment Report of the IPCC (2007), developing countries are expected to suffer most from the negative impacts of climate change. Asia, Africa and many Small Island Developing States would be more vulnerable due to projected changes in annual average river runoff and water availability, decreases in crop productivity in dry and tropical regions, exposure of coastal areas to cyclones, storm surges, erosion, coastal subsidence and sea level rise (see 'The Case...' text box). Hence, the countries with the fewest resources are likely to bear the greatest burden of climate change in terms of loss of life and their related impacts on investment and the economy. Often, extreme weather events set back the development process for decades.

Even though developing countries are predicted to face the most severe impacts of climate change, they are less prepared and thus less able to confront the challenges than developed countries. For example, climate change-related weather disasters (e.g. floods, cyclones) are likely to cause substantial loss of life in developing countries, in particular amongst the most vulnerable populations who often dwell in precarious geographic areas and in sub-standard dwellings. The institutional capacity to successfully deal with such weather events is comparatively low. Indeed, over 96% of disaster-related deaths in recent years have taken place in developing countries.<sup>1</sup>

Developing countries are less prepared to cope with sea level rise, water shortages, increased extreme events, or the negative effects on agriculture resulting from climate change. All of these impacts put increased pressure on the capacities of the governments of those countries.

<sup>1</sup> Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation, African Development Bank, Asian Development Bank, DfID (United Kingdom), Directorate-General for Development (European Commission), Federal Ministry for Economic Cooperation and Development (Germany), Ministry of Foreign Affairs Development Cooperation (The Netherlands), OECD, UNDP, UNEP, The World Bank, 2003. <http://siteresources.worldbank.org/INTCC/817372-1115381292846/20480623/PovertyAndClimateChangeReportPart12003.pdf>

### The need for building resilience

Strengthening the adaptive capacity of governments, communities and households to climate change impacts is vital to decreasing the impact on vulnerable populations and increasing their resilience. A poverty-reduction strategy should increase the resilience of livelihoods, assets, and infrastructure. However, such a strategy should incorporate existing knowledge and coping strategies of vulnerable populations and should be designed with the targeted communities' participation, allowing them to have access to climate information. Social inequities can affect such access and hinder the adoption of an appropriate adaptation strategy.

Mitigation efforts can also increase the resilience and capacity of communities to adapt to changes in local climate conditions. Reducing both loss of natural habitat and deforestation can have significant biodiversity, soil and water conservation benefits, and can be implemented in a socially and economically sustainable manner. For example, forestation and sustainable bioenergy plantations can restore degraded land, manage water runoff, retain soil carbon and benefit rural economies<sup>2</sup> thus improving their ability to adapt to adverse impacts of climate change.

### The way forward for policy: Address poverty; build resilience

In general, the impacts and responses to climate change should be evaluated and integrated into poverty reduction strategy papers and conflict reduction strategies. Policy-makers need to recognise that sustainable adaptation measures must be context specific, and that policy responses need to integrate the participation of local stakeholders and use community-focused approaches. Development policies addressing the potential migratory impacts of climate change should stress coping capacities, adaptation and sustainability. Development and poverty reduction programmes and projects should incorporate resilience elements in its strategies<sup>3</sup>.

[↪ back to Facilitation Guide: Building a Culture of Safety and Resilience](#)

<sup>2</sup> Intergovernmental Panel on Climate Change (2007). Climate Change 2007: Synthesis Report. Geneva, Switzerland.

<sup>3</sup> Forced Migration Online. Environmentally displaced people: understanding the linkages between environmental change, livelihoods and forced migration. [http://repository.forcedmigration.org/show\\_metadata.jsp?pid=fmo:4960](http://repository.forcedmigration.org/show_metadata.jsp?pid=fmo:4960)



## Building community resilience through education

Education is also an instrument for preventing disasters from happening. Many hazards only become disasters due to human behaviour or as a result of a lack of preparedness. What people **know** has therefore often been demonstrated to be more important than what people **have** when it comes to avoiding or limiting the harmful consequences of hazards.

Ensuring quality education before, during, and after disasters can help build individual and community resilience to future climate change-induced disasters. It can reduce vulnerabilities to hazards by equipping learners and their communities with life-saving knowledge and helping them to develop positive coping mechanisms. Education can be instrumental in building local capacity to cope after disasters and in helping learners and the community to return to a normal life.

Education plays a significant role in increasing long-term behaviour changes and promoting participation among the general public. As such, it contributes to enhancing bottom-up solutions to a global problem that cannot be addressed by 'elites'. As an example, children often learn about natural risks at school and then pass this information onto their parents. This is typically the case in developing countries – when such programmes exist, but also occurs in developed states.<sup>4</sup> Adults, once informed, are more able to participate in civil society and to influence decision-making in areas that affect them, particularly at the local level.

Many other ethical discussions and principles<sup>5</sup> in relation to climate change can be approached by formal or informal education, with potentially strong outcomes in terms of giving rise to critical reflection. Viewing climate change in ethical terms underlines the point that everyone's behaviour counts and contributes, even indirectly, to influencing the trends of environmental and social systems. By thinking about and acting on our responsibilities, we share benefits within and

<sup>4</sup> Education also contributes in developing countries to saving lives by simply teaching children and women to swim or perform certain emergency procedures in the event of floods or other natural disasters.

<sup>5</sup> For exploratory purposes, other important principles in relation to climate change can be quoted here: the principle of equitable access to medical, scientific and technological developments with the sharing of knowledge and benefits; the principle of safeguarding and promoting the interests of the present and the future generations; the polluter pays principle; the precautionary principle.

### School System Disaster Response

The response of school systems in providing educational services to displaced families from New Orleans and other coastal cities when hurricanes Katrina and Rita hit the Gulf Coast of the United States in 2005 provides an example of accommodating children affected by an extreme weather event. Schools and school districts expedited enrolments to assure children did not remain out of school for an extended period of time. The US Congress approved funding for schools, which were educating displaced students. In some cases families returned to their hometowns when schools reopened; in other cases the families stayed permanently in their new communities and schools were able to deal with the fluctuation of enrolments.

among societies, but also between humans and plants, animals, ecosystems and the entire 'biotic community'.<sup>6</sup>

### Reorienting existing education programmes to address sustainability

Curricular revisions, not only in science and mathematics education, but also in the social sciences and humanities are needed to educate the younger generation about climate change, and to stimulate the problem-solving and critical thinking skills needed to generate solutions at the local and global levels. For some geographic regions, re-orienting education will go deeper. In the case of climate-induced migration, new skills may be necessary to live with members of other ethnic groups and/or cope with a changing physical environment. These need to be incorporated into the curriculum.

Education can play an important role in facilitating adaptation to the challenges posed by climate change. It can help reduce the vulnerability of communities and improve their capacity to adapt to changes in their social, economic and ecological environment, and an uncertain future. Most importantly, it helps individuals to make informed decisions on how to adapt their lives and livelihoods to the effects of climate change and reduce risk and vulnerability.

**Indigenous and local knowledge** is a key resource for communities in understanding the environment, and assessing and adapting

<sup>6</sup> According to A. Leopold, (an American ecologist), 'a thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise', *A Sand Country Almanac* (1949).

# Get the Facts:

## CLIMATE CHANGE IN THE COMMUNITY

to climate change impacts. It should be strengthened and integrated into education programmes. Building on students' knowledge of local communities and their culture and value systems is essential. This makes climate change education more authentic and relevant to specific situations, and helps to find local, realistic and affordable solutions for adaptation.

### Education for climate change adaptation in the community

Education for adaptation is not an easy task. The future of vulnerable communities in

#### Community-based Monitoring

Community-based monitoring (CBM) is a complex research field that is becoming an essential and often required component in academic research and natural resource management (Fleener et al., 2004; Huntington, 2008). It is often used as a validation of results produced by conventional research methods. CBM enables researchers to reach beyond traditional data collection strategies by using the best available knowledge, be it academic, indigenous or local.

The Circumpolar Biodiversity Monitoring Program commissioned the development of a Community-Based Monitoring Handbook (Gofman and Grant Friedman, 2010). The handbook enhances the role of community-based observations in the current and emerging Arctic research projects and recommendations can also be applied to broader monitoring efforts and in non-Arctic regions. The Handbook reviews several ongoing community monitoring programmes, and is written for a diverse audience that includes scientists, students, Arctic community residents and government officials.

Projects reviewed include:

- Arctic Borderlands Ecological Knowledge Co-op (<http://taiga.net/coop/>)
- Community Moose Monitoring Project and Community Ecological Monitoring Project, ECORA (Integrated Ecosystem Approach to Conserve Biodiversity and Minimize Habitat Fragmentation in the Russian Arctic, <http://www.grida.no/ecora/>)
- Marine Rangers Project in Australia ([www.atns.net.au/agreement.asp?EntityID=4923](http://www.atns.net.au/agreement.asp?EntityID=4923))

[↩ back to Handout 1](#)

coastal areas, deserts or mountains is already uncertain in the short term. Education for adaptation therefore has to prepare for futures characterized by uncertainty. Adaptation to climate change requires individuals to be aware of potential changes in the climate and to understand the implications on their lives. It requires them to assess the risks such changes hold for their future, and to take informed decisions on how to adapt their livelihoods and homes.

Quality education that equips individuals with critical thinking and problem-solving skills improves the adaptation capacities of affected communities. Education programmes that explicitly prepare for disaster, and promote indigenous knowledge, sustainable lifestyles and sustainable development will further enhance these capacities.

Education for adaptation plays a key role in enhancing the resilience of communities, in particular, in **rural areas** where livelihoods are dependent on the weather. Education programmes can help to raise awareness of changing farming requirements and incorporate climate information into the decision-making of rural communities. In agriculture, for instance, adaptation options for education may explore opportunities of reducing dependency on rain-fed agriculture, adopting drought resistant and early maturing varieties, as well as better use and management of rain water through rainwater harvesting. These may require the use of action enquiry strategies in teaching and learning.

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### Educating for disaster risk reduction

Governments must commit to teacher training and curricula development to support large-scale teaching on DRR. Disaster prevention and preparedness need to be incorporated throughout formal curricula and through co-curricular and informal means. Students can be taught about disasters and their impacts on people's lives as part of the science and life-skills curricula. While classes should familiarize students with local hazards and what to do in an emergency, a multi-hazard approach should be adopted to instruct learners about the variety



of hazards that exist. Policy-makers can engage teachers and students in adapting, developing and testing high-quality interactive materials and strategies to teach DRR, while teachers should be trained in how to create safe learning environments that promote the protection and well-being of learners.

[↪ back to Summary of what is learned on Day 4](#)

### **Locally relevant, culturally appropriate: Education for sustainable development**

The ESD framework and pedagogies provide an educational framework for many environmental, social, economic, ethical and political issues and are thus ideal for addressing the wide variety of impacts related to climate change.

ESD can be implemented in myriad ways such that the resulting ESD programme is locally

relevant and culturally appropriate, reflecting the unique environmental, social and economic conditions of each locality. Furthermore, ESD increases civil capacity by enhancing and improving the workforce, social tolerance, environmental stewardship, participation in community-based decision-making, and quality of life. These features enable climate change education to acquire a wider and deeper meaning and applicability through close association with ESD (see 'Education for...' text box).

[↪ back to Facilitation Guide: Field Trip Preparation](#)

#### **Education for Sustainable Development:**

- is based on the principles and values that underlie sustainable development;
- deals with the balanced well-being in all three realms of sustainability – environment, society and economy;
- promotes life-long learning;
- is locally relevant and culturally appropriate;
- is based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences;
- engages formal, non-formal and informal education;
- accommodates the evolving nature of the concept of sustainability;
- addresses content, taking into account context, global issues and local priorities;
- builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable workforce and quality of life;
- is interdisciplinary. No one discipline can claim ESD for its own, but all disciplines can contribute to ESD;
- uses a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills.



# Get the Facts:

## CLIMATE CHANGE IN THE COMMUNITY

Climate change impacts on communities worldwide

### Intergovernmental Panel on Climate Change (IPCC) Information on Current Knowledge about Future Impacts

#### Freshwater resources and their management

By mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water-stressed areas. In some places and in particular seasons, changes differ from these annual figures.]

Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.

In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.

Adaptation procedures and risk management practices for the water sector are being developed in some countries and regions that have recognised projected hydrological changes with related uncertainties.

#### Ecosystems

The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).

Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.

The progressive acidification of oceans due to increasing atmospheric carbon dioxide levels increases the potential for the skeletons of coldwater coral reefs to dissolve, perhaps already within a few decades. The impacts will be greatest at high latitudes..

#### Food, Fibre and forest products

Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3°C depending on the crop, and then decrease beyond that in some regions.

At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase the risk of hunger.

Globally, the potential for food production is projected to increase with increases in local average temperature over a range of 1-3°C, but above this it is projected to decrease.

Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes.

Adaptations such as altered cultivars and planting times allow low- and mid- to high-latitude cereal yields to be maintained at or above baseline yields for modest warming.

Globally, commercial timber productivity rises modestly with climate change in the short- to medium-term, with large regional variability around the global trend.

Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.

#### Costal systems and low lying areas

Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be



exacerbated by increasing human-induced pressures on coastal areas.

Corals are vulnerable to thermal stress and have low adaptive capacity. Increases in sea surface temperature of about 1-3°C are projected to result in more frequent coral bleaching events and widespread mortality, unless there is thermal adaptation or acclimatisation by corals.

Coastal wetlands including salt marshes and mangroves are projected to be negatively affected by sea-level rise especially where they are constrained on their landward side, or starved of sediment.

Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.

Adaptation for coasts will be more challenging in developing countries than in developed countries, due to constraints on adaptive capacity.

### **Industry, settlement and society**

Costs and benefits of climate change for industry, settlement and society will vary widely by location and scale. In the aggregate, however, net effects will tend to be more negative the larger the change in climate.

The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies.

Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

### **Health**

Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity, through:

- increases in malnutrition and consequent disorders, with implications for child growth and development;
- increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts;
- the increased burden of diarrhoeal disease;
- the increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and,
- the altered spatial distribution of some infectious disease vectors.
- Climate change is expected to have some mixed effects, such as a decrease or increase in the range and transmission potential of malaria in Africa.

Studies in temperate areas have shown that climate change is projected to bring some benefits, such as fewer deaths from cold exposure. Overall it is expected that these benefits will be outweighed by the negative health effects of rising temperatures worldwide, especially in developing countries.

The balance of positive and negative health impacts will vary from one location to another, and will alter over time as temperatures continue to rise. Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives and infrastructure and economic development.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers, pp. 11-13. Cambridge University Press.

[↩ back to PowerPoint slides for Day 4](#)

## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

**CLIMATE  
CHANGE**  
IN THE  
CLASSROOM



## Day Five At-A-Glance

Sample Schedule (Duration)	Session	
9:00 - 9:30 (30 minutes)	Revisiting Day Four	<ul style="list-style-type: none"> <li>• PowerPoint slide 2</li> </ul>
9:30 - 10:30 (60 minutes)	Activity: Climate Change Cartoons	<ul style="list-style-type: none"> <li>• One lettered set (A-J) of up to ten photocopied climate change cartoons (Handout 1) for each group of three or four participants.</li> <li>• PowerPoint slides 3-12</li> </ul>
10:30 - 10:50 (20 minutes)	Break	
10:50 - 11:05 (15 minutes)	Input: Climate Justice	<ul style="list-style-type: none"> <li>• PowerPoint slides 13-17</li> </ul>
11:05 - 12:00 (55 minutes)	Activity: Climate Change: Eroded, Limited and New Rights	<ul style="list-style-type: none"> <li>• One cut-up set of Human Rights Cards (Handout 2) for each group of three or four participants</li> <li>• One sheet of chart paper, marker and glue stick for each group</li> <li>• PowerPoint slides 17- 19</li> </ul>
12:00 - 13:00 (60 minutes)	Lunch	
13:00 - 13:55 (55 minutes)	Activity: Climate Change and the Millennium Development Goals	<ul style="list-style-type: none"> <li>• One cut-up set of the UN Millennium Development Goals cards (Handout 3)</li> <li>• Chart paper, markers and a glue stick per group of 2-3 participants</li> <li>• One copy per participant of Handout 4, Impacts of Climate Change on the Millennium Development Goals</li> <li>• PowerPoint slides 20-21</li> </ul>
13:55 -14:25 (30 minutes)	Activity: How Far Do Our Freedoms Go In Securing the Future?	<ul style="list-style-type: none"> <li>• Markers, blank stickers big enough to write on (2-3 stickers per person)</li> <li>• PowerPoint slide 22</li> </ul>
14:25 - 14:40 (15 minutes)	Break	
14:40-16:00 (80 minutes)	Activity: CCESD across the Curriculum (2)	<ul style="list-style-type: none"> <li>• Sheet of chart paper and one marker per group of 3-4 participants</li> <li>• Pins and/or adhesive tape for hanging charts on pin boards or walls</li> <li>• Up to 10 invitation cards – of a different colour for each subject – per group</li> </ul>
16:00	Close	<ul style="list-style-type: none"> <li>• Participants asked to complete Handout 5</li> <li>• Remind participants to read through Day Five ‘Classroom Activities’ and bring any questions to the next day’s workshop</li> <li>• Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Five</li> </ul>

## Day Five Facilitation Guide

This module takes a global perspective, exploring climate change as a complex global phenomenon and weaving together cross-cutting issues such as gender, health, human rights, peace and social justice. A cartoon interpretation activity reveals a range of issues, in particular, climate justice. Climate change is then explored from, first, a human rights perspective and, second, the perspective of the achievement of the Millennium Development Goals. The complex issue of what does or does not constitute legitimate action and activism when the sustainability and well-being of humanity and the planet are at stake is opened up for discussion. The day closes with participants proposing their ideas for CCESD across the curriculum and across their disciplines.

[Click to consult the Summary of what is learned on Day Five](#) 

[Click to download the Powerpoint slides in pptx format for Day Five](#) 

[Click to consult the Powerpoint slides for Day Five](#) 

### 9:00-9:30 Revisiting Day Four

With slide 2 showing, facilitator leads a two-part discussion, opening each part with one of the following questions:

- As you wrote your reflections diary entry for Day Four did any issues and questions arise that you would like to raise with the group?
- Do you have any questions concerning the Classroom Activities for Day Four in your activities file?

### 9:30-10:30 Activity: Climate Change Cartoons

#### Time Needed

- 60 minutes (30 minutes in groups; 15 minutes reporting back; 15 minutes discussion)

#### Objectives/Explanation

- To employ cartoons to explore perceptions on climate change and climate justice issues
- To practice media analysis
- To look at the place of cartoons in fostering the attitudes and dispositions for promoting social change and justice

#### Materials Needed

- One lettered set (A-J) of up to ten photocopied climate change cartoons (Handout 1) per group of three or four participants.

#### Procedure

1. Distribute sets of cartoons and ask groups to spread them out on the table or floor.
2. Ask individuals to quietly peruse the cartoons and to rank them intuitively in terms of their immediate impact, jotting down their chosen order and writing a brief note about what they think each cartoon is trying to say,
3. Have individuals share their rankings and explanations with group members, the aim being to understand each other's perspectives and thinking rather than look for consensus.
4. List a range of specific criteria – such as 'shocking', 'disturbing', 'sad' 'perceptive',

#### Facilitation Guidance

Cartoons can convey ideas and perspectives in direct, humorous, effective and startlingly simple ways. As such, they provide a fascinating springboard for consideration of climate change and sustainability issues as well as media perceptions and judgments on those issues.

Members of each group should be encouraged to share their initial responses to the cartoons before going on to report on their ranking of them according to the criterion they were given. Questions to put in the closing discussion include:

- What other criterion would it have been interesting to use for the activity?
- How do the cartoons achieve their effect?
- What insights do the cartoons offer on global climate change issues and, specifically, issues of climate change injustice?
- Who might most applaud each of the cartoons and who might feel most disturbed and challenged by its message?
- Which cartoon would you most like to send to world leaders to think about?

The facilitator should point out at some stage in the debriefing that humour has, historically, been a very powerful tool in action for social change and justice, and not least by loosening up seemingly intractable positions against change.

[Click to consult Handout 1](#) 

‘thought provoking’, ‘funny’, ‘puzzling’. Give each group one of the criteria to work with and ask groups to rank the cartoons according to that criterion, [For instance, one group will rank the ten cartoons from ‘most shocking’ to ‘least shocking’].

 Click to consult slides 3-12

5. Have groups report back on their ranking, and the thinking behind their ranking, before engaging participants in a discussion of issues that have surfaced. Reflect up the slides of the cartoons (slides 3-12) as they are discussed.

### 10:30-10:45 Break

### 10:45-11:05 Input: Climate Justice

 Click to consult slides 13-17

- Using slides 13 to 16 explore the concept of climate justice, referring back to the cartoons as and when applicable.
- Using slide 17, explore the different modes of justice brought into play by climate change.

### 11.05-12:00 Activity: Climate Change: Eroded, Limited and New Rights

#### Time Needed

- 55 minutes (30 in groups; 30 reporting back and discussion)

#### Objectives/Explanation

- To explore the present and likely future impact of climate change on the enjoyment of rights
- To reflect on whether any new rights are becoming necessary in a climate changing world

#### Materials Needed

- One cut-up set of Human Rights Cards (Handout 2) per group of three or four participants
- One sheet of chart paper, marker and glue stick per group

#### Procedure

1. Ask participants to form groups of three or four and hand them a set of materials for the activity.
2. Explain that the Rights Cards are taken from the articles of the Universal Declaration of Human Rights of 1948, a document over sixty years old but still a guiding document enshrining the rights of every human being. The articles are presented in simplified form.
3. Refer to Articles 1, 2 and 29 in particular. Explain that Articles 1 and 2 lay down that everyone without distinction is entitled to the same rights while Article 29 points out that, in practice, enjoyment of a right may need to be limited to protect the rights and freedoms of others.
4. Ask groups to divide their chart paper into two sections, one with the title

#### Facilitation Guidance

In introducing and debriefing the activity it is important to make the distinction between having a right and being able to enjoy that right. For example, when a family loses its subsistence farm because of creeping desertification and is therefore forced to migrate, the free enjoyment of several rights for the family is undermined. Nevertheless, in principle, the family’s human rights remain intact.

It will also be helpful to briefly remind participants about the climate change stories they have considered over the last few days, so as to draw real-world parallels to these issues. Recommending them to draw on local climate change experiences is also important.

Questions for the debriefing can include:

- Is the onset of climate change affecting a particular type of human rights? Are they security-oriented rights (i.e. protective of physical, material, social and economic well-being) or liberty-oriented rights (i.e. seeking to enhance individual freedom of action and choice and participation on political life) or both?
- What were the types of rights that groups felt needed to be restricted in some way to protect the rights and freedoms of others?
- Are the rights affected by climate change different between high-income and low-income nations?
- How do the well-established concepts of freedom from and freedom to apply to the discussion?

*Continued, next page*

 Click to consult Factsheet information on climate change human rights implications

 Click to consult Handout 2

‘Rights and Freedoms being Eroded/Lost’ and the other with the title ‘Rights and Freedoms that may need to be Limited’.

5. Invite participants to review each Rights Card. Their task is, first, to decide whether the enjoyment of the right described in the card is being eroded among people suffering for the effects of climate change or if they think it will likely be eroded as climate change becomes more acute in the future. If either is the case, they stick it the ‘Eroded’ section of the sheet with an explanatory note. Second, they are to consider whether enjoyment of the right should be limited in some way - now or in the future - so as to reduce the severity of climate change. If so, they should stick the card in the ‘Limited’ section of the sheet with a note explaining their thinking. A card can be stuck along the dividing line if they think it fits in both halves. Cards they think fit under neither category should be set aside.
6. Ask groups to conclude their discussion by thinking whether any new rights need enshrining in international declarations as the causes and impacts of climate change are better understood. Additionally, ask if they think any rights need expressing in different ways.
7. Invite groups to report back and facilitate a general reflection on issues raised.
8. Close the discussion by showing slides 18 and 19.

- Did some groups set aside rights cards that, upon further consideration, they should not have set aside?
- The universal enjoyment of a human right is dependent on the universal acceptance of duties to each other. What are the most important duties in a climate-changing world?
- What did participants flag as new rights that were needed in a climate-changing world? Did they identify any established rights that might be expressed differently? Is there a case for a new Climate Change Charter of Rights?

[Click to consult slides 18-19](#) 

## 12:00-13:00 Lunch

## 13:00-13:55 Activity: Climate Change and the Millennium Development Goals

### Time Needed

- 55 minutes (10 minutes introduction and initial brainstorming; 25 minutes group exchanges; 20 minutes whole group discussion and input)

### Objectives/Explanation

- To examine implications of climate change for achievement of the UN Millennium Development Goals (MDGs)
- To explore interconnections between the Millennium Development Goals and the challenges posed by climate change
- To recognize the interdependence of global development efforts

### Materials Needed

- One cut-up set of the UN Millennium Development Goals cards (Handout 3)
- Chart paper, markers and a glue stick per group of two or three participants
- One copy per participant of Handout 4, ‘Impacts of Climate Change on the Millennium Development Goals’

### Procedure

1. Explain that there are a number of studies acknowledging that climate

### Facilitation Guidance

This is a simple but effective means of examining the implications, actual or potential, of climate change for global development efforts and of exploring the reverberations of impacts across the eight MDGs.

Participants can be invited, as in the above procedure, to discuss climate change implications at different levels: global, regional, national, and local. Alternatively, the facilitator can ask groups to focus on just one of those levels.

In the debriefing, it is probably best to take each MDG in turn. The one or more groups that have considered a particular MDG can be asked to share their ideas on current or likely impacts of climate change on the realization of the Goal. The discussion can then widen to have other groups report on how they think the effects of climate change on the MDG in question is likely to reverberate on and influence progress towards the MDG they have considered. The discussion then moves on to the next MDG using the same procedure. With each MDG, it is important to enquire about any ‘None’ returns. Are there, indeed, no repercussions or can participants come up with ideas?

[Click to consult Handout 3](#) 

[Click to consult Handout 4](#) 



change is hampering efforts to deliver the UN Millennium Development Goals and that there is even evidence that climate change is putting progress towards achieving the goals into reverse. Use slides 20-21 in introducing the activity.

2. Ask participants to form a group of two or three and give each group one UN Millennium Development Goals card. Ask them to paste it in the middle of their chart paper and brainstorm global, regional and local impacts of climate change on the achievement of the given MDG.
3. After the brainstorm, ask each group to join another group that has investigated a different MDG. They should give each other summary explanations of their work and take questions.
4. Then ask the combined group to consider how the climate change impacts on one of the MDGs may in turn have repercussions for the realization of the other MDG they worked on.
5. Have the members of the original two groups note down agreed repercussions from the other MDG on their chart paper. Have them note down 'None' if no repercussions are identified.
6. Invite each original small group to find to another group working on a different MDG and repeat the same procedure. Repeat the procedure again if enough time remains.
7. Bring the whole group together to share and discuss the insights emerging from the activity. At an appropriate point in the debriefing, perhaps after the discussion of 'None' responses (see below), distribute Handout 4 and have the group review potential impacts of climate change they identified and those they overlooked.

### 13:55-14:25 How Far Do Our Freedoms Go in Securing the Future?

#### Time Needed

- 30 minutes (12 minutes reflecting and circulating; 18 minutes whole group discussion)

#### Objectives/Explanation

- To consider the question of what does and does not constitute legitimate action and activism when the sustainability and well-being of humanity and the planet are believed to be in danger

#### Materials Needed

- Markers, blank stickers big enough to write on, 2-3 stickers per person (Participants will write one of: Strongly Agree, Agree, Don't Know, Disagree, or Strongly Disagree in response to the information on the Kingsnorth Trial on slide 22)

#### Procedure

1. Show slide 22 on the 2008 Kingsnorth Trial in Kent, United Kingdom, in which six environmental activists halted the operation of a coal-fired power station in a protest about climate change. The jury found the activists not guilty on the grounds that their breaking the law was justified because their actions were to prevent greater damage in the future.
2. Ask participants to reflect for two minutes on the result of the trial and the implications for what is 'justified' in the name of sustainability, future well-being, and protection of the environment. At the end of the two minutes, invite participants to go to the trays of badges and choose and wear the badge that most faithfully represents their own response to the trial outcome.

#### Facilitation Guidance

It is important to encourage participants to engage in positive, constructive discussion and active listening. A somewhat different approach is to invite participants to change badges between statements if the discussions have caused them to rethink their position.

Helpful questions for the debriefing include:

- Can we think of times when people have taken action for change that was considered unlawful but has contributed to justice and well-being?
- What were the principal arguments advanced for and against the trial's outcome?
- How would your thinking change should climate change increase in its severity?
- Where does loyalty most lie in deciding what action, if any, to take to combat climate change? My region? National interest? National law? The earth? Present generations? Future generations?
- Can these loyalties be combined? How?



3. Have participants wearing the same badge meet together for two minutes (in pairs or threes) to discuss why they chose the badge. Then have them discuss for two minutes with someone wearing a badge one position removed from their own. Then have them discuss the statement for two minutes with someone wearing a badge two or more positions removed. Finally, ask participants to meet again with the person(s) they first talked with and have them review what they have heard and learned and the degree to which their discussions have caused them to reconsider their position.

### 14:25-14:40 Break

### 14:40-16:00 CCESD across the Curriculum (2)

#### Time Needed

- 80 minutes (25 minutes in groups; 25 minutes circulating and writing invitations; 30 minutes whole group discussion)

#### Objectives/Explanation

- To bring together ideas for CCESD across the curriculum as accumulated throughout the training
- To explore interdisciplinary frameworks and opportunities for CCESD

#### Materials Needed

- One sheet of chart paper and one marker per group of 3-4 participants
- Pins and/or adhesive tape for hanging charts on pin boards or walls
- Up to 10 invitation cards – of a different colour for each subject – per group

#### Procedure

1. Have participants form groups ideally of three or four according to the subject(s) they teach.
2. Have them write the name of their subject(s) at the top of the sheet of chart paper.
3. Ask groups to review the learning from the training through the eyes of a subject teacher and list the principal opportunities for addressing CCESD in the teaching of the subject(s) in question. Remind them that on Day 1 they brainstormed initial curriculum ideas and that on Day 2 they looked at the potential for considering the future across the curriculum. They might wish to refer back to their earlier work but they will also need to take into account the curricular implications of issues considered since then - mitigation, adaptation, disaster risk reduction, resilience, vulnerability and climate justice – as well as any ideas coming from the practice field trip.
4. Have each group stick their completed chart on the pin board or wall (leaving space between charts so they are easily accessible to the group).
5. Ask group members to take turns standing beside their chart to field questions while other group members move around to investigate the work of other groups. In this way everyone

#### Facilitation Guidance

This activity seeks to weave the multiple threads of the training together in order to generate potential CCESD curriculum content. It first focuses upon subject-based CCESD before opening up ideas for interdisciplinary curriculum responses.

In the lengthy debriefing stage, the following questions will be helpful:

- How big a contribution to CCESD can your subject make?
- In the case that it can make a large contribution, what are its principal assets in helping enrich CCESD?
- If it is a small contribution, why is that? Could the contribution be increased if the curriculum was changed and, if so, how would it need to change?
- What opportunities did you find for interdisciplinary work (as expressed in the invitations)? Did invitations go to all or only some subject areas? If only some, why was that? How do those receiving invitations react to the proposal? Would they accept the invitation back in school? What would need to change to enable them to accept an invitation to collaborate across subject boundaries?

If possible, the facilitator should arrange for the charts and invitations to be typed up as a document for participants to take back to their schools. The outcomes can also be shared with school principals and educational officials.

## Day Five: Climate Change Learning: A Global Focus

has a chance to circulate but someone is also always available to provide clarifications on the ideas listed.

6. Then ask groups to reconvene around their chart and consider ideas for CCESD-related cross-curricular links that have occurred to them while reviewing others' work. How could subjects work together to mutual benefit in strengthening and reinforcing CCESD? Have them write and deliver up to ten invitation cards to other subject groups proposing collaboration on a specific element of CCESD. Have groups receiving an invitation attach it to their chart.
7. Convene participants as a whole group for a closing debriefing.

### 16.00 Close



- Ask participants to complete a feedback sheet for Day Five (Handout 5).
- Remind participants to read through the Classroom Activities for the day and to bring any questions to the next day's workshop.
- Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Six.



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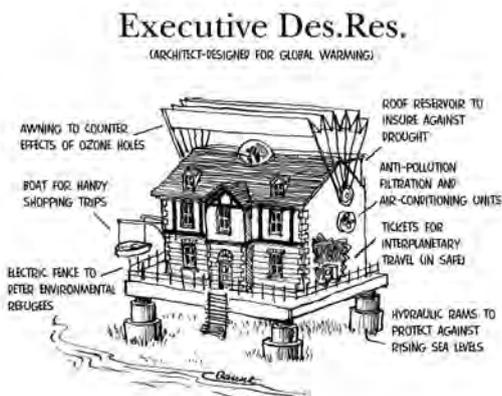
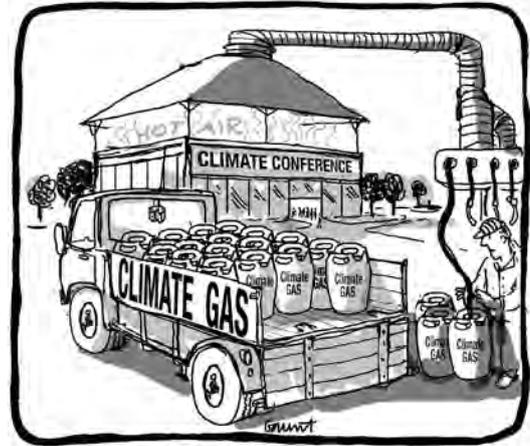
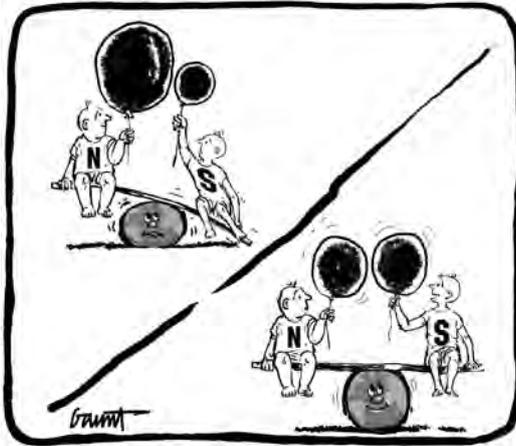
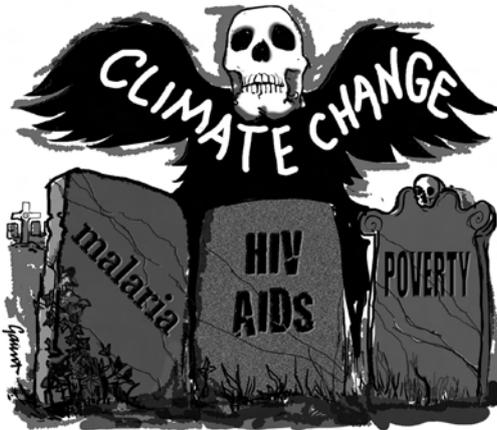
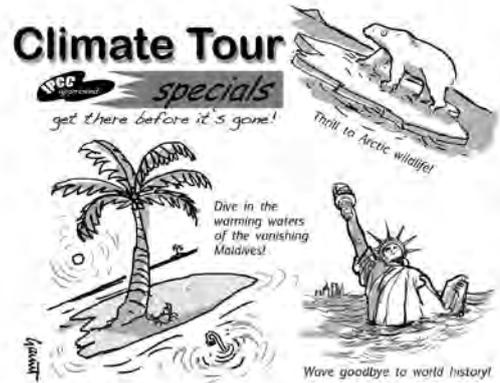
## Day / Focus

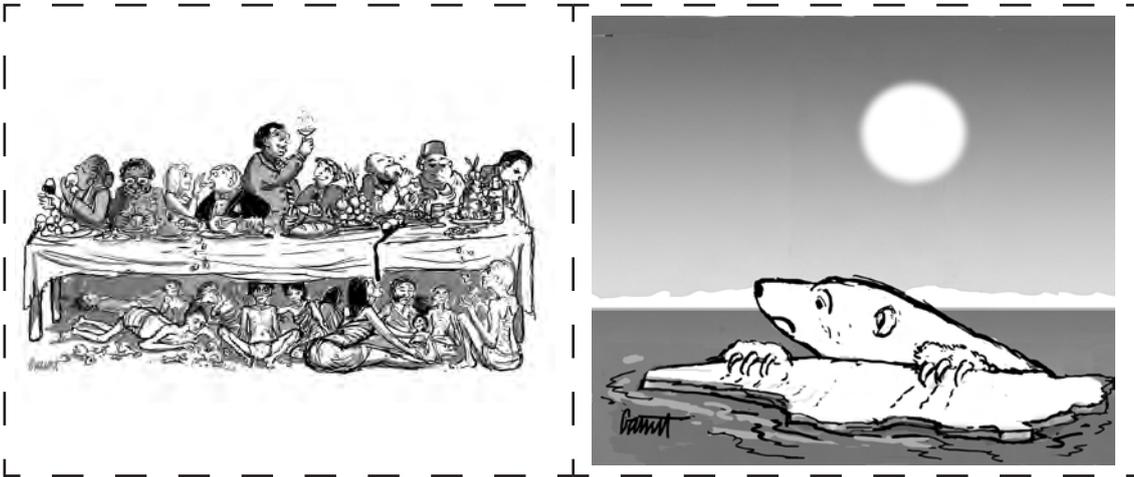
1. Climate change learning for sustainable development
2. The Future
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# DAY FIVE HANDOUTS

## Handout 1. Climate Change Cartoons





Credit: Lawrence Moore.

[↩ back to Facilitation Guide:  
Climate Change Cartoons](#)

## Handout 2: Universal Declaration of Human Rights (Simplified Version)

### Article 1. Equality of all people

All people are born free and equal in dignity and rights. They should behave towards each other in a spirit of community and solidarity.

### Article 2. Right of all to fair and equal treatment

You should have all the rights and freedoms listed in this Declaration, no matter where you are from, what colour you are, what sex you are, what language you speak, what religion you practice, what views you hold or how rich or poor you are. Nor does it matter what country you live in.

### Article 3. Right to life

You have the right to life, and to live in liberty and security.

### Article 4. Right to freedom from slavery

No one has the right to make you a slave and you cannot make anyone your slave.

### Article 5. Right to freedom from torture

No one has the right to torture you, or to treat or punish you in a cruel way, and you cannot torture anyone.

### Article 6. Right to be regarded as a person

Wherever you are, the law must recognize you as a person with rights.

### Article 7. Right to equality before the law

The law is the same for everyone, and it should be applied in the same way for everyone. Laws must never treat people differently.

### Article 8. Right to legal protection

You have the right to legal remedy when your rights are violated.

### Article 9. Right to freedom

No one has the right to put you in prison or keep you there, or send you away from your country unjustly or without reason.

### Article 10. Right to a fair trial (1)

If you bring a case to law or are charged and must go on trial, this should be conducted fairly and publicly. The people who try your case should not let themselves be influenced by others.

### Article 11. Right to a fair trial (2)

If charged with an offense, you should be considered innocent until it can be proved that you are guilty, and you have the right to defend yourself against any charge at a public trial. You should not be punished for something you did before a new law was made.

### Article 12. Right to privacy

You have the right to protection from interference with your privacy, family, home and correspondence. You have the right to have your honour and reputation protected in law.

### Article 13. Right to freedom of movement

You have the right to come and go as you wish in your country. You have the right to leave your country and return to it if you wish.

### Article 14. Right to political asylum

If someone persecutes you, you have the right to go to another country and ask it to protect you. You lose this right if you have committed a crime or acted contrary to the principles of the United Nations.

**Article 15. Right to nationality**

You have the right to a nationality and no one can deprive you of that nationality, without a good reason. You have the right to change your nationality if you wish.

**Article 16. Right to marry and have a family**

You have the right to marry and have a family when you are an adult. There should be nothing to stop you marrying someone from a different race, country or religion from yourself. Man and women have equal rights in marriage. No one can force you to marry. The government of your country should protect your family.

**Article 17. Right to own property**

You have the right to own property on your own or in association with others. No one can take your property away from you without reason.

**Article 18. Right to freedom of belief**

You have the right to freedom of thought, conscience and religion, the right to change your religion or beliefs and the right to practice your religion and beliefs if you wish, either alone or with other people.

**Article 19. Right to freedom of opinion and expression**

You have the right to freedom of opinion and expression, freedom to hold opinions without interference, and the right to receive and transmit information and ideas from or to other people, no matter where they live, through any media.

**Article 20. Right to freedom of assembly**

You have the right to organize or take part in meetings or work together in a peaceful way, but no one can force you to belong to a group.

**Article 21. Right to political activity**

You have the right to take an active part in your country's affairs by belonging to the government or by voting for politicians of your choice. You have the right to work in local government. The government shall be elected freely by all people. Election shall be held regularly and everyone's vote is equal.

**Article 22. Right to social security**

You have the right to social security and are entitled through national effort and international cooperation to the fulfilment of economic, social and cultural rights necessary for your dignity and free development.

**Article 23. Right to work**

You have the right to work, to choose your work freely, to just and favourable conditions of work, and to receive payment for to allow you and your family to live decently. Everyone should receive the same pay for doing the same work. You have the right to claim unemployment benefit or social security if necessary. You have the right to join a trade union to protect your interests.

**Article 24. Right to leisure**

You have the right to rest and leisure, to work reasonable hours and to take periodic paid holidays.

 Click to consult Factsheet information on climate change health implications

**Article 25. Right to a decent standard of living**

You have the right to a decent standard of living to ensure the health and wellbeing of your family (including food, clothing, housing, medical care and necessary social services); also the right to security in unemployment, sickness, disability, widowhood, old age or other lack of livelihood brought about by circumstances beyond your control. Mothers and children deserve special care.

**Article 26. Right to education**

You have the right to learn. Primary education should be compulsory and free. You should be able to learn a profession or continue your studies as far as you are able. At school you should be taught to develop your talents and to get along with other people, whatever their religion, their race or their nationality. Education should help the United Nations bring about and keep peace in the world. Your parents have the right to choose what kind of school you will go to.

**Article 27. Right to culture and copyright**

You have the right to join in the cultural life of your community and to share in the better life that scientific progress makes possible. Anything you invent, write or produce should be protected and you should be able to benefit from it.

**Article 28. Right to a social and international order**

Everyone is entitled to a social and international order that will help them achieve the rights in this Universal Declaration.

**Article 29. Duties to community and respect of rights**

You have duties towards the community that makes your full development possible. Your rights and freedoms shall be limited only so far as necessary to protect the rights and freedoms of others.

**Article 30. Protection of this Declaration**

No government, organization or person may destroy the rights and freedoms set out in this Declaration.

Source: Adapted from: Pike, G. & Selby, D. (1988). *Human Rights: An Activity File*.

[↩ back to Facilitation Guide: Climate Change: Eroded, Limited and New Rights](#)

### Handout 3: Millennium Development Goals Cards

MDG 1. Eradicate extreme poverty and hunger	MDG 2. Achieve universal primary education
MDG 3. Promote gender equality and empower women	MDG 4. Reduce child mortality
MDG 5. Improve maternal health	MDG 6. Combat HIV/AIDS, Malaria and other diseases
MDG 7. Ensure environmental sustainability	MDG 8. Develop a global partnership for development

[↩ back to Facilitation Guide:  
Climate Change and the Millennium  
Development Goals](#)

## Handout 4: Impacts of Climate Change on the Millennium Development Goals

Millennium Development Goal	Potential Impacts of Climate change
<b>Goal 1</b> <b>Eradicate extreme poverty and hunger</b>	<ul style="list-style-type: none"> <li>• Damage to livelihood assets, including homes, water supply, health, and infrastructure, can undermine peoples' ability to earn a living;</li> <li>• Reduction of crop yields affects food security;</li> <li>• Changes in natural systems and resources, infrastructure and labour productivity may reduce income opportunities and affect economic growth;</li> <li>• Social tensions over resource use can lead to conflict, destabilizing lives and livelihoods and forcing communities to migrate.</li> </ul>
<b>Goal 2</b> <b>Achieve universal primary education</b>	<ul style="list-style-type: none"> <li>• Loss of livelihood assets and natural disasters reduce opportunities for full time education, more children (especially girls) are likely to be taken out of school to help fetch water, earn an income or care for ill family members;</li> <li>• Malnourishment and illness reduces school attendance and the ability of children to learn when they are in class;</li> <li>• Displacement and migration can reduce access to education.</li> </ul>
<b>Goal 3</b> <b>Promote gender equality and empower women</b>	<ul style="list-style-type: none"> <li>• Exacerbation of gender inequality as women depend more on the natural environment for their livelihoods, including agricultural production. This may lead to increasingly poor health and less time to engage in decision-making and earning additional income;</li> <li>• Women and girls are typically the ones to care for the home and fetch water, fodder, firewood, and often food. During times of climate stress, they must cope with fewer resources and a greater workload;</li> <li>• Female headed households with few assets are particularly affected by climate related disasters.</li> </ul>
<b>Goal 4</b> <b>Reduce child mortality</b>  <b>Goal 5</b> <b>Improve Maternal Health</b>	<ul style="list-style-type: none"> <li>• Deaths and illness due to heat-waves, floods, droughts and hurricanes;</li> <li>• Children and pregnant women are particularly susceptible to vector-borne diseases (e.g. malaria and dengue fever) and water-borne diseases (e.g. cholera and dysentery) which may increase and/or spread to new areas – e.g. anaemia resulting from malaria is currently responsible for one quarter of maternal mortality;</li> <li>• Reduction in the quality and quantity of drinking water exacerbates malnutrition especially among children;</li> <li>• Natural disasters affect food security leading to increased malnutrition and famine, particularly in sub-Saharan Africa.</li> </ul>

 Click to consult Factsheet information on climate change implications on gender

<b>Goal 6</b> <b>Combat HIV/AIDS, malaria and other diseases</b>	<ul style="list-style-type: none"> <li>• Water stress and warmer conditions encourage disease;</li> <li>• Households affected by AIDS have lower livelihood assets, and malnutrition accelerates the negative effects of the disease.</li> </ul>
<b>Goal 7</b> <b>Ensure environmental Sustainability</b>	<ul style="list-style-type: none"> <li>• Alterations and possible irreversible damage in the quality and productivity of ecosystems and natural resources;</li> <li>• Decrease in biodiversity and worsening of existing environmental degradation;</li> <li>• Alterations in ecosystem-human interfaces and interactions lead to loss of biodiversity and loss of basic support systems for the livelihood of many people, particularly in Africa.</li> </ul>
<b>Goal 8</b> <b>Develop a global partnership for development</b>	<ul style="list-style-type: none"> <li>• Climate change is a global issue and a global challenge: responses require global cooperation, especially to help developing countries adapt to the adverse effects of climate change;</li> <li>• International relations may be strained by climate impacts.</li> </ul>

Source: Excerpt from: UNFCCC (2007). *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries*.

[↩ back to Facilitation Guide: Climate Change and the Millenium Development Goals](#)

## Handout 5. UNESCO Teacher Education Course on Climate Change Education for Sustainable Development: Feedback Sheet

Workshop Day No: 1, 2, 3, 4, 5, or 6 (please circle as appropriate)

This is to help the workshop facilitator(s) know how the programme is being received. They will take account of your comments in adjusting the course or their facilitation.

1. What I liked about today's workshop

2. What I think could be improved in how the workshop is being conducted

3. What questions and concerns the day has left me with

4. My other comments

**Thank you very much!**

[↩ back to Facilitation Guide: Introduction](#)

## Summary of what is learned on Day Five

### 1. Pedagogies

<b>Understanding climate change Perspectives</b>	e.g.: Using humor as a platform to address and understand powerful perceptions and judgments on climate change and climate justice (Facilitation Guide: Climate Change Cartoons, pp. 3-4)
<b>Understanding Freedom and Access to Rights</b>	e.g.: Understanding climate justice and the difference between human rights and access to rights, through real-world storytelling (Facilitation Guide: Climate Change - Eroded, limited and new rights, pp. 4-5)
<b>Identifying Sustainable Behavior</b>	e.g.: Addressing differences between action and activism that is legitimate or not in climate changed future (Facilitation Guide: How Far Do Our Freedoms Go In Securing the Future?, pp. 6-7)
<b>Applying Holistic Approach to CCESD</b>	e.g.: Students assess integrating various curriculum in order to strengthen CCESD (Facilitation Guide: CCESD Across the Curriculum, pp. 9-10; Regional Resource Pack: Section C)

Click to consult Factsheet information on human rights and legal status of environmental migrants



### 2. Definitions

<b>Rights:</b> Eroded, Limited and New
--

### 3. Interdisciplinary Knowledge Systems

Knowledge from Natural Sciences	Knowledge from Social Sciences	Knowledge from Humanities
<b>Climate Change Education</b> <ul style="list-style-type: none"> <li>Desertification, natural systems, natural disasters, carbon footprint</li> </ul>	<b>History</b> <ul style="list-style-type: none"> <li>Apply “Universal Declaration of Human Right” to present and understand definition of Human Rights</li> </ul>	<b>CCESD through Global Perspective</b> <ul style="list-style-type: none"> <li>Cross-cutting curriculum and disciplines</li> </ul>
		<b>Values &amp; Perspectives</b> <ul style="list-style-type: none"> <li>Assessing changed ideals after application to own life</li> </ul>
		<b>Justice and Well-being</b> <ul style="list-style-type: none"> <li>Assessing loyalties to region, nation, earth, present/future generations for action on climate change</li> </ul>

Click to consult Factsheet information on climate justice



#### 4. International Frameworks

MDGs	Disaster Risk Reduction (DRR)
<b>Health</b> <ul style="list-style-type: none"> <li>HIV/AIDS, disease, child mortality, clean water, famine</li> </ul>	<b>Futures casting</b> <ul style="list-style-type: none"> <li>Students consider erosion of rights and freedoms based on climate change future</li> </ul>
<b>Human Rights</b> <ul style="list-style-type: none"> <li>Security-oriented, liberty-oriented</li> <li>Justice, Implications</li> </ul>	<b>MDGs on DRR</b> <ul style="list-style-type: none"> <li>Goals relevant to DRR and negative impacts of climate change</li> </ul>
<b>Peace and Social Justice</b> <ul style="list-style-type: none"> <li>Students present varying perceptions on climate change and climate justice issues to promote action</li> </ul>	
<b>Implications of climate change on achievement of UN MDG's</b> <ul style="list-style-type: none"> <li>Recognize interdependence of global development efforts</li> </ul>	
<b>Global Partnership for Development</b> <ul style="list-style-type: none"> <li>Global cooperation</li> </ul>	

#### 5. Skills

Extrapolating
Media discernment
Decision making
Holistic perception

[↩ back to Facilitation Guide: Introduction](#)

# Day Five PowerPoint Slides

1

2

3

Climate Change Cartoons

Credit: Lawrence Moore. Reproduced here with permission.

4

Climate Change Cartoons

Credit: Lawrence Moore. Reproduced here with permission.

5

Climate Change Cartoons

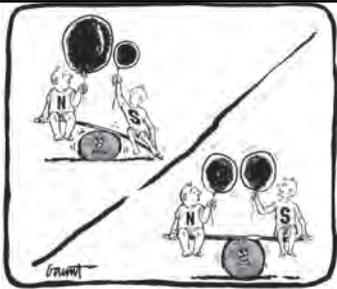
Credit: Lawrence Moore. Reproduced here with permission.

6

Climate Change Cartoons

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7



Climate Change Cartoons

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8



Climate Change Cartoons

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9

Executive Des.Res.



Climate Change Cartoons

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10



Climate Change Cartoons

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11



Climate Change Cartoons

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12



Climate Change Cartoons

Credit: Lawrence Moore. Reproduced here with permission.

[back to Facilitation Guide: Climate Change Cartoons](#)

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## Climate Change Impacts

- Impacts of climate change 'will fall disproportionately upon developing countries and the poor persons within all countries, and thereby exacerbate inequities in health status and access to adequate food, clean water, and other resources.'

■ Source: IPCC (2002).

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## Who has Contributed the Most?

- The 'carbon footprint' of the poorest 1 billion people is about 3 per cent of the world's total footprint
- Between 1850 and 2002, developed countries accounted for 76 per cent of cumulative carbon-dioxide emissions from fossil-fuel combustion, while developing countries accounted for 24 per cent.

■ Source: Excerpts from UNFPA web site. *Fact Sheet: Climate Change and Women*.

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## Who is Most Affected?

- 'Climate change tends to exacerbate differences among various groups, in terms of vulnerability and ability to cope with the effects. In general, vulnerable and socially marginalized groups, such as the poor, children, women, the elderly, and indigenous peoples, tend to bear the brunt of environmental change'

■ Source: UNFPA (2009). *State of World Population, 2009*.

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## The Gender Effect

- 'Gender inequalities intersect with climate risks and vulnerabilities. Women's historic disadvantages – their limited access to resources, restricted rights, and a muted voice in shaping decisions – make them highly vulnerable to climate change. The nature of that vulnerability varies widely, cautioning against generalization. But climate change is likely to magnify existing patterns of gender disadvantage.'

■ Source: UNDP (2007). *Human Development Report 2007/8*.

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## Climate Change and Justice Issues

- **Distributive justice:** 'Some people, groups of States carry an unfair burden in suffering the negative consequences of climate change to the course of which they have made little or no contribution.'
- **Compensatory justice:** 'If people who suffer the consequences of climate change are not those who caused it, can they legitimately claim compensation from those who did cause it?'
- **Procedural justice:** 'Who should participate in which processes of decision-making about measures to prevent, mitigate, or adapt to climate change?'
- **Human rights:** 'Human rights guaranteed by international instruments are put under threat by global climate change.'

■ Source: World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) (2010). *The Ethical Implication of Global Climate Change*. UNESCO, Paris.

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## Human Rights Implications (I)

- 'Human rights guaranteed by international instruments are put under threat by global climate change. The question of duties correlative with recognized rights necessarily follows. Can States or individuals appeal for instance to the human rights enshrined in the Universal Declaration of Human Rights to require certain States, institutions or individuals to stop those actions that cause global climate change, or to claim compensation from them if they do not? If yes, the question is how exactly this can be done, and through which mechanisms and structures.'

■ Source: World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) (2010). *The Ethical Implication of Global Climate Change*. UNESCO, Paris.

[↩ back to Facilitation Guide: Climate Justice](#)

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### Human Rights Implications (2)

- ...We must examine the degree to which global climate change has any implications for the basic right to liberty, which includes a person's right to use his/her property to enhance his/her well-being as he/she sees fit, as well as the right to freely choose one's own way of life'

■ Source: World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) (2010). *The Ethical Implication of Global Climate Change*. UNESCO, Paris.

↳ back to Facilitation Guide: Climate Change: Eroded, Limited and New Rights

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### UN Millennium Development Goals (MDGs)

- International Development Goals for achievement by 2015:
  - MDG 1: Eradicate extreme poverty and hunger
  - MDG 2: Achieve universal primary education
  - MDG 3: Promote gender equality and empower women
  - MDG 4: Reduce child mortality
  - MDG 5: Improve maternal health
  - MDG 6: Combat HIV/AIDS, Malaria and other diseases
  - MDG 7: Ensure environmental sustainability
  - MDG 8: Develop a global partnership for development

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### MDG Progress is in Danger

- 'Climate change is hampering efforts to deliver the MDG promise. Looking to the future, the danger is that it will stall and then reverse progress built-up over generations not just in cutting extreme poverty, but in health, nutrition, education and other areas.'

■ Source: UNDP (2007). *Human Development Report 2007/8*.

↳ back to Facilitation Guide: Climate Change and the Millenium Development Goals

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### The Kingsnorth Trial, Kent, UK

- In 2008, Six Greenpeace activists halted the operation of the Kingsnorth coal-fired power station. Their protest was against plans to build an even bigger coal-fired power station next door
- They were interrupted and arrested before they could finish painting their message asking the government to scrap the plans on the power station chimney
- They were charged with criminal damage and faced possible jail sentences
- The Greenpeace defence was that the action, even if illegal, was justified in that they were trying to prevent future damage to the world through climate change
- **The jury found the defendants innocent in the light of this defence but said their verdict did not set a precedent**

↳ back to Facilitation Guide: How Far Do Our Freedoms Go in Securing the Future?

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### End of Day 5 – See you tomorrow

Please don't forget to:

- Fill out and submit your feedback form
- Read through *Classroom Activities* for the day and bring any questions to tomorrow's workshop
- Write your reflective workshop diary entry for the day and bring the diary to Day 6

↳ back to Facilitation Guide: Introduction

# Get the Facts:

## A GLOBAL PERSPECTIVE

### The global challenge

Rising temperatures, changes in sea level, changing precipitation patterns, altered seasons and other environmental shifts brought about by climate change have already begun to impact human societies in numerous and diverse ways. In some cases these phenomena impose new challenges and make existing challenges more difficult. Rising sea levels, for example, pose a direct threat to settlements in low-lying coastal areas, while the growing frequency of storms and floods affect communities across the globe.

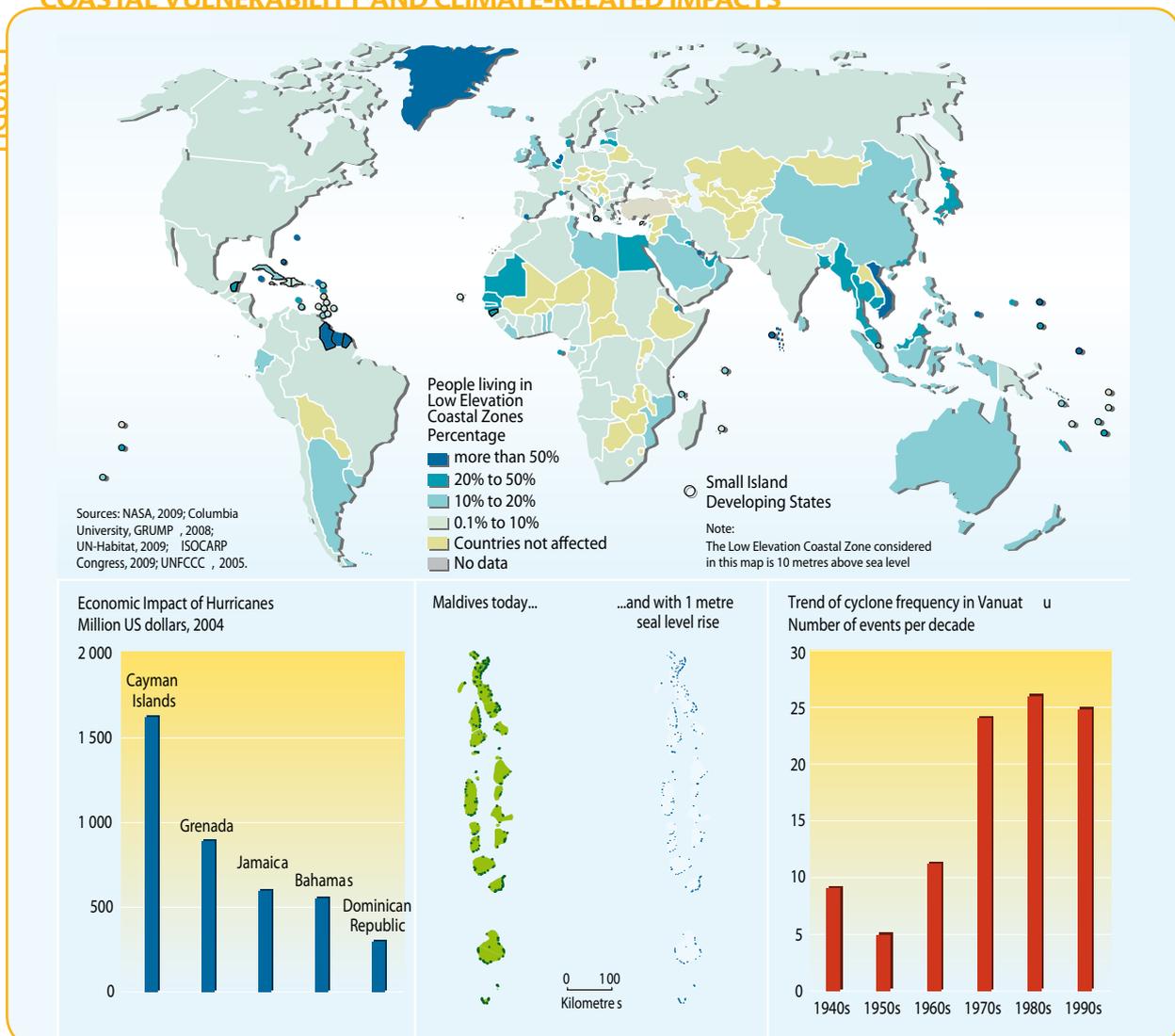
More specifically, climate change exacerbates problems such as poverty, disease and gender inequalities that already afflict – albeit to varying degrees – individuals, communities and in some cases whole nations. Article 1 of the UNFCCC states that the adverse effect of climate change will not only be felt in

natural and managed ecosystems, but also have “significant deleterious effects” on the “operation of socio-economic systems or on human health and welfare”. The impact of climate change also constitutes an opportunity to leverage positive social transformation with a particular focus on the needs of the most vulnerable within a comprehensive sustainable development framework.

For policy-makers, the challenge is to ensure that climate-related policies and measures simultaneously provide better living conditions for society and translate into more decent work, better health, adequate housing, education, gender equality, food security, protection of human rights, social protection for the most vulnerable, and ultimately contribute to poverty reduction and sustainable development, ensuring equitable low-carbon development processes.

### COASTAL VULNERABILITY AND CLIMATE-RELATED IMPACTS

FIGURE 1



UNEP/GRID-Arendal and CICERO (n.d.) Many Strong Voices - Turning Vulnerability into Strength

# Get the Facts:

## A GLOBAL PERSPECTIVE

### Global vulnerability

Costs and benefits of climate change for industry, settlement and society will vary widely by location and scale. In the aggregate, however, net effects will tend to be more negative the larger the change in climate.

The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies.

Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas

### Developing Country Vulnerability

The Stern Review, prepared for the British government by economist Sir Nicholas Stern, argues that developing countries are particularly vulnerable because of their topical geography, their high population growth, heavy dependence on agriculture and rapid urbanisation, their weak infrastructures and lack of resources.

[http://www.direct.gov.uk/en/N11/Newsroom/DG\\_064854](http://www.direct.gov.uk/en/N11/Newsroom/DG_064854)

### The Scale of Displacement

Migration, rising populations, unsustainable use of resources, poverty and civil war all contribute to vulnerability in the face of natural and weather-related disasters. The UN Office for the Coordination of Humanitarian Affairs (OCHA) and the Internal Displacement Monitoring Centre (IDMC) examined 2008 data and found that at least 36 million people were displaced by “sudden-onset natural disasters”, of which more than 20 million were displaced owing to the sudden onset of weather-related disasters, including about 6.5 million people because of floods in India. “Research from other sources suggests that many millions of people are also displaced annually as a result of slow-onset climate-related disasters such as drought,” it adds.

most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

### Human rights implications of climate change

Climate change has both intermittent - but increasingly frequent - extreme impacts (such as large storms and heat waves), and slow on-set, cumulative effects (such as extinction of life forms and sea level rise). Both kinds of effects may have a role in disrupting livelihoods and displacing human populations (see ‘The Scale...’ text box).

Climate change manifestations such as sea level rise, desertification and growing water scarcity, and extreme climate variability and events such as cyclones and floods do not take place in a vacuum. They can lead to millions of people being displaced by shoreline erosion, coastal flooding and agricultural disruption.<sup>1</sup> Scientists are increasingly confident about the identified impacts of climate change on the environment. Upon viewing these data through a human rights lens, it is clear that projected impacts threaten the effective enjoyment of a range of human rights, such as the right to safe and adequate

<sup>1</sup> Migration and Climate Change, IOM Migration Research Series, No. 31, p. 9

### Human Rights and Forced Migration

In May 2008, Cyclone Nargis struck the Irrawaddy Delta region in Myanmar, severely affecting 2.4 million people and leading to the displacement of 800,000 people. The resulting increase in population densities of neighbouring regions contributed to spread disease, while health and education services were largely inadequate for accommodating the sudden influx of people, depriving them of basic rights.





water and food, the right to health and to adequate housing (see ‘Human Rights...’ text box). Equally, the human rights perspective brings into focus that climate change is set to hit the poorest countries and communities the hardest.

Up to now, the scale of the problem has not been duly recognized. However, given the increasing number and impact of extreme environmental changes being attributed to climate change, the number and scale of migrations to come imply that challenges lie ahead for migrant destinations.

This raises the question of how to best protect environmental migrants (i.e. their legal status) and the responsibilities of the international community towards them. Environmental migrants fall through the cracks of international refugee and immigration policy – and there remains considerable resistance to the idea of expanding the definition of political refugees to incorporate ‘climate refugees’. Participants in the international debate on environmental migration share core concerns, including multi-causality and the recognition of the social construction of vulnerability. Nevertheless, more research is required to build a better understanding of the challenges environmental migrants face, accompanied by more informed adaptation strategies and policies to protect their human rights.

Nonetheless, some progress has been made on this issue as demonstrated in the ‘enhanced action on adaptation’ text of the agreement of the UNFCCC COP 16 in Cancun. The text invites Parties to enhance action on adaptation by undertaking measures for understanding, coordination and cooperation with regard to climate change-induced displacement, migration and planned relocation at the national, regional and international levels.<sup>2</sup>

From a human rights perspective, the identification of the proportion of poor people in the population is not sufficient. It is necessary to identify specific groups – in terms of various characteristics such as gender, geographical location, ethnicity, religion, age or occupation – in which poverty is entrenched, so that the problem of poverty can be addressed at as disaggregated a level as possible. Second, special efforts must be made to identify those among the poor who are particularly deprived and vulnerable to climate change effects. When resource constraints call for the setting

<sup>2</sup> UNFCCC. Cancun Adaptation Framework. Paragraph 14f, 2010.

of priorities, it is the entitlement of these groups that should receive prior attention. This is necessary for the sake of equality, which is an essential principle of the human rights approach. Moreover, knowledge on how climate change affects vulnerable populations is crucial for successful planning, implementation and evaluation of low-carbon and climate-resilient poverty reduction and development strategies.

[↪ back to Facilitation Guide: Eroded, limited](#)

[↪ back to Summary of what is learned on Day 5 and new rights](#)

## Ethics and climate justice

The present and future occurrence of climate events or processes and the potential for a growing number of environmental migrants<sup>3</sup> whose lives are uprooted raise many ethical issues.

Who should be responsible for hosting people when the impacts of a disaster are widespread, for example, covering a whole country? A state may have all or part of its infrastructure undermined and be unable to help its own populations. Should neighbouring countries, or the entire international community shoulder the responsibility? Or should responsibility lie with those countries which have historically been the largest emitters of GHGs? Even more broadly, who should pay? And how should the burden of cost be distributed – amongst governments or private actors? Additionally, are we, as intellectual beings, also responsible to protect the animals and other species living on this planet since our activities provide the key to their survival or extinction?

These issues are complex, particularly due to the different underlying justice claims involved (often overlapping and conflicting), and can have corrective and substantive distributional dimensions or procedural and formal ones. A second factor is that climate change harms are very difficult to transfer in international law, which often appears powerless to cover climate cases in spite of existing established principles, in particular the responsibility for states ‘to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction’.<sup>4</sup>

<sup>3</sup> The use of specific terminology may have strong repercussions regarding international law coverage. The term refugees provides better cover under international law; the term migrants is less covered. For more details on this topic see Migration and Climate Change, No. 31. IOM, 2008.

<sup>4</sup> Cf. UNFCCC preamble, Principle 21 of the Stockholm Declaration (1972); Principle 2 of the Rio Declaration on Environment and Development (1992); and Article 3 of the Convention on Biological Diversity (1993).

# Get the Facts:

## A GLOBAL PERSPECTIVE

Gender - Are men and women equally affected?

### The links between gender and climate change

An examination of the historic gender-poverty interrelationship reveals how lack of access to education, health, water, sanitation, food, and exposure to HIV results in differing vulnerabilities and adaptive capacities of men and women towards impacts of climate change, disasters, and poor environmental management.

Climate change tends to exacerbate these differences, and places a larger burden on women and girls. This reinforcing interrelationship

#### Limited Access to Information in Disaster Situations is Deadly

It was demonstrated that in the 1991 cyclone disasters in Bangladesh, 90 per cent of the 140,000 people who died were women. Bangladesh society is highly sex-segregated and, in this particular case, early warning signals did not reach large numbers of women as the information was passed through market places to which many women do not have easy access.

From: Training Manual on Gender and Climate Change, (see reference at the end of this section).

therefore increases the effects of climate change on women in several ways as described below.

### Migration

Environmentally displaced women who migrate in search of a job will face challenges of finding employment, housing and appropriate social services, but with the added impairment of gender discrimination. Another possible scenario is in rural, agriculture-dependent households, where the male breadwinner may migrate to the city for work as a result of limited resources. In the absence of the male partner, women may experience greater autonomy and have enhanced decision-making power if they become de facto heads of household. However, this is not always the case. For example, in many regions of Bangladesh and Pakistan, women may not be able to take major decisions that affect their families without permission from a male family member.

### Climate change-induced disasters

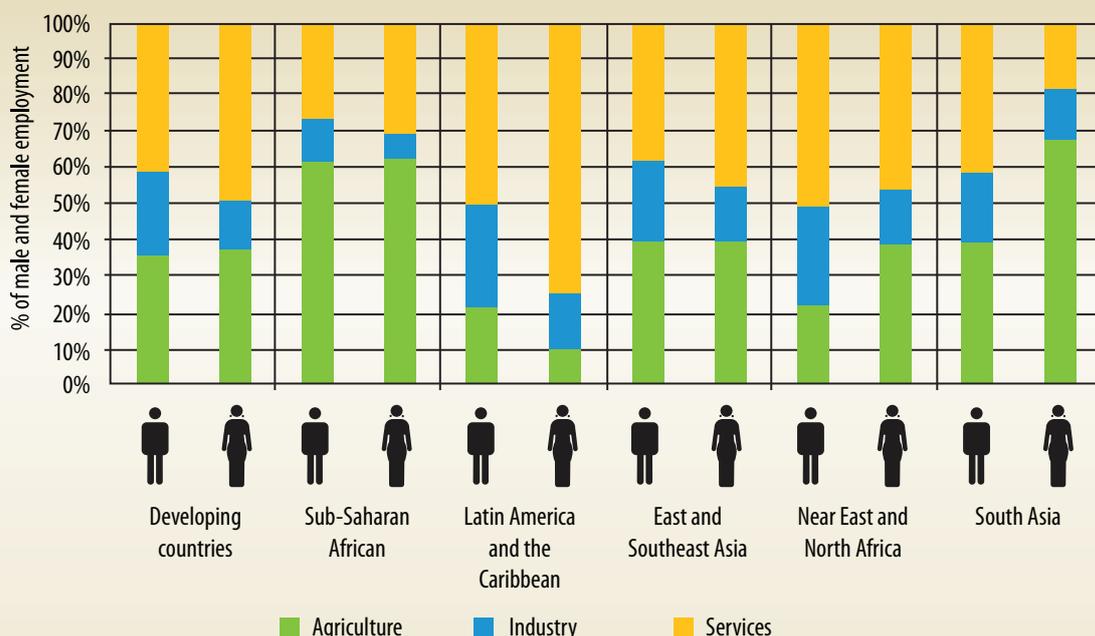
A 2007 study<sup>5</sup> analysed disaster events in 141 countries and found that more women than men die from disasters when women's economic and social rights are not protected. In societies where both genders enjoy equal rights, disaster-related casualty statistics are similar among women and men<sup>6</sup> (see 'Limited Access...' text box).

<sup>5</sup> The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981–2002, E. Neumayer and T. Plümper, 2007.

<sup>6</sup> Training Manual on Gender and Climate Change, IUCN,

DISTRIBUTION OF MALE AND FEMALE EMPLOYMENT, BY SECTOR

FIGURE 2



FAO. The Role of Women in Agriculture. ESA Working Paper No. 11-02, 2011.



## Agriculture

The management and use of natural resources can differ between women and men. For example, women and girls in rural areas of developing countries bear much of the responsibility of basic food production — an activity highly vulnerable to events linked to climate change such as drought or flood. As a consequence, these female farmers face significant risks for the security of their food production and thus their capacity to survive.<sup>7</sup> Thus, a loss of natural resources as a result of climate change greatly affects women and girls and has the potential to increase gender inequalities (see Figure 2).

## Water

Women and men have different roles and bear different responsibilities regarding water, defined by their sex, age, traditions, religion, beliefs and customary laws. In most of the regions of the world, women and girls bear the responsibility of ensuring that there is sufficient water for daily domestic chores (drinking, cooking, cleaning, plant irrigation, etc.), and spend a significant amount of time collecting and using water. In areas affected by drought, desertification or erratic rainfall, the collection of water is especially burdensome and time-consuming, leaving less time for women and girls to engage in other activities such as education (see Figure 18). In 2007, young girls accounted for 54 per cent of the global out-of-school population, partly due to their responsibility for finding water for household use.<sup>8</sup>

## Health

One key variable in determining direct and indirect impacts of climate change on health is gender. For example, studies have shown that women's and men's health risks differ during heat waves, due to both social and physiological reasons. Socially-constructed gender roles also often render women more vulnerable than men during natural disasters, leading to higher mortality and morbidity rates. This is exacerbated in countries where women have lower education, awareness, and socioeconomic status compared with men, which limits their mobility and access to information.<sup>9</sup>

Consider also that women are the primary caregivers to the sick. When the health impact of climate change leads to increased levels of water-borne and vector-borne diseases, women will be called upon more frequently to tend to the sick. Again, this will leave less time for the other activities for which women are responsible, adding to their stress and workload.

[↩ back to Handout 4](#)

## Health - Will climate change make you sick?

Researchers have long observed the close links between climate and human health. There was consequently little surprise when the scientific community concluded that changes to the global climate would affect the fundamental requirements for good health everywhere: clean air, safe drinking water, sufficient food and secure shelter.

Climate change is already having a negative effect on health worldwide. The World Health Organization (WHO) estimated that global warming between the 1970s and 2004 has caused over 140,000 additional deaths annually,<sup>10</sup> and is making serious infectious diseases like malaria and diarrhea more challenging to control. These trends are likely to worsen in the near future, regardless of current efforts to cut greenhouse gas (GHG) emissions and mitigate climate change.<sup>11</sup> Depending on the specific area affected, a warmer and more variable climate is also likely to increase the frequency and intensity of heat waves, elevate the levels of some air pollutants, increase transmission of diseases through contaminated water and food, compromise agricultural production, and increase the hazards of extreme weather events. The threats that climate change poses to health may vary in different places and across time. For example, cities that periodically suffer from heat spells could expect more intense heatwaves, while areas prone to malaria could experience an increase in outbreaks. Table 1 (next page) lists some of the most likely health concerns caused by climate change.

UNDP, GGCA, 2009.

7 Resource Guide on Gender and Climate Change, UNDP, 2009.

8 Education for All Global Monitoring Report, UNESCO, 2010.

9 Bart W. Édes. Climate Change Impacts on Health and Migration. Asian Development Bank. Prepared Remarks for the Plenary Session on Vulnerability and Resilience in the Context of Climate Change Delhi Sustainable Development Summit, 5 February 2011.

10 Global health risks: Mortality and burden of disease attributable to selected major risks. WHO, 2009.

11 Climate and health factsheet. WHO, 2005.

# Get the Facts:

## A GLOBAL PERSPECTIVE

### POTENTIAL HEALTH CONCERNS CAUSED BY CLIMATE CHANGE

Weather Events	Impacts on Human Health
Warm spells, heat waves and stagnant air masses	<ul style="list-style-type: none"><li>• Heat stroke, affecting mainly children and the elderly</li><li>• Increase in respiratory diseases</li><li>• Cardiovascular illnesses</li></ul>
Warmer temperatures and disturbed rainfall patterns	<ul style="list-style-type: none"><li>• More exposure to vector-borne diseases like malaria, Japanese encephalitis and other diseases carried by vectors such as mosquitoes, rodents and ticks</li></ul>
Heavy precipitation events	<ul style="list-style-type: none"><li>• Increased risk of diseases related to contaminated water (water-borne) and to unsafe food (food-borne). Depletion of safe water supplies and poor sanitation will increase the incidence of diarrhoeal diseases such as cholera.</li></ul>
Droughts	<ul style="list-style-type: none"><li>• Malnutrition and starvation particularly affecting children's growth and development.</li><li>• Reduced crop yields causing stress for farmers and their families (known as "psychosocial stress"), who may be unable to pay their debts during extended and repeated droughts.</li></ul>
Intense weather events (cyclones, storms)	<ul style="list-style-type: none"><li>• Loss of life, injuries, life-long handicaps.</li><li>• Damaged public health infrastructure such as health centers, hospitals and clinics.</li><li>• Loss of life, property and land, displacement and forced migration due to disasters will bring about psychosocial stress affecting mental health.</li></ul>
Sea level rise and coastal storms	<ul style="list-style-type: none"><li>• Loss of livelihoods and disappearance of land will trigger massive migration and cause potential social conflicts, affecting mental health.</li></ul>

[↩ back to Handout 2](#)

## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE IN THE CLASSROOM



## Day Six At-A-Glance

Sample Schedule (Duration)	Session	
9:00 - 9:30 (30 minutes)	Revisiting Day Five	<ul style="list-style-type: none"> <li>• PowerPoint slide 2</li> </ul>
9:30 - 10:30 (60 minutes)	Activity: Climate Change Despair and Empowerment Sequence	<ul style="list-style-type: none"> <li>• Two cards and a sheet of drawing paper per participant</li> <li>• Sufficient blank 'commitment' cards</li> <li>• Flip chart and marker</li> <li>• PowerPoint slides 3-4</li> </ul>
10:30 - 10:50 (20 minutes)	Break	
10:50 - 11:35 (45 minutes)	Activity: Confronting Climate Change Denial: Snappy Dramase	<ul style="list-style-type: none"> <li>• One cut-up set of the Snappy Drama Cards (Handout 1) per group of four</li> <li>• PowerPoint slides 5-6</li> </ul>
11:35 - 12:00 (25 minutes )	Input: CCESD Skills and Learning Processes	<ul style="list-style-type: none"> <li>• One copy of the CCESD: A Skill List (Handout 2) per participant</li> <li>• PowerPoint slides 7-9</li> </ul>
12:00 - 13:00 (60 minutes)	Lunch	
13:00 - 13:40 (40 minutes)	Activity: Alternative Pathways	<ul style="list-style-type: none"> <li>• One sheet of chart paper and marker per three or four participants</li> <li>• PowerPoint slide 10</li> </ul>
13:40 - 14:55 (75 minutes)	Activity: Whole School CCESD Plans	<ul style="list-style-type: none"> <li>• One double sheet of chart paper (taped along the back)</li> <li>• A sufficient set of cards or slips of paper if possible of a different colour to the chart paper</li> <li>• PowerPoint slides 11-15</li> </ul>
14:55 - 15:10 (15 minutes)	Break	
15:10 - 15:40 (30 minutes)	Activity: Where to now with CCESD?	<ul style="list-style-type: none"> <li>• One sheet of chart paper and marker per 3-4 participants</li> <li>• PowerPoint slide 16</li> </ul>
15:40 - 15:55 (15 minutes)	Whole Group Discussion: Final Reflections	<ul style="list-style-type: none"> <li>• -</li> </ul>
15:55 - 16:00 (5 minutes)	Activity: CCESD Circle	<ul style="list-style-type: none"> <li>• -</li> </ul>
15:30	Close	<ul style="list-style-type: none"> <li>• Handout 3</li> <li>• Day Six classroom activities</li> <li>• PowerPoint slide 17</li> </ul>

## Day Six Facilitation Guide

This module begins by giving participants experience in eliciting their students' concerns about the future, in having students engage with feelings of despair and powerlessness in the face of climate change, and in translating those feelings into feelings of purposefulness and empowerment. A dramatic play provides the means to practice confronting climate change denial and contradictory responses. The skills and learning processes appropriate to CCESD are overviewed by drawing upon participants' experiences over the six days. A planning tool for CCESD-oriented whole school change is introduced. The course closes by consolidating ideas for whole-school and school-in-community approaches to CCESD and having participants commit to practical short, medium and long term plans for CCESD in their schools and communities.

[Click to consult the Summary of what is learned on Day Six](#) 

[Click to download the Powerpoint slides in pptx format for Day Six](#) 

[Click to consult the Powerpoint slides for Day Six](#) 

### 9:00-9:30 Revisiting Day Five

With slide 2 showing, facilitator leads a two-part discussion, opening each part with one of the following questions:

- As you wrote your reflections diary entry for Day Five did any issues and questions arise that you would like to raise with the group?
- Do you have any questions concerning the Classroom Activities for Day Five in your activities file?

### 9:30-10:30 Activity: Climate Change Despair and Empowerment Sequence

#### Time Needed

- 60 minutes

#### Objectives/Explanation

- To work primarily at an affective level by looking at personal responses to climate change
- To engage with feelings of despair, hopelessness and powerlessness in the face of climate change, and to work toward converting these feelings into feelings of purposefulness and empowerment
- To emphasize teachers' responsibilities in working with the concerns and fears of students in a climate-changing world

#### Materials Needed

- Two cards and a sheet of drawing paper per participant
- Sufficient blank 'commitment' cards
- Flip chart and marker

#### Procedure

1. Have participants sit in a large circle.
2. Explain that the sequence of activities to follow is intended to address the fear and sense of despair and hopelessness that many people feel in the face of climate change, whether that is because of the potential destruction of the environment they know, the loss of livelihood, the destruction of their

#### Facilitation Guidance

This activity is designed to take participants through a sequence of powerful emotional experiences before demonstrating the potential within them for social action in difficult times. First, they recall feelings and moments of power (Stage 1) before encountering climate change dystopias in the face of which they may very well feel an acute sense of powerlessness (Stages 2, 3). The orientation then swings (Stages 4, 5) to focusing upon what they most value in life and to considering hopeful futures (something that is likely to be made more intense by just having considered what they love). The focus then turns (Stage 6) to considering individual action to limit the causes and impacts of climate change that is then bolstered by considering the power participants have been able to find in themselves in earlier frightening circumstances (Stage 7).

In the concluding comment (Stage 8), the facilitator should remind participants that young people all over the world are fearful for the future and that it is the proper responsibility of educators to work with these fears and help develop in them the skills and dispositions so that they feel able and willing to take part in timely transformation. Exercises such as this are important in combating despair, helplessness and cynicism in young people, which is a necessary precursor to fostering in them the skills and dispositions for social action.

[Click to consult Factsheet information on vulnerability and powerlessness](#) 

[Click to consult Factsheet information on empowerment through CCESD](#) 

culture and lifestyle, the failure of those holding power to respond effectively, or just the sheer magnitude and seeming intractability of the threat. Young people share these fears and it is the responsibility of their teachers to help address these fears.

**3. Stage 1: Feeling Powerful.**

Ask participants to think about times when they have had to do something very difficult or frightening and ended with them feeling greatly empowered. Give them a few minutes for reflection before asking them to pick up a card and draw images that capture the experience and feelings of those times. Have participants share and explain their images around the circle. Then have them store their card for future reference.

**4. Stage 2: Thinking the Unthinkable.**

Ask participants to each pick up a card and write down three sentences, each sentence starting with one of the following as on slide 3:

- ‘The thing that worries me most about the changing climate is...’
- ‘The thing I prefer not to think about regarding climate change is...’
- ‘What scares me most about a climate-changed world is...’

Give three to four minutes for writing. Avoid giving examples and encourage participants to write what they wish. Collect the cards, shuffle them and hand them out randomly. Have participants read out the card they have received. Accept all sentences without comment.

**5. Stage 3: Climate Change Nightmares.**

Ask participants to silently run a film in their heads about dangerous climate change inspired by the recall of a bad dream, something they have actually experienced, or something they have read in a newspaper, magazine or book, or seen in a film. After a few minutes ask them to draw a picture on paper, not to be shown to anyone, of their feelings.

**6. Stage 4: Something You Love.**

Ask participants to again close their eyes and think about something they most value about life or the world and what they would do to protect it. After a few minutes, ask volunteers to share and describe what they thought of.

**7. Stage 5: A Hopeful Future.**

On a new card, have participants write three sentences as on Slide 4 beginning:

- ‘I could help my community face up to climate change by...’
- ‘I could show climate change leadership if I...’
- ‘To help transform things, a good way forward for me would be to...’

Again, collect the cards, shuffle them and hand them out randomly. Have participants read out the card they have received. All the sentences are again accepted without comment.

**8. Stage 6: The Big and Little Things We Could Do.**

Having heard the individual contributions, have the group pool ideas for the big things and little things they could personally do to help combat climate change as teachers, as well as members of a community. Big things are more public and noticed and are likely to involve others; little things are more private and unnoticed such as a small change in personal habits. Note down ideas on the flip chart.

**9. Stage 7: Revisiting Feeling Powerful.**

Ask participants to look back again at their images of themselves being powerful (Stage 1). Invite them to quietly reflect on how those feelings of power might be drawn upon in helping combat climate change and, in particular, in acting on the big and little things pooled during Stage 6. Then go around the circle asking participants to share their reflections one by one. Finally, place blank ‘commitment to action’ cards in the centre of the circle and after a few minutes of quiet reflection, invite participants to write their own commitment cards, sharing them informally with colleagues at the end of the activity if they wish.

**10. Stage 8: Concluding Comment.**

Close the activity sequence with a concluding comment (see Facilitation Guidance).

 Click to consult slide 3

 Click to consult slide 4

 Click to consult Factsheet information on learners as agents of change

**10:30-10:50 Break****10:50-11:35 Activity: Confronting Climate Change Denial: Snappy Dramas****Time Needed**

- 45 minutes (5 minutes introduction; 30-35 minutes for snap dramas; 5-10 minutes for debriefing)

**Objectives/Explanation**

- To explore climate change denial and cognitive dissonance as it applies to climate change
- To role-play ways of addressing denial and cognitive dissonance and to practice the skills involved

**Materials Needed**

- One cut-up set of the Snappy Drama Cards (Handout 1) per group of four

**Procedure**

1. Introduce the concepts of climate change denial and cognitive dissonance using Slides 5 and 6.
2. Have participants form groups of four.
3. Introduce the idea of 'snappy dramas', i.e. short dramas, to be quickly prepared and then to be immediately performed in response to stimulus material.
4. Explain that you are going to give out a succession of cards, each one offering an example of climate change denial or cognitive dissonance. Hand out the first card. Tell group members that they are to decide on roles and prepare a quick one-minute drama in which some in the group (action takers on climate change) try to confront the denial and/or reveal the cognitive dissonance of others in the group. Give four minutes of preparation time. Then choose three groups to perform their drama. Once the performances are complete, hand out the second card, repeating the process four or five times in all (with three performances to conclude each section).
5. After the four or five snap dramas, facilitate a brief reflection on the skills and strategies that have been demonstrated in confronting denial and revealing cognitive dissonance.

**Facilitation Guidance**

Before the session the facilitator should decide which four or five of the six cards available are to be used and in what order.

In the short debriefing, the facilitator should ask participants to pinpoint the different strategies that those who assumed the role of action takers on climate change employed in attempting to break through the denial to reveal the cognitive dissonance they encountered. What approaches do participants think are likely to be most effective in fostering awareness, openness and deep self-reflection leading to concerned engagement with climate change? Can the skills be taught to students and used by students in their community involvement and in their outside-community, including international, exchanges?

[Click to consult Handout 1](#) 

[Click to consult slides 5-6](#) 

**11.35-12:00 Input: CCESD Skills and Learning Processes**

- Distribute the CCESD Skills document (Handout 2) and go through it with the group pointing out that the skills enumerated have been practiced during the six days.
- Drawing on the section on learning and teaching philosophy as well as the Guidelines for Facilitating Participatory Learning in the Conceptual Framework document, and using Slides 7-9 (the latter two repeated from Day One), offer a summative rationale for the learning and teaching approaches used through the six days and make the case for such approaches being integral to CCESD back in school.
- Stress that activities in the school activities pack are grounded in the same philosophy.
- Ask for questions and observations.

[Click to consult Handout 2](#) 

[Click to consult slides 7-9](#) 

**12:00-13:00 Lunch**

**13:00-13:40 Activity: Alternative Pathways**

**Time Needed**

- 40 minutes (25 minutes in groups; 15 minutes reporting back)

**Objectives/Explanation**

- To practice and reflect on planning and implementing CCESD school change

**Materials Needed**

- One sheet of chart paper and marker per three or four participants

**Procedure**

1. Have participants form groups of three or four (if participants are from various schools, it would be helpful to have teachers from a particular school together in the same group).
2. Distribute the chart paper and marker to each group.
3. Using the example in Slide 10, explain the Alternative Pathways process for overcoming barriers. Participants write down a current problem regarding CCESD in their school on one side of their sheet and the desired situation on the opposite side. Alternative means of circumventing or overcoming the problem and arriving at the desired situation are discussed and written in. Steps along the alternative pathways are linked with arrows.
4. Ask each group to report back, encouraging critical feedback from others before having the whole group reflect on lessons learned about planning and effecting change towards CCESD in school.

**Facilitation Guidance**

In encouraging feedback on reports and facilitating the whole-group discussion, it is important to raise questions concerning the realism and practicability of the plans. Were they in some ways naïve? Were they overly idealistic? Were important considerations overlooked? In what ways could the plans be made more workable? And, importantly, do the plans mesh with the value system of CCESD?



**13:40-14:55 Activity: Whole School CCESD Plans**

**Time Needed**

- 75 minutes (15 minutes introduction; 25 minutes in groups; 15 minutes combined groups; 10 minutes back in groups; 10 minutes whole group discussion)

**Objectives/Explanation**

- To bring together and consolidate ideas for whole school and school-in-community approaches to CCESD that have been raised during the course
- To develop new ideas
- To critically review the ideas proposed

**Materials Needed**

- One double-width sheet of chart paper (2 sheets taped along the back)
- A sufficient set of cards or slips of paper, if possible of a different colour to the chart paper

**Procedure**

1. Have participants form groups of four or five, ideally (but not necessarily) composed of teachers of different subjects from the same school.

**Facilitation Guidance**

Following on from the previous day's work on curriculum, this activity draws together, consolidates, elaborates and adds to accumulated thinking on whole school approaches to CCESD.

As groups present their three ideas, the critical question to ask is why they have chosen those particular ideas as being likely to have most impact on their school(s) and communities. Their answers will be something of a 'litmus test' of what they have learned about change strategizing during the six days. It is very important to congratulate groups for their work.

If possible, the facilitator should arrange for the charts to be typed up for participants to use back in their schools. The contents can also be shared with school principals and educational officials.

2. Reintroduce the '4C' model (slide 11) and remind participants of the Climate Change Awareness School Committee activity from Day 3 (refer to the charts that should still be hanging on the wall). Also, rehearse the key topics and concepts of the course: climate change causes and effects, the multi-faceted and complex nature of climate change challenges, sustainable development, futures learning, the need for local and global dimensions in addressing climate change mitigation, adaptation, disaster risk reduction, resilience, vulnerability, climate justice, empowerment and action.
3. Go through Slides 11-15 if necessary as additional illustrations of what is possible under each dimension of the model, especially reinforcing the importance of developing synergies between initiatives falling under the different dimensions wherever possible. Emphasize that these are generic ideas but what is now needed are school- and situation-specific ideas.
4. Have groups draw the '4C' model as large as possible on their double-width sheet of chart paper.
5. Explain that the task is to come up with concrete ideas for what can be done at participants' schools, ideas that can be taken back to school and shared with colleagues and communities. They should write ideas in some detail on the cards available and place them in the appropriate place on their chart. Underscore the fact that positioning of the cards is important. An idea that affects the curriculum but has minimal campus implications should be placed in the non-overlapping area of 'Curriculum' while one that has implications for both curriculum and the school campus should be placed in the overlapping area. If it also touches on community, it goes in the area where the three dimensions overlap. A card under 'Culture' should sit closest to the other three dimensions it relates to most.
6. Call a halt to the work after 25 minutes and have each group join with another group. Have each group explain their ideas to the other group with the other group members fulfilling the role of 'critical friends' revealing potential flaws, things not taken into account, assumptions, and so on, as well as identifying areas missing from the chart. Give each group 10 minutes to explain their work and receive feedback.
7. Have groups review their work in the light of the feedback, refining ideas and adding new ones.
8. Assemble the whole group for a debriefing and have each group present the three ideas they have come up with that they think will most effectively advance CCESD at their school(s) and in their communities.

Click to consult  slide 11

Click to consult  slides 12-15

### 14:55-15:10 Break

### 15:10-15:40 Where to Now with CCESD?

#### Time Needed

- 30 minutes

#### Objectives/Explanation

- To have participants commit to practical short, medium and long term plans for CCESD at their schools or in their communities

#### Materials Needed

- One sheet of chart paper and marker per three or four participants

#### Procedure

1. Have participants form groups of three or four.
2. Distribute the chart paper and markers and have each group set out the chart paper in three columns as in Slide 16.
3. Ask groups to write down what actions they individually intend to take at school given what

#### Facilitation Guidance

This activity is a simple but effective way of having participants translate what they have learned in the course into practical intentions back at school and back in their community.

It is a good idea to have the charts typed up and circulated to all participants and, if circumstances allow, to hold meetings with the group to review what has been achieved after, say, two months, six months and two years. Such meetings can also be used to evaluate curriculum and whole school change under the '4C' model, why certain intentions have been successful and others frustrated, and to update, revise and extend action plans.

Click to consult  slide 16

they have learned during the course. Actions can be short term (i.e. things they intend to do in the next few weeks), medium term (i.e. things they intend to do in the next few months) and long term (i.e. things they intend to do over the next few years).

4. Have group members each share one thing from each column that they are especially committed to doing.

### 15:40-15:55 Whole Group Discussion: Final Reflections

- Use this penultimate time slot to open the floor to any reflections, questions or observations on the course.

### 15:55-16:00 CCESD Circle

#### Time Needed

- 5 minutes

#### Objectives/Explanation

- To close with an expression of values
- To reinforce group solidarity as members depart

#### Materials Needed

- None

#### Procedure

1. Ask participants to form a circle and then turn so they are each facing a neighbour in the circle. [Join in, if necessary, so everyone is paired].
2. Ask participants to reflect for a short while on the one human quality they would best like to take into their future work for CCESD; for instance, hope, flexibility, openness, strategic wisdom.
3. At a signal from the facilitator, ask them to share their quality with the person they are facing, avoiding any explanation or discussion.
4. Ask them to move by each other (going in opposite directions) and, as they do, to take on the other person's chosen quality as their own. As they face a new person in the circle, they offer their new quality to that person who takes on that quality.
5. Continue the process as new pairs are formed and move on until participants are back with their original partner.

#### Facilitation Guidance

This is a brisk and lively way of sharing characteristics and values that lend themselves to CCESD learning and teaching, advocacy and change agency. But its simplicity is deceptive. It is very difficult to do and, at times, there are likely to be outbursts of laughter – which is not a bad way to end a six-day course.

### 16.00 Close

- Ask participants to complete a feedback sheet for Day Six (Handout 3).
- Remind participants to write their reflective workshop diary entry for the day and (if applicable) bring the diary to any group reunion.
- Show Slide 17.

 Click to consult Handout 3

 Click to consult slide 17



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## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
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UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY SIX HANDOUTS

## Handout 1. Snappy Drama Cards

### Small window of opportunity...

The newspaper front page had a shocking piece about the melting of the Arctic ice, the sinking of island nations, and the spread of deserts. 'We have only a small window of opportunity to stop climate change before it is too late,' the editorial proclaimed. On page 8 the newspaper was advertising its special world travel offers to see places soon to disappear with climate change. On page 11 was a whole-page advertisement by a car manufacturer for a Sports Utility Vehicle [SUV]. The editor has agreed to meet with meet some concerned readers who have complained...

**Roles:** the editor; the newspaper sales manager; two concerned members of the public

### Too big to handle...

The couple watched the program on climate change. It really worried them. 'Ah well,' the man said, 'we've had these sorts of problems before, and somebody will come up with something. Leave it to the experts.' 'Yes,' the woman said, 'there's not much we can do anyway. It's too big for us to handle'. There was somebody at the door. It was their nephew and niece. 'Hi,' the young couple said, 'we've just come from our CCESD class. Did you watch that climate change program?' ...

**Roles:** the man, the woman; the two young people

### Biggest university...

'We have become the leading North American university in championing environmental protection and education,' the university press release announced. 'We are proud that forty of our academics representing several faculties are attending the upcoming world conference on climate change in (place of choice)'. While attending the conference held at the city's biggest hotel, two of the much-travelled academics meet two local climate change activists in a local café.

**Roles:** the two academics; the two local activists

### The biggest denial...

'The biggest climate change denial is the failure of the wealthy nations to tell people that climate change is already having devastating effects for people in the developing world with 300,000 dead each year and the lives of 325 million seriously affected.\* The visiting scholar from (continent of choice) watched the impact of what she had said on the students. One asked: 'Why have our parents and teachers never told us this? What should we do?'

**Roles:** the visiting scholar, three students

\* Original quote from Kofi Annan, May 2009.

### Business as usual...

'Science and technology will see us through the climate crisis,' the science advisor to industry said. 'Solar, wind and wave power are just the start. There will be means to extract and bury carbon from the atmosphere. Sun shields in space will cool the earth. There will be a brave new world allowing us to continue with business as usual. There is no need to give up the lifestyles and economic systems we currently have. Leave it to the scientists.' Across the table, three CCESD educators looked concerned. 'But blindly continuing with 'business as usual' is not helpful, one replied, we have to face up to a new reality...'

**Roles:** the science advisor; the three CCESD educators

### Nothing more we can do...

The three teachers came back from a six-day CCESD training program. They were keen to help take the school in new directions. They went to see the principal. 'Yes, climate change is a huge, huge problem,' the principal said, 'but we have a recycling program already, there is the annual environmental day field trip, and the mechanics of climate change are explained in the science class.' Without upsetting the parents and dropping bits of the curriculum, 'There is nothing more we can do.' The three teachers...

**Roles:** the principal; the three teachers

 Click to consult Factsheet information on lifestyles and consumption

[↩ back to Facilitation Guide: Snappy Drama](#)

## Handout 2: Climate Change Education for Sustainable Development: A Skills List

### Skills of Information Management

- **Receiving and expressing information:** the ability to receive, express and present information
- **Organizing and processing information:** the ability to classify, analyze, synthesize and sequence information
- **Evaluating information:** the ability to determine the quality, appropriateness and priority level of information, to distinguish evidence and opinion, to recognize bias and prejudice

### Skills of Critical Thinking and Discernment

- **Critical thinking:** the ability to critically evaluate evidence, opinions, behaviours, processes and decisions
- **Creative thinking:** the ability to move outside established frameworks, ideas and assumptions and generate fresh insights, perspectives, and solutions
- **Problem solving:** the ability to solve problems through effective information management, out of the box thinking and intuition
- **Ethical judgment:** the ability to select and use criteria to determine the rightness or wrongness of an idea, situation, course of action
- **Media discernment:** the ability to decode and deconstruct media spoken, written and visual messages
- **Decision making:** the ability to make informed decisions
- **Systemic/relational thinking:** the ability to perceive relationally, seeing flows, patterns and interconnections
- **Holistic perception:** the ability to see the particular as part of the whole

### Skills of Interaction

- **Consensus building and negotiation:** the ability to drive towards consensual or negotiated agreement without loss of values or integrity
- **Assertiveness:** the ability to articulate clearly desires, feelings, preferences, view points and value positions in a firm but always respectful manner
- **Listening:** the ability to listen to others in an attuned way
- **Cooperation:** the ability to work with others cooperatively and inclusively toward the realization of a common goal
- **Conflict management:** the ability to use conflict resolution and mediation so as to optimize the creative forces of conflict
- **Empathy/solidarity:** the ability to empathize and demonstrate solidarity with the predicament and feelings of other human beings

### Skills of Action

- **Change agency/advocacy:** the ability to work alone and/or with others to support positive direction of change and pre-empt negative direction of change
- **Campaigning:** the ability to influence trends and directions through electronic and traditional media, performance, art, petitioning, lobbying, and participating in forums where ideas are shared and decisions made
- **Involvement literacy:** the ability to discern where the dividing line is between acceptable and unacceptable forms of social and political action, and understand the limitations, potentials and repercussions of different types of action
- **Adaptation/risk avoidance:** the ability to recognize risk potential and need for adaptation and to respond in 'fit for purpose' ways

### Futures-oriented Skills

- **Envisioning:** the ability to envision positive and negative futures and identify what might be done now to realize the former and pre-empt the latter
- **Extrapolating:** the ability to measure how present trends and developments will roll out in the future
- **Forecasting:** the ability to make tentative predictions for the future based on present conditions
- **Backcasting:** the ability to think backwards from a point in the desirable future and think about how we can arrive there

### Personal Skills

- **Being congruent:** the ability to discern inconsistencies between one's own (and others') declared attitudes and actual behaviours, and to work closing the gap
- **Emotional coping:** the ability to work through despair, hopelessness, stress and cynicism/negativity towards resilience and readiness to take pro-social action
- **Centring:** the ability to bring emotional, intellectual, physical and spiritual aspect of being human into harmony
- **Living simply:** the ability to live lightly, simply, non-exploitatively and aesthetically in recognition of the threat to the planet

[↩ back to Facilitation Guide: CCESD Skills and Learning Processes](#)

## Handout 3. UNESCO Teacher Education Course on Climate Change Education for Sustainable Development: Feedback Sheet

Workshop Day No: 1, 2, 3, 4, 5, or 6 (please circle as appropriate)

This is to help the workshop facilitator(s) know how the programme is being received. They will take account of your comments in adjusting the course or their facilitation.

1. What I liked about today's workshop

2. What I think could be improved in how the workshop is being conducted

3. What questions and concerns the day has left me with

4. My other comments

Thank you very much!

[↩ back to Facilitation Guide: Introduction](#)

[↩ back to Facilitation Guide: Close](#)

## Summary of what is learned on Day Six

### 1. Pedagogies

<b>Emotional Learning</b>	e.g.: Engaging personal feelings of hopelessness and redirecting towards action on ESD issue (Facilitation Guide: CC Despair and Empowerment, pp. 2-3)  e.g.: Connecting real-life stories of “drama” to concepts of climate change denial and cognitive dissonance (Facilitation Guide: Snappy Dramas, p. 5)
<b>Commitment to Social Action</b>	e.g.: Adapt learned capacities to realistic personal and communal commitments to action (Facilitation Guide: CC Despair and Empowerment, pp. 2-3)
<b>Critically Analyze and Monitor Social Actions</b>	e.g.: Ability to reflect upon effectiveness, ethics, pitfalls and implications of various social change initiatives (Facilitation Guide: Climate Change Action, pp. 7-9)
<b>Recognizing Skill Sets and Capacities</b>	e.g.: (Handouts: Handout 2 - Skills List, pp. 4-5)

### 2. Definitions

<b>Climate change denial</b>
Cognitive dissonance
Involvement literacy

### 3. Interdisciplinary Knowledge Systems

Knowledge from Natural Sciences	Knowledge from Social Sciences	Knowledge from Humanities
<b>Climate Change Education</b> <ul style="list-style-type: none"> <li>Students use CC knowledge to encourage participation and action on SD challenge</li> </ul>	<b>Social Psychology</b> <ul style="list-style-type: none"> <li>Students learn concepts to identify common and/or shared behaviors</li> </ul>	<b>CCESD Learning Process Rationales</b> <ul style="list-style-type: none"> <li>Participatory, empowerment, diverse experience, in-community learning</li> </ul>
	<b>Culture</b> <ul style="list-style-type: none"> <li>Students examine systems of culture (campus, community, institution) to determine and develop social actions</li> </ul>	<b>CCESD Learning Approaches</b> <ul style="list-style-type: none"> <li>Individual, group, experiential, inputs</li> </ul>
		<b>Interdisciplinary learning</b> <ul style="list-style-type: none"> <li>CCESD whole-school approach</li> </ul>

#### 4. International Frameworks

<b>MDGs</b>	<b>Disaster Risk Reduction (DRR)</b>
<b>Human rights</b> <ul style="list-style-type: none"> <li>Capacity building</li> </ul>	<b>Coping with CC dystopia</b> <ul style="list-style-type: none"> <li>Focus on hopeful futures, considering individual action to combat CC disasters</li> </ul>
<b>Promoting Empowerment &amp; Participation</b> <ul style="list-style-type: none"> <li>Knowledge sharing</li> </ul>	
<b>Improving Quality of Education</b>	
<b>Promoting experimentation &amp; innovation</b>	
<b>Communication</b> <ul style="list-style-type: none"> <li>Free flow of ideas for universal access to information</li> </ul>	

#### 5. Skills

<b>Responsible Citizenship</b>
<b>Creative Critical Thinking and Discernment</b>
<b>Emotional Coping</b>
<b>Empowerment</b> <ul style="list-style-type: none"> <li>Practice effective strategies and approaches to foster awareness in others</li> </ul>
<b>Evaluating and Managing Change</b>
<b>Problem Solving</b> <ul style="list-style-type: none"> <li>Learn to address potential barriers (dissonance and denial) in order to practice learned skills – Alternative Pathways</li> </ul>
<b>Holistic Perception</b>

[↩ back to Facilitation Guide: Introduction](#)

## Day Six PowerPoint Slides

1

2

3

### Climate Change Fears

- 'The thing that worries me most about the changing climate is...'
- 'The thing I prefer not to think about regarding climate change is...'
- 'What scares me most about a climate-changed world is...'

[↪ back to Facilitation Guide: Climate Change Despair and Empowerment Sequence](#)

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### Climate Change Empowerment

- 'I could help my community face up to climate change by...'
- 'I could show climate change leadership if I...'
- 'To help transform things, a good way forward for me would be to...'

[↪ back to Facilitation Guide: Climate Change Despair and Empowerment Sequence](#)

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### Climate Change Denial

- **Climate change denial** is the term used to describe how individuals and institutions downplay or ignore the extent of climate change, its significance, and its origins in human behaviour. Denial happens in defence of financial interests, but also to protect individuals from facing the prospect of a climate-changed future and the changes they would need to make in their behaviours and lifestyles. It is especially prevalent amongst the populations of high-income countries.

■ Source: Sustainability Frontiers (2011).

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### Cognitive Dissonance

- **Cognitive dissonance**, a term used in social psychology, describes an uncomfortable feeling arising from holding two contradictory ideas and/or behaving in two contradictory ways at the same time. It also describes when we know - but won't acknowledge - that what we are saying or how we are behaving is contradicted by evidence and we continue to resist amending what we say or what we do.

■ Source: Sustainability Frontiers (2011).

[↪ back to Facilitation Guide: Confronting Climate Change Denial: Snappy Dramas](#)

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### CCESD: A Learning Process Rationale

- **Learning as participatory** – if the goal is foster skills and attitudes for participation, then participation must be practiced
- **Learning as empowerment** – if the goal is to empower learners and enable them to contribute to change they must be given a voice
- **Learning as a diverse experience** – learning that truly engages and continually refreshes is diverse in form, mood and pace
- **Whole person learning** – learning that transforms and leads to action brings together the cognitive (thought) and the affective (emotion)
- **Practical in-community learning** – school and community as theatres of hands-on learning projects and partnerships

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### Why Participatory Learning?

- It allows for the fullest sharing of the ideas, experiences and perspectives that learners bring to the classroom while revealing what they don't know
- It is informed by the core values of human rights, peace and democracy and gives everyone a voice
- It gives practice in participation and so builds the skills and dispositions that empower young people to contribute to social change
- It provides for variety and diversity in learning programs, mixing activities for different sized groups, high energy and more slow-paced reflective activities, activities favouring all types of learner
- It offers 'whole-person learning' combining cognitive learning (e.g. problem solving, decision-making) with affective (emotional) learning, making the learning experience richer

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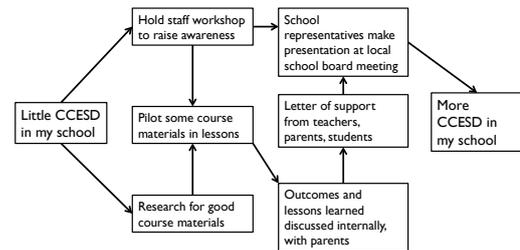
### Learning Approaches

- **Individual learning** – participants work on their own (before usually sharing what they have done with others)
- **Group learning** – participants work as a whole group but often in smaller groups of differing sizes exchanging ideas, experiences and perspectives often in response to stimulus material (what is often called *interactive* or *cooperative* learning). This may involve *milling* (i.e. moving around and sharing) or sitting down.
- **Experiential learning** – participants go through a carefully crafted experience inside or outside the classroom (e.g. field visits) before discussing and analyzing what they have learnt. They may be asked to work as a whole group and/or in small groups. Two forms of experiential learning that will be encountered are *simulation games* and *role-play activities*.
- **Inputs** – the facilitator will make a brief input, allowing time for discussion of what she or he says

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### Alternative Pathways Process to Overcome Barriers

A sample process:

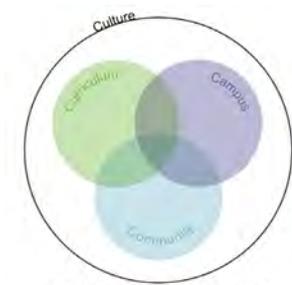


[↩ back to Facilitation Guide: CCESD Skills and Learning Processes](#)

[↩ back to Facilitation Guide: Alternative Pathways](#)

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### A Whole School Approach to CCESD



[↩ back to Facilitation Guide: Whole School CCESD Plans](#)

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### Examples of the Curriculum Dimension of CCESD

- **Art/drama** – poster campaigns and street theatre to alert communities to climate change
- **Language/literature** – stories and poetry on climate change futures
- **Social studies** – researching climate life histories of older community members
- **Maths/geography** – extrapolative work on seawater rises and land incursions
- **Science/biology** – observing and keeping logs of seasonal changes
- **Technology** – designing climate change defences

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### Examples of the Campus Dimension of CCESD

- Students research the school's level of commitment to 'reduce, re-use and recycle' and present their proposals
- Teachers, students and community members work together to plan and implement a whole school climate change adaptation strategy
- An interpretative garden of climate resistant indigenous plants and food crops is developed at the school
- The school works with local experts on an energy-efficient low cost 'cool the school' initiative
- Students research ways of cutting down the school's greenhouse gas emissions caused by transport
- The school walls are used for notices on climate change adaptation and risk reduction

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### Examples of the Community Dimension of CCESD

- The school holds climate change adult education programs and invites the community to special climate change student events
- Adults join with students and teachers to undertake climate change research and development projects in the locality
- The school holds Students' Hearings at which students question local leaders on what is happening on climate change; the community and media attend
- The community supports and contributes to climate change field trips
- All are invited to a regular 'future democracy' forum at the school where people share their climate change concerns, hopes and action ideas; plans for action are agreed

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### Examples of the (Institutional) Culture Dimension of CCESD

- The school develops a climate change mission statement out of a process of consultation with all stakeholders (including students)
- The school publishes a two-monthly newsletter giving news of climate change developments
- The school establishes a climate change council of all stakeholders that reports to the principal and the community 'future democracy' forum
- Older students teach younger students about climate change
- Someone from elsewhere with the required expertise evaluates the school's climate change efforts periodically and writes a report

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### Where to now with CCESD?

Short Term	Medium Term	Long Term

[↩ back to Facilitation Guide: Whole School CCESD Plans](#)

[↩ back to Facilitation Guide: Where to now with CCESD?](#)

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### End of Day 6 – End of the Course!

Please don't forget to:

- Fill out and submit your feedback form for the entire education course
- ALL THE BEST TO YOU FOR YOUR IMPORTANT CCESD WORK TO COME !**

[↩ back to Facilitation Guide: Introduction](#)

[↩ back to Facilitation Guide: Close](#)

# Get the Facts:

## CLIMATE CHANGE ACTION

### Vulnerability and powerlessness

#### What is the link between climate change and natural hazards and disasters?

Climate change is expected to increase the frequency and intensity of climate-related hazards such as floods, droughts and heat waves.

The capacity of communities to cope, particularly in low-income countries, may be diminished as a consequence of continual climate change-related degradation of ecosystems, reduced availability of water and food, and loss of biodiversity and natural assets, thus increasing their vulnerability.

When vulnerable communities lack the resilience and resources to cope with a hazard, such hazards become disasters. Other variables such as population growth may also compound and exacerbate the impacts of climate change in increasing the likelihood of disasters.

Disaster risks multiply with the intensity of the hazard and with social and environmental vulnerabilities of the society and the environment. In turn, they may be reduced by society's ability to cope with the hazard, as shown in the following equation:<sup>1</sup>

$$\text{Disaster risk} = \frac{\text{Natural hazard} \times \text{Vulnerability}}{\text{Capacity of societal system}}$$

#### What are the impacts of disasters on education?

Natural disasters can destroy schools and can render education systems non-functional, thus affecting the physical safety and the psychological well-being of individuals and communities. School enrolment may decline among the most vulnerable, often girls, those living in poverty and in child-headed households, or learners enrolled in school but who rarely attend. Moreover, the quality of education may also be impaired as a result of disasters. According to UNICEF, approximately 175 million children are likely to be affected by an expected increase in climate change-related natural disasters in the next 10 years<sup>2</sup>. UNISDR estimates that more than half a million children are displaced from school every

year due to flooding alone,<sup>3</sup> with floods amongst the most frequent and recurrent natural disasters worldwide.

[↩ back to Facilitation Guide: Despair and Empowerment Sequence](#)

### Lifestyles and consumption: Everyone plays a part

Every day, people engage in consumption to varying degrees – we eat, move about, clothe and shelter ourselves as we go about our daily routines. The global economy exists to allow this consumption to occur, producing and delivering the goods and services we require, desire and can afford. Our lifestyle choices define, connect and differentiate us. They are representative of the ways in which we lead our lives and interact with one another in our global society of nearly 7 billion people.

On a global scale, our day-to-day life and choices may seem like a drop in the ocean,

<sup>3</sup> UNESCO Framing Paper for DRR and Education, 2010, Internal document.

#### Satisfying Global Consumption Requires Resources of 1.5 Earths

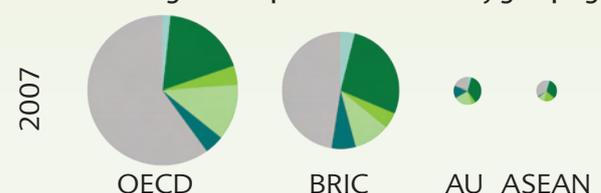
Humanity's Ecological Footprint has more than doubled since 1966. In 2007, humanity used the equivalent of 1.5 planets to support its activities.

Even with modest UN projections for population growth, consumption and climate change, by 2030 humanity will need the capacity of two Earths to absorb carbon dioxide waste and keep up with natural resource consumption.

The scope of the challenges humanity faces not only for preserving biodiversity, but also for halting climate change and meeting human development aspirations, such as reducing worldwide hunger and poverty are immense. Yet change is possible.

From: **The Global Footprint Network 2010 Living Planet Report**. [http://www.footprintnetwork.org/en/index.php/GFN/page/2010\\_living\\_planet\\_report/](http://www.footprintnetwork.org/en/index.php/GFN/page/2010_living_planet_report/)

Relative ecological footprint of four country groupings



<sup>1</sup> 'The role of local institutions in reducing vulnerability to recurrent natural disasters and in sustainable livelihoods development in high-risk areas', Asian Disaster Preparedness Centre, FAO Case Study, 2003.

<sup>2</sup> UNICEF Humanitarian Action Report, 2010.

# Get the Facts:

## CLIMATE CHANGE ACTION

especially when it comes to confronting challenges that have far-reaching environmental, social and economic implications. But scientists have shown that small variations can affect giant systems — the way in which we live impacts not only ourselves but also our natural environments and societies worldwide (see ‘Satisfying Global...’ text box). Many opportunities exist through our individual and collective choices to initiate change and create solutions for sustainable lifestyles. Practically, this involves adopting attitudes and learning skills to reduce energy consumption, use renewable forms of energy, design greener technologies, make changes in consumption patterns, mitigate biodiversity loss, etc., while ensuring quality of life for all. Everyone — from politicians to educators, school administrators and students — has a role to play in facilitating the shift towards more sustainable lifestyles.

[↪ back to Handout 1](#)

### Empowerment through CCESD

Education represents an important strategic resource in the fight against climate change and

#### Children and Youth as Agents of Change

The World Association of Girl Guides and Girl Scouts (WAGGGS), with 10 million members globally, has a Food Security and Climate Change challenge badge for ages 5- 10, 11-15, and 16 – 20. A youth guide and a resource activity pack support the challenge badge. It motivates young people to take actions to improve their lives and encourage their local communities to become more environmentally friendly. The Guide raises awareness about the contribution of everyday activities to climate change.



© World Association of Girl Guides and Girl Scouts

preparation for its current and future impacts. Education policies and curricula need to promote strategies to address climate change, in terms of mitigation and adaptation by increasing knowledge and understanding of the causes and impacts. Additionally, it should enhance knowledge, skills, values and attitudes for effective mitigation using appropriate action-oriented pedagogies.

Education for sustainable development (ESD) provides a framework for climate change education. It includes a wide spectrum of educational responses to climate change, and promotes a systemic and multi-disciplinary understanding of the causes and consequences. It proposes learning approaches that deliver critical thinking and problem-solving skills, as well as the attitudes and knowledge that empower individuals and communities to make informed and responsible decisions.

Young people and young adults entering life as citizens and professionals can be catalysts for social, cultural and technological innovation. They are also key actors in shaping lifestyles and consumption trends. In a globalized and virtually connected world, young people are often the drivers of innovation — actors of change essential to build a sustainable planet (see ‘Children and...’ text box).

#### CCESD - Taking climate change education beyond science

The traditional thinking on climate change education (CCE) in formal educational settings is limited to teaching atmospheric composition and processes from a natural science perspective. Climate science has traditionally been taught in geography (e.g. climatology) and earth science (e.g. meteorology). This part of CCE can be easily updated in primary and secondary education through cyclical revisions of the science curriculum, which take place in many countries about once every decade.<sup>4</sup> Climate change education, however, is greater than climate science. It is cross-curricular and cuts across various disciplines.

Mitigating as well as adapting to climate change is going to take far more than knowledge of the natural sciences. For places where the impacts of climate change are not immediate or extreme, an appropriate educational goal is mitigation and solidarity — working together to lessen climate change for ourselves and others around

<sup>4</sup> ‘Rethinking Climate-Change Education: Everyone wants it, but what is it?’ The Green Teacher, 89, R. McKeown and C. Hopkins, Summer, 2010.



the world. Climate change mitigation requires a change in consumption patterns and fuel use for everyone. This will require large-scale public awareness (i.e. non-formal education) campaigns inclusive of all people of all ages to change behaviours. However, CCE will also need to include training for the workforce as well as schooling (i.e. formal education) and informal (e.g. media) education.

In places in the world where the sea level is rising, droughts parch the land, or floods inundate homes and fields, educating for adaptation is essential. The skills needed for people to adapt to climate change will include decision-making to promote positive change against a background of uncertainty and instability. However, the discussion concerning which other skills should comprise CCE is complex: information and knowledge are important; so too are skills, values and principles.

[↩ back to Facilitation Guide: Despair and Empowerment Sequence](#)

### Students Influence the Move to a Safer School Location

In the Philippines, after learning that their school was at high risk of landslides following a risk assessment, children’s organisations conducted a campaign to educate their peers on the physical processes of landslides and many students also wrote to the School Division Superintendent to express their desire to relocate. The School Headmaster had decided to hold a community referendum on whether to relocate the school, and although the parents were initially against it and students for it, the students’ efforts were able to influence the vote so that the school was moved to a safer location.

Full story at: <http://www.plan-uk.org/what-we-do/disasters/increasing-resilience/25540/>



## Learners as agents of change

Children, youth and other learners should be encouraged and supported to spread climate change and DRR knowledge. Although students are often the most vulnerable in the face of disasters, they can play a key part in building community resilience, acting as bridges between families and communities. Transferring DRR skills to children and youth increases the likelihood that vital knowledge on how to reduce risk will be passed on to future generations. Schools and child and youth clubs can also play an important role in disaster prevention through involving children in awareness-raising activities (street dramas, theatre, music performances and games, etc). Street posters can also be a useful tool for raising awareness on DRR issues. Children and youth can also get directly involved in other climate change and DRR initiatives such as tree planting, water harvesting and drip irrigation (see ‘Students Influence...’ text box, previous page). The inclusion of DRR messages in radio programmes for and by children and youth is also a means to reach a wider community, especially those in distant rural areas.

[↩ back to Facilitation Guide: Despair and Empowerment Sequence](#)



United Nations  
Educational, Scientific and  
Cultural Organization



# Regional Resource Pack

→ Africa



UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE

IN THE  
CLASSROOM



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## Overview

This resource pack contains region-specific information to be used as background for classroom lessons and activities. Specific activities that require information from this resource pack are indicated in the classroom activity descriptions. The contents are broken down as follows:

- Section A provides climate change status and predictions relevant to all four regions.
- Section B provides data on the impacts of climate change in Africa.
- Section C provides a selection of regional and national climate change mitigation and adaptation policies.
- Section D provides case studies on climate change impacts.
- Section E provides stories of positive action.

## Section A: Climate Change Emissions and Impacts – The Global Situation

### Intergovernmental Panel on Climate Change (IPCC) Information on Current Knowledge about Future Impacts

#### Freshwater resources and their management

By mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water-stressed areas. In some places and in particular seasons, changes differ from these annual figures.]

Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.

In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.

Adaptation procedures and risk management practices for the water sector are being developed in some countries and regions that have recognised projected hydrological changes with related uncertainties.

#### Ecosystems

The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).

Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.

The progressive acidification of oceans due to increasing atmospheric carbon dioxide levels increases the potential for the skeletons of coldwater coral reefs to dissolve, perhaps already within a few decades. The impacts will be greatest at high latitudes..

## Food, Fibre and forest products

Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3°C depending on the crop, and then decrease beyond that in some regions.

At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase the risk of hunger.

Globally, the potential for food production is projected to increase with increases in local average temperature over a range of 1-3°C, but above this it is projected to decrease.

Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes.

Adaptations such as altered cultivars and planting times allow low- and mid- to high-latitude cereal yields to be maintained at or above baseline yields for modest warming.

Globally, commercial timber productivity rises modestly with climate change in the short- to medium-term, with large regional variability around the global trend.

Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.

## Coastal systems and low lying areas

Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas.

Corals are vulnerable to thermal stress and have low adaptive capacity. Increases in sea surface temperature of about 1-3°C are projected to result in more frequent coral bleaching events and widespread mortality, unless there is thermal adaptation or acclimatisation by corals.

Coastal wetlands including salt marshes and mangroves are projected to be negatively affected by sea-level rise especially where they are constrained on their landward side, or starved of sediment.

Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.

Adaptation for coasts will be more challenging in developing countries than in developed countries, due to constraints on adaptive capacity.

## Industry, settlement and society

Costs and benefits of climate change for industry, settlement and society will vary widely by location and scale. In the aggregate, however, net effects will tend to be more negative the larger the change in climate.

The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies.

Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

## Health

- Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity, through:
- increases in malnutrition and consequent disorders, with implications for child growth and development;
- increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts;
- the increased burden of diarrhoeal disease;
- the increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and,
- the altered spatial distribution of some infectious disease vectors.
- Climate change is expected to have some mixed effects, such as a decrease or increase in the range and transmission potential of malaria in Africa.

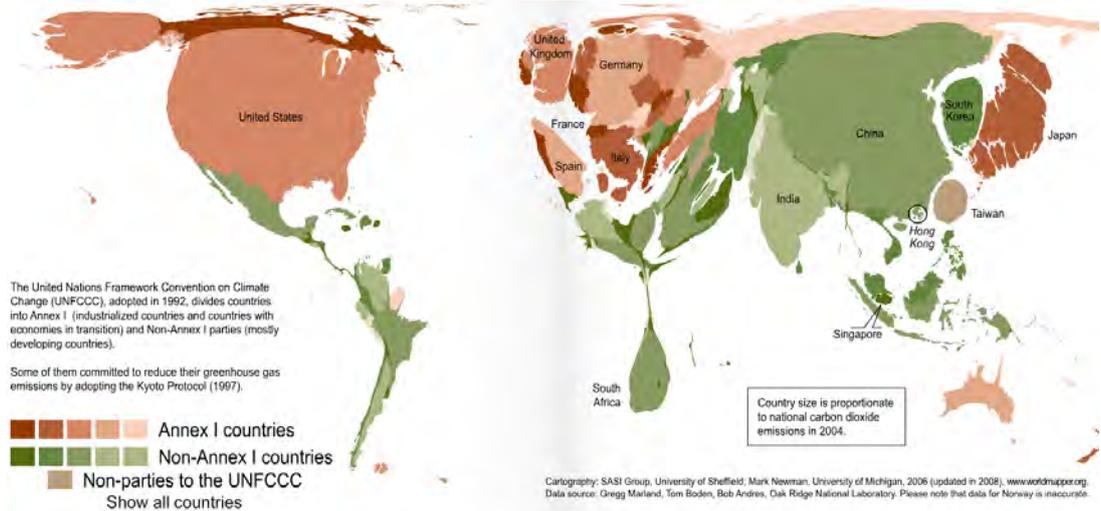
Studies in temperate areas have shown that climate change is projected to bring some benefits, such as fewer deaths from cold exposure. Overall it is expected that these benefits will be outweighed by the negative health effects of rising temperatures worldwide, especially in developing countries.

The balance of positive and negative health impacts will vary from one location to another, and will alter over time as temperatures continue to rise. Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives and infrastructure and economic development.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, pp. 11-13. Cambridge University Press. Reproduced here with permission.

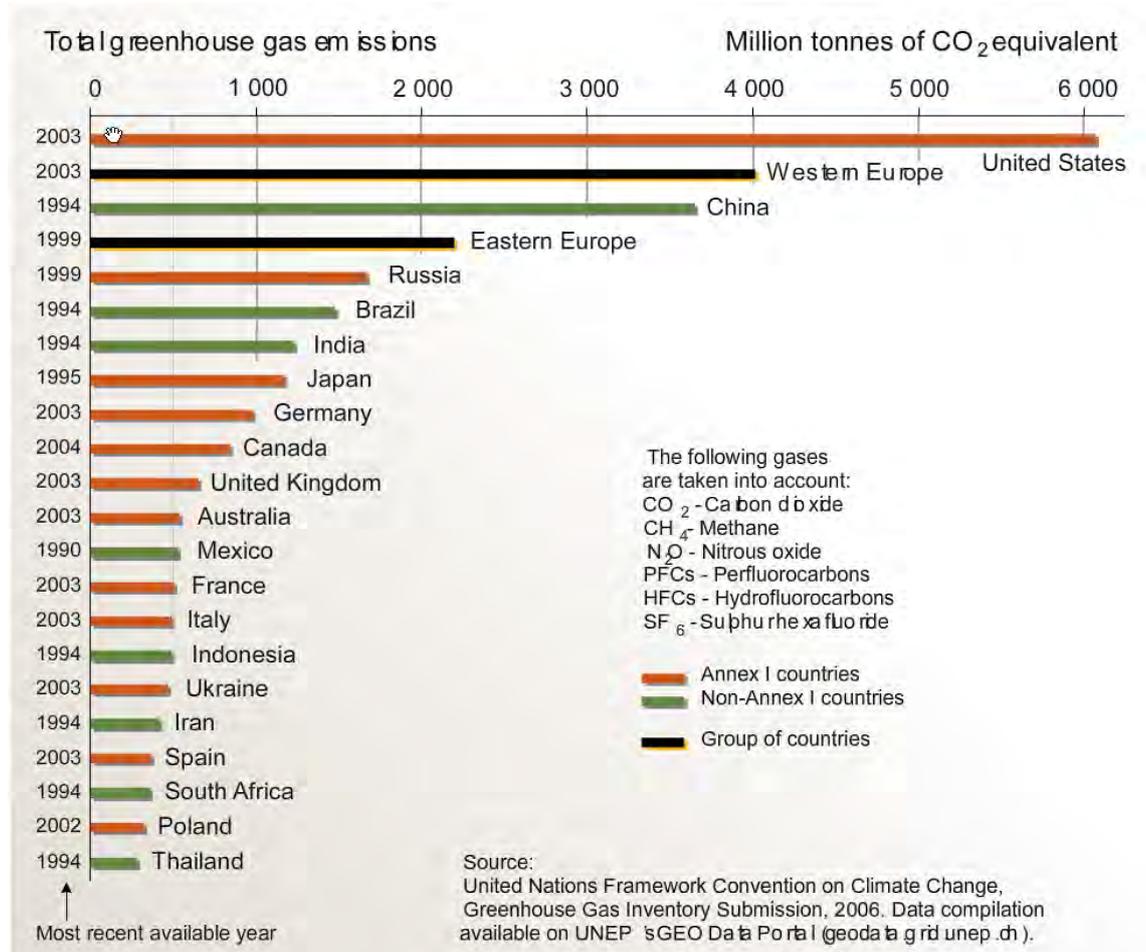
## Climate Change Infographics

### ↓ Total CO<sub>2</sub> Emissions from Fossil-Fuel Burning, Cement Production and Gas Flaring (2009)



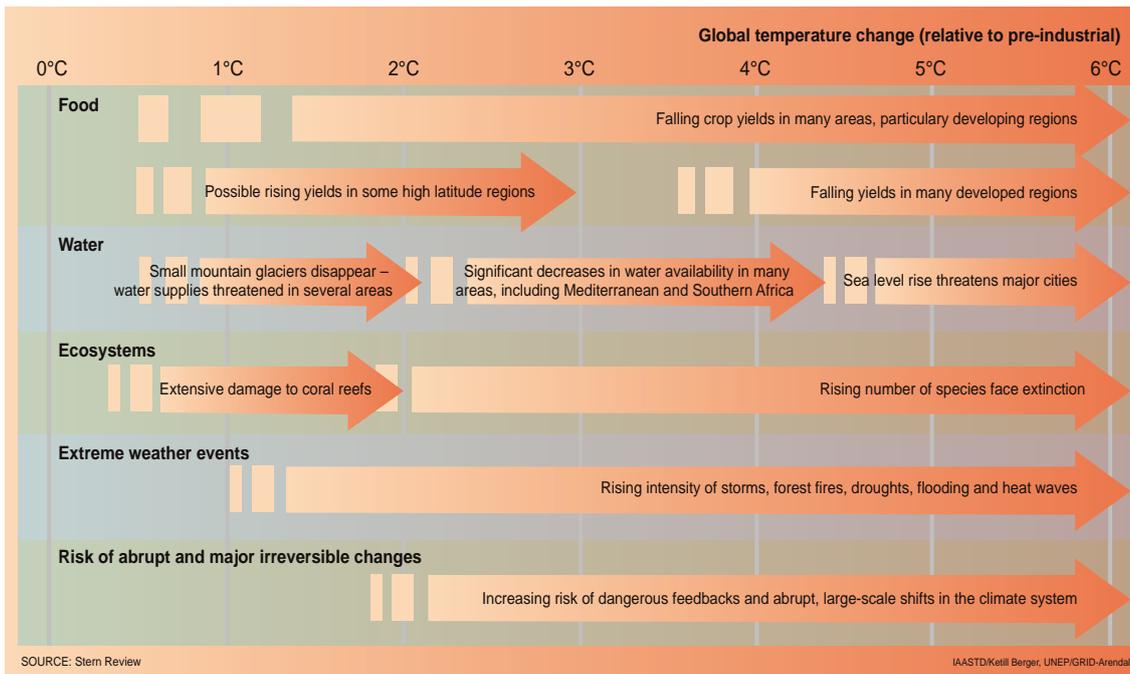
Source: From UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 16:05, June 12, 2011 from <http://maps.grida.no/go/graphic/total-co2-emissions-from-fossil-fuel-burning-cement-production-and-gas-flaring>. Reproduced here with permission.

### ↓ Top 20 Greenhouse Gas Emitters (including land use change and forestry)



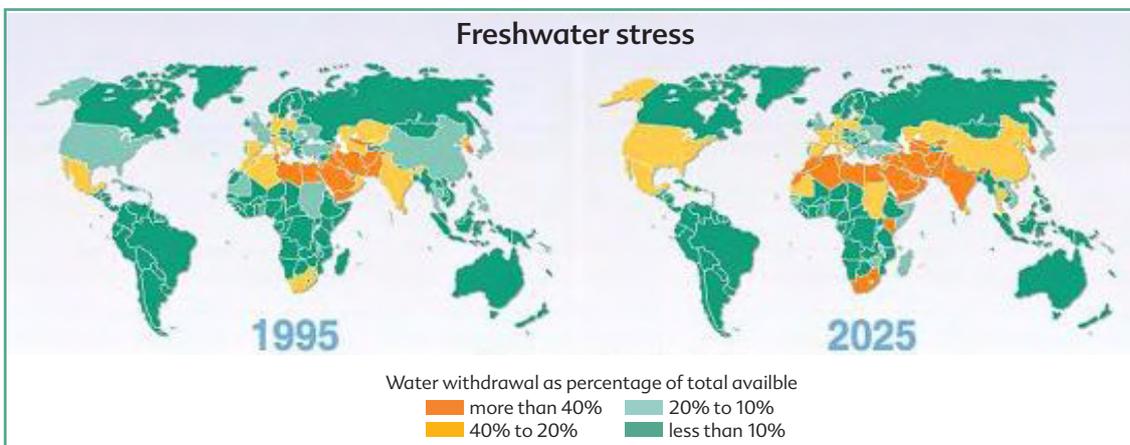
Source: Top 20 greenhouse gas emitters (including land use change and forestry). (2009). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 16:09, June 12, 2011 from. Reproduced here with permission.

Projected Impact of Climate Change



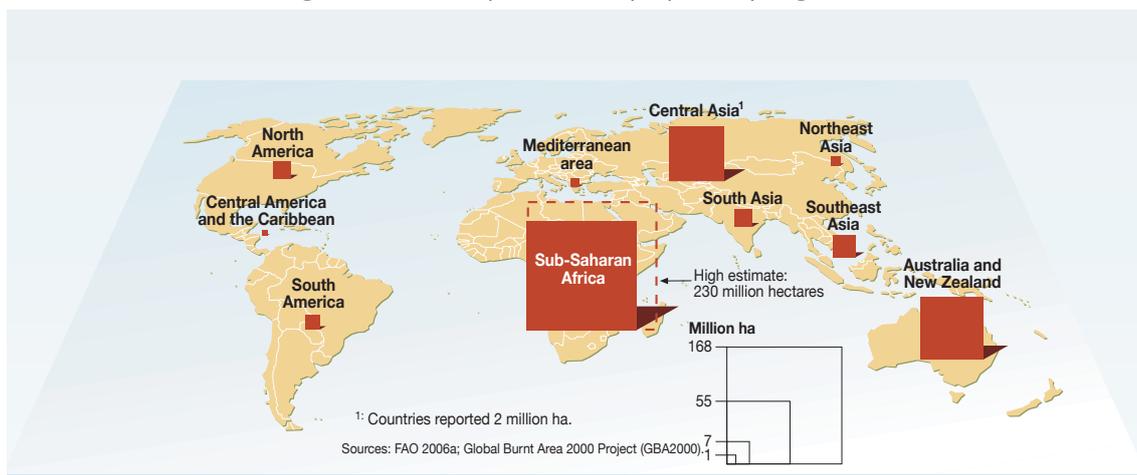
Source: Projected impact of climate change. (2008). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 17:02, June 13, 2011 from <http://maps.grida.no/go/graphic/projected-impact-of-climate-change>. Reproduced here with permission.

Freshwater Stress - Comparing 1995 to predictions for 2025



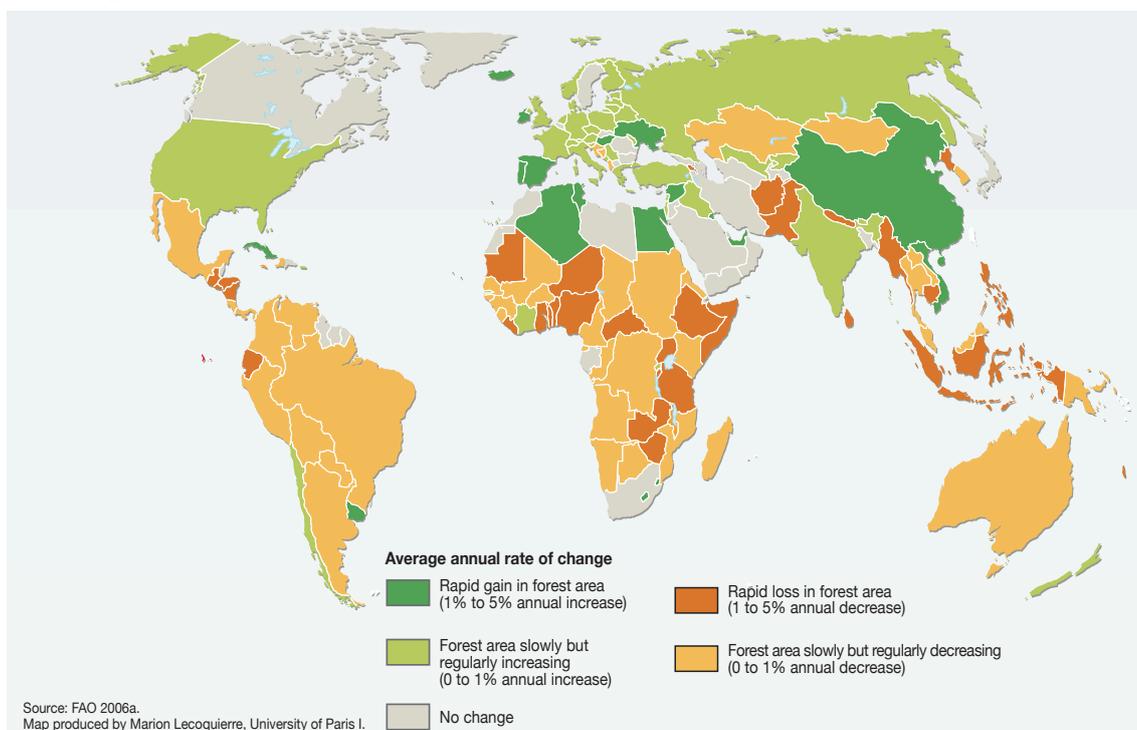
Source: Freshwater stress. (2000). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:41, June 11, 2011 from <http://maps.grida.no/go/graphic/freshwater-stress>. Reproduced here with permission.

Estimate of area of vegetation destroyed annually by fire by region



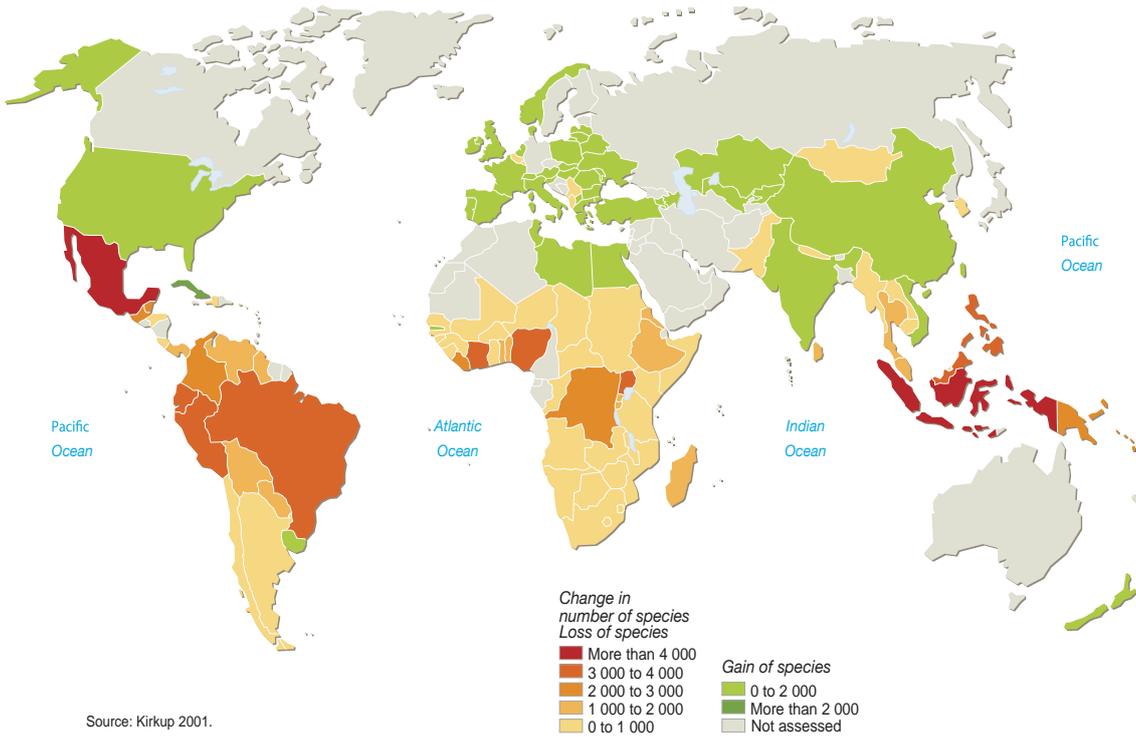
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 49 Reproduced here with permission.

Changes in area covered by forest, 1990-2005



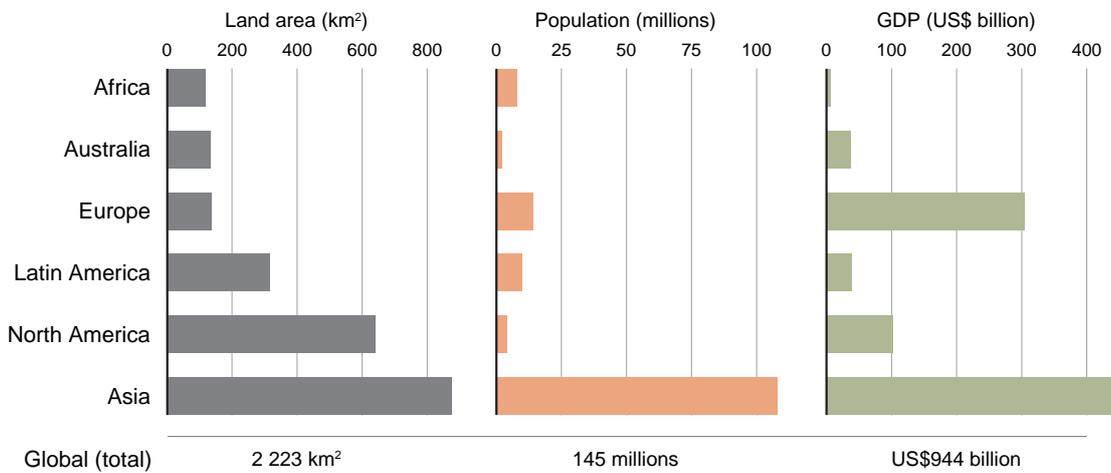
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 12. Reproduced here with permission.

Estimated loss of plant species, 2000-2050



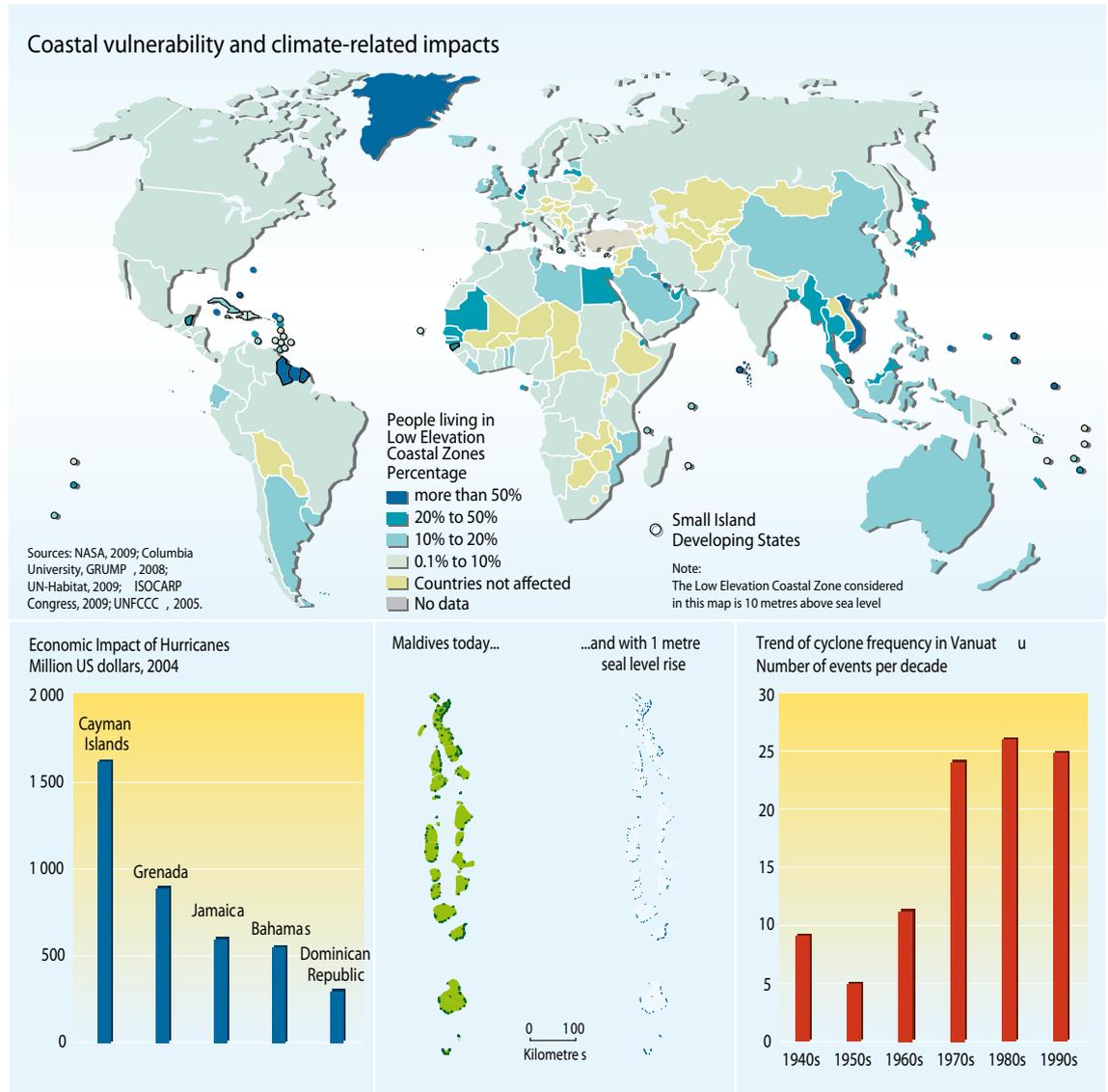
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 35. Reproduced here with permission.

A 1-meter sea level rise



Population, area and economy affected by a 1 m sea level rise (global and regional estimates, based on today's situation). (June 2007). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:35, June 11, 2011 from <http://maps.grida.no/go/graphic/population-area-and-economy-affected-by-a-1-m-sea-level-rise-global-and-regional-estimates-based-on->. Reproduced here with permission.

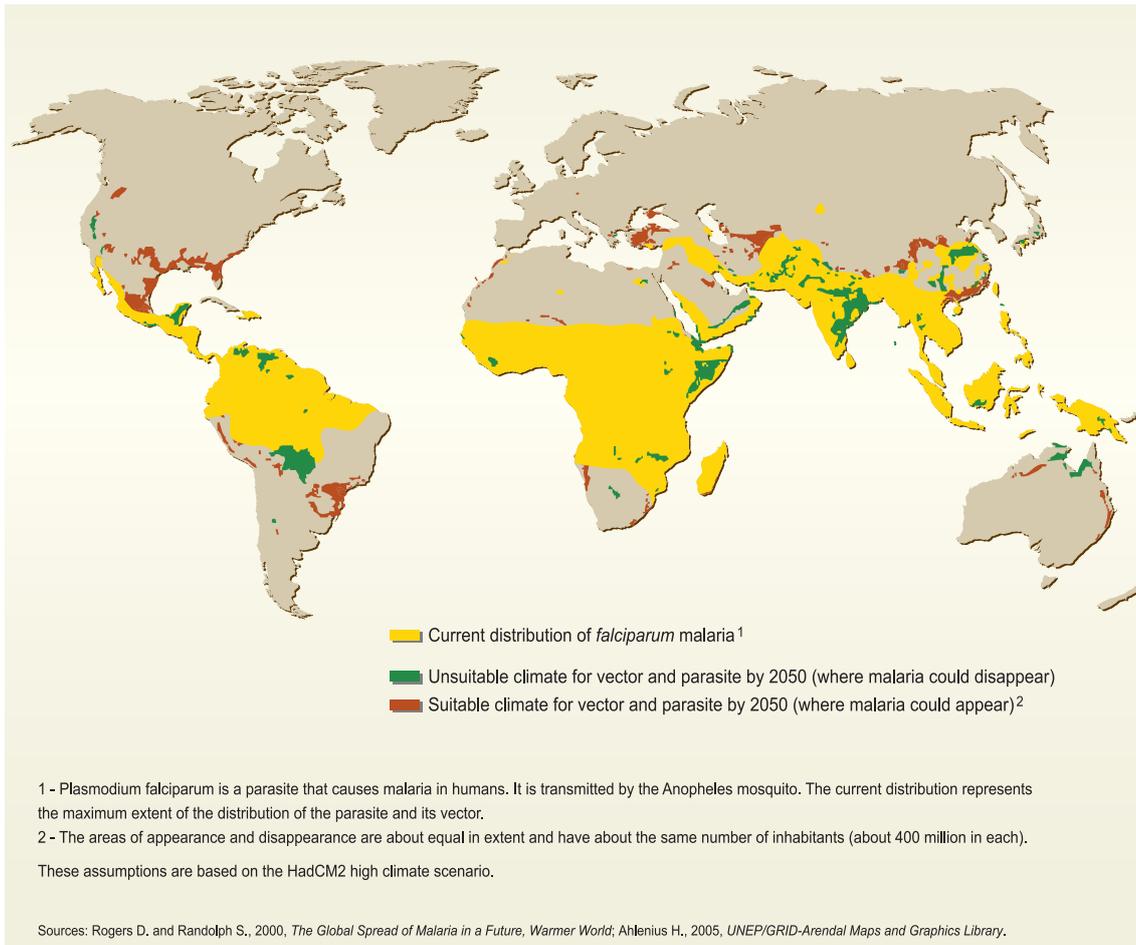
Coastal vulnerability and climate-related impacts



Source: UNEP/GRID-Arendal and CICERO (n.d.) Many Strong Voices - Turning Vulnerability into Strength, p. 14. Reproduced here with permission.

↓ Malaria by 2050

Malaria by 2050



Source: European Environment Agent.  
<http://www.eea.europa.eu/data-and-maps/figures/malaria-in-2050>  
 © European Environment Agent

## Section B: Climate Change Impacts in Africa

### Intergovernmental Panel on Climate Change (IPCC) Information

By 2020, between 75 million and 250 million people are projected to be exposed to increased water stress due to climate change. If coupled with increased demand, this will adversely affect livelihoods and exacerbate water-related problems.

Agricultural production, including access to food, in many African countries and regions is projected to be severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are expected to decrease. This would further adversely affect food security and exacerbate malnutrition in the continent. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020.

Local food supplies are projected to be negatively affected by decreasing fisheries resources in large lakes due to rising water temperatures, which may be exacerbated by continued over-fishing.

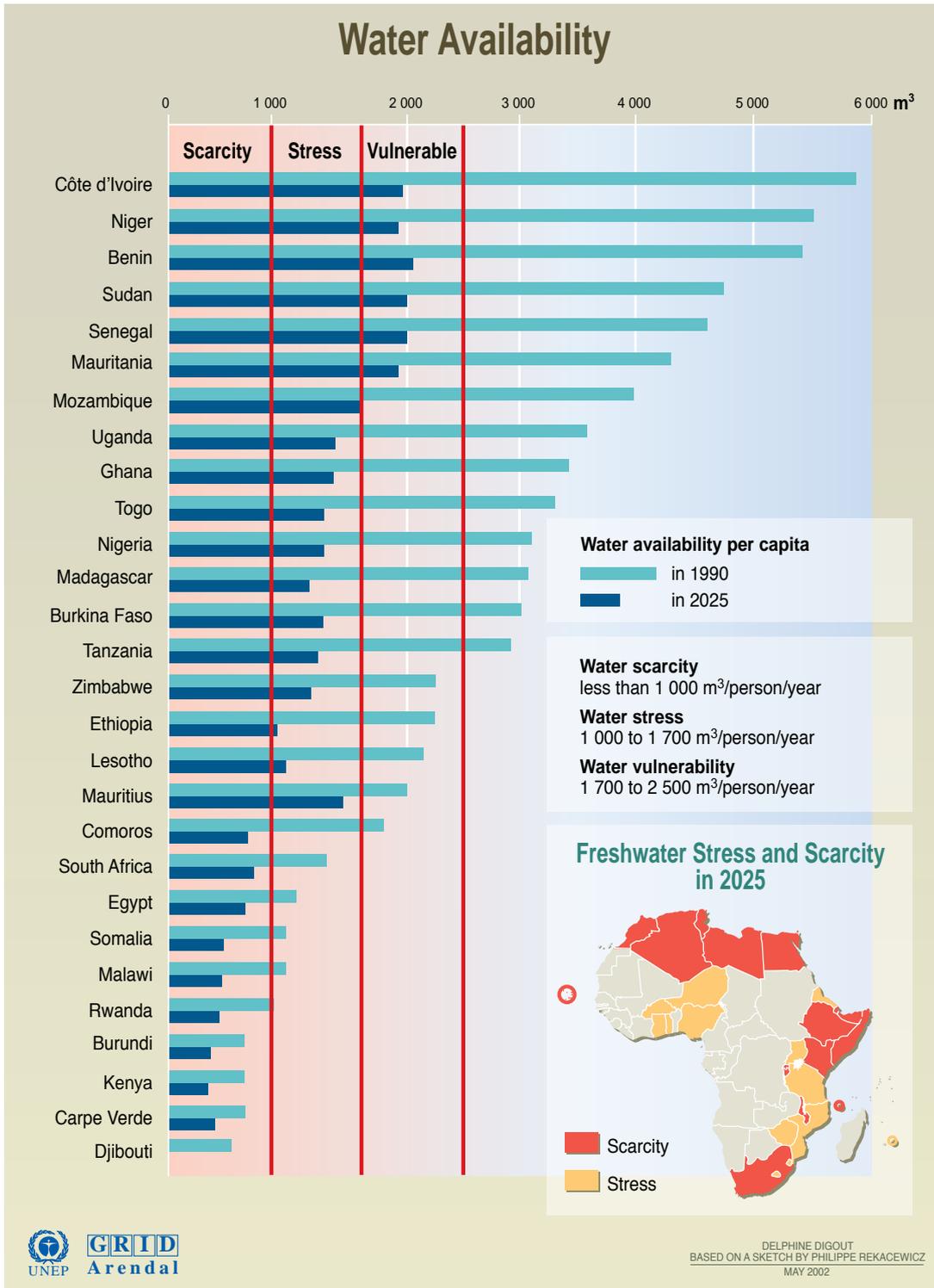
Towards the end of the 21st century, projected sea-level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5-10% of Gross Domestic Product (GDP). Mangroves and coral reefs are projected to be further degraded, with additional consequences for fisheries and tourism.

New studies confirm that Africa is one of the most vulnerable continents to climate variability and change because of multiple stresses and low adaptive capacity. Some adaptation to current climate variability is taking place; however, this may be insufficient for future changes in climate.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p 13. Cambridge University Press.

Reproduced here with permission.

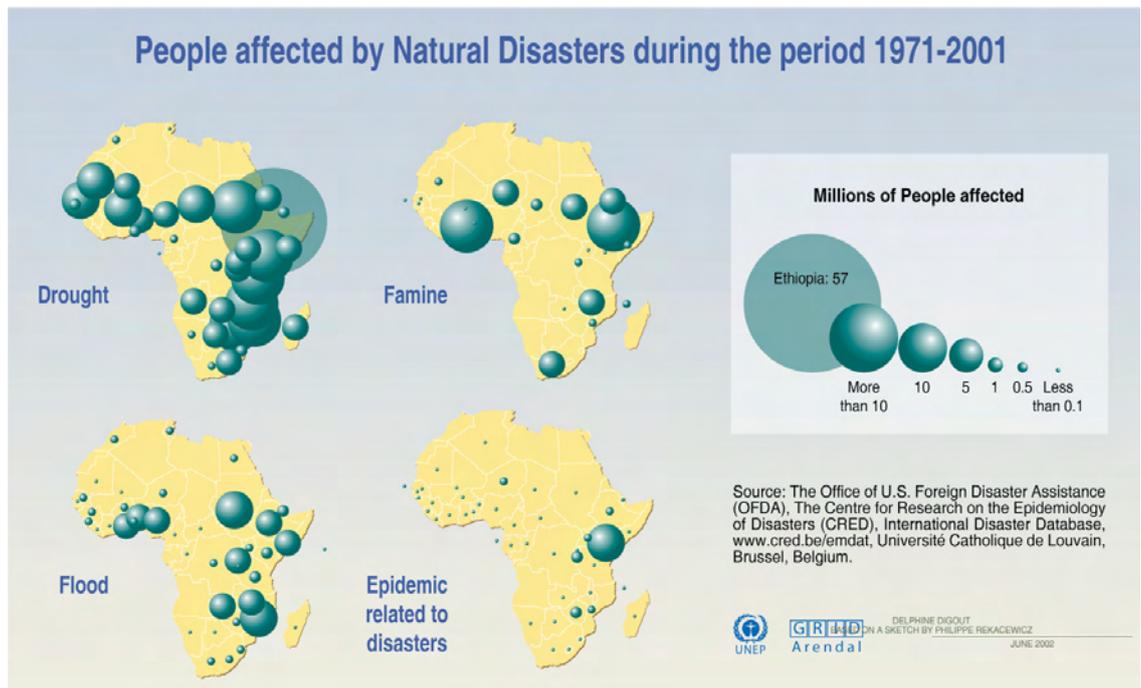
Water Availability in Africa



Source: United Nations Economic Commission for Africa (UNECA), Addis Abeba ; Global Environment Outlook 2000 (GEO), UNEP, Earthscan, London, 1999.

Source: Water availability in Africa. (2002). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 21:59, June 11, 2011 from [http://maps.grida.no/go/graphic/water\\_availability\\_in\\_africa](http://maps.grida.no/go/graphic/water_availability_in_africa). Reproduced here with permission.

↓ People Affected by Natural Disasters during the period 1971-2001



Source: Natural Disasters During the Period 1971 to 2001. (2002). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 21:55, June 11, 2011 from [http://maps.grida.no/go/graphic/people\\_affected\\_by\\_natural\\_disasters\\_during\\_the\\_period\\_1971\\_to\\_2001](http://maps.grida.no/go/graphic/people_affected_by_natural_disasters_during_the_period_1971_to_2001)  
Reproduced here with permission.

Climate Change Vulnerability in Africa



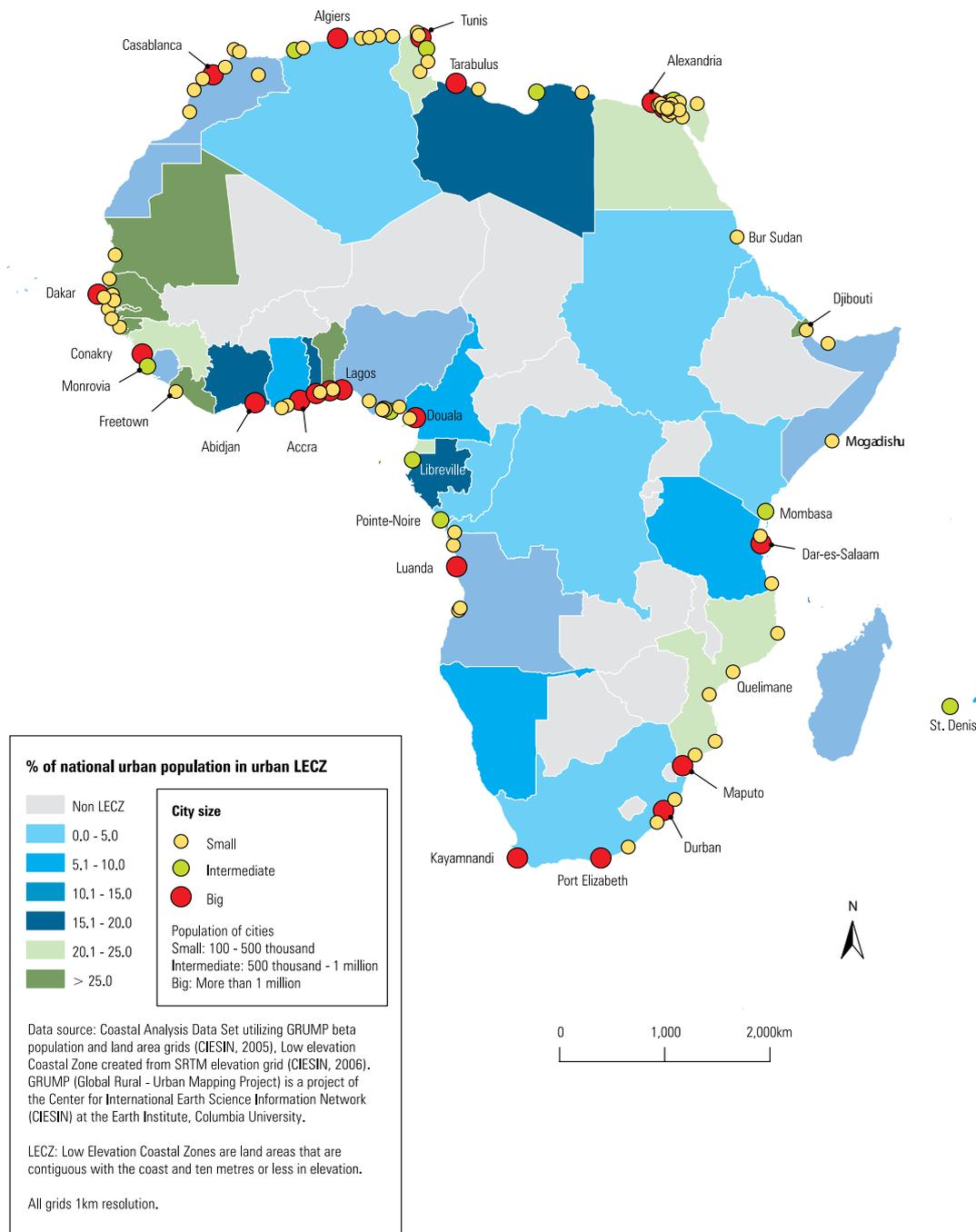
Sources: Anna Ballance, 2002.

Source: Climate change vulnerability in Africa. (2002, updated 2004, 2005). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:38, June 11, 2011 from [http://maps.grida.no/go/graphic/climate\\_change\\_vulnerability\\_in\\_africa](http://maps.grida.no/go/graphic/climate_change_vulnerability_in_africa)

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↓ African Cities at Risk due to Sea-level Rise

# AFRICAN CITIES AT RISK DUE TO SEA-LEVEL RISE



Source: UN-HABITAT(2008). *State of the World Cities 2008/9*.

## Section C: Glimpses into Climate Change Policies in Africa

### United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme)

As of July 2011 there are three UN REDD Programme partner countries in the Africa region that have been allocated funding for National UN-REDD Programmes.

Web links for each are given below.

- **Zambia**  
<http://www.un-redd.org/UNREDDProgramme/CountryActions/zambia/tabid/1029/language/en-US/Default.aspx>
- **Democratic Republic of the Congo**  
<http://www.un-redd.org/UNREDDProgramme/CountryActions/DemocraticRepublicofCongo/tabid/1027/language/en-US/Default.aspx>
- **Tanzania**  
<http://www.un-redd.org/UNREDDProgramme/CountryActions/Tanzania/tabid/1028/language/en-US/Default.aspx>

#### Box 1. What is REDD+?

Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. “REDD+” goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

Excerpts from the UN -REDD website.  
For further details, visit at <http://www.un-redd.org/AboutREDD/tabid/582/Default.aspx>

### National Adaptation Programmes of Action on Climate Change (NAPAs)

NAPAs from the following African countries are available from the UNFCCC website below:  
[http://unfccc.int/cooperation\\_support/least\\_developed\\_countries\\_portal/submitted\\_napas/items/4585.php](http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php)

- Benin
- Burkina Faso
- Burundi
- Central African Republic
- Chad
- Democratic Republic of the Congo
- Djibouti
- Eritrea
- Ethiopia
- Gambia
- Guinea
- Guinea-Bissau
- Lesotho
- Liberia
- Madagascar
- Malawi
- Mali

#### Box 2. What are NAPAs?

National adaptation programmes of action (NAPAs) provide a process for Least Developed Countries (LDCs) to identify priority activities that respond to their urgent and immediate needs to adapt to climate change – those for which further delay would increase vulnerability and/or costs at a later stage.

Excerpts from UNFCCC website.  
For further details, visit: [http://unfccc.int/national\\_reports/napa/items/2719.php](http://unfccc.int/national_reports/napa/items/2719.php)

- Mozambique
- Niger
- Rwanda
- Senegal
- Sierra Leone
- Sudan
- Tanzania
- Togo
- Uganda
- Zambia

### UN-REDD in Zambia

Zambia has approximately 50 million hectares of forest, with an estimated deforestation rate of 250,000 to 300,000 hectares per year. In recognition of the role of REDD+ can play in reducing emissions and facilitating sustainable socio-economic development, the Zambian government is presently assessing the opportunities potentially delivered through REDD+. Zambia is currently one of nine developing countries in the world that will be piloting the UN-REDD Programme, which aims to prepare countries for future REDD+ implementation. The first phase in the UN-REDD Programme is the UN-REDD Quick Start initiative....

The primary drivers of deforestation and forest degradation need to be addressed in order to ensure the success of National REDD+. Within Zambia, these drivers vary across regions and include inter alia: i) charcoal and wood fuel use (for domestic, commercial and industrial uses); ii) timber production; and iii) unsustainable agricultural methods and other land use practices. Drivers of deforestation and forest degradation are a result of a complex set of underlying causes that are primarily caused by past and current development processes. These underlying causes cut across numerous sectors (e.g. energy, forestry, agriculture and water). In order to address them and thereby to facilitate the realisation of REDD+, the entire mode of development within Zambia will need to be altered. Both the supply and demand for wood and non-wood forest products will, for example, need to be addressed simultaneously.

The large scale and cross cutting nature of interventions required to implement REDD+ will necessitate high level government support and large-scale cross-sectoral reforms. Preparation for REDD+ will require a specific set of interventions including inter alia: i) developing capacity from community to government level; ii) strengthening of institutional, policy and legislative frameworks; iii) strengthening the implementation of policy and enforcement of legislation; iv) wide spread sharing of knowledge on REDD+; and v) developing incentives for the adoption of alternative livelihoods and energy sources. Ultimately, the success of National REDD+ will also require large-scale stakeholder engagement across all levels, but specifically at the community level in order to ensure that communities receive tangible benefits from REDD+.

Source: Excerpts from *Zambia Final National Programme Document* (September 2019) p. 7  
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## Lesotho's National Adaptation Programme of Action

Lesotho's National Adaptation Programme of action is to identify and prioritise national needs so that effective implementation measures may be put into place to combat the adverse effects of climate change.

The NAPA process identified eleven adaptation options outlined below in their order of priority.

### Option 1:

Improve Resilience of Livestock Production Systems Under Extreme Climate Conditions in Various Livelihood Zones in Lesotho

### Option 2:

Promoting Sustainable Crop Based Livelihood Systems in Foothills, Lowlands and Senqu River Valley

### Option 3:

Capacity Building and Policy Reform to Integrate Climate Change in Sectoral Development Plans

### Option 4:

Improvement of an Early Warning System Against Climate Induced Disasters and Hazards

### Option 5:

Securing Village Water Supply for Communities in the Southern Lowlands

### Option 6:

Management and Reclamation of Degraded and Eroded Land in the Flood Prone Areas (Pilot Project for Western Lowlands)

### Option 7:

Conservation and Rehabilitation of Degraded Wetlands in the Mountain Areas of Lesotho

### Option 8:

Improvement of Community Food Security Through the Promotion of Food Processing and Preservation Technologies

### Option 9:

Strengthening and stabilizing eco-tourism based rural livelihoods

### Option 10:

Promote Wind, Solar and Biogas Energy Use as a Supplement to Hydropower Energy

### Option 11:

Stabilizing Community Livelihoods which are Adversely Affected by Climate Change Through Improvement of Small Scale Industries

Source: Excerpts from *Lesotho's National Adaptation Programme of Action (NAPA) on Climate Change Under the United Nations Framework Convention on Climate Change*. p. vi.  
Reproduced here with permission.

## Section D: Climate Change Impacts – Case Studies

### Nowhere to Hide from Climate Change in Kenyan Refugee Camp

DADAAB, Kenya, December 18 (UNHCR) – Dulane Jama and his family suffered in silence for three years in a remote corner of eastern Ethiopia before he finally decided to go and look for a safe place to live before they all died. After an arduous and dangerous trek across Somalia, he ended up about four months ago at Dadaab, a sprawling and overcrowded refugee complex in north-east Kenya housing almost 300,000 refugees. Most are Somalis who have fled conflict or persecution in their troubled homeland.

Dulane is slightly different – he and his family have been forced to flee by climate change and general insecurity. But more and more people are fleeing for a similar mix of reasons. Conflict in the region, especially in Somalia, has made it more difficult to manage the effects of climate change. Demand for precious and scarce resources such as water and grazing land is leading to conflict, followed by displacement, more environmental degradation and more conflict.

The 44-year-old Dulane is a member of the Marehan, an ethnic Somali clan whose members live all over the region. He, his wife and their 12 children raised livestock near the town of Korahay, close to the border with Somalia. Then one day, the rains stopped coming and life became harder and harder.

“There have been drought conditions in Ethiopia for the past three years,” he said with a bitter smile. “Originally I had 50 camels, 30 cattle and 35 sheep and goats, but they are all dead now,” Dulane added. The situation was dire, so he decided to make his way to Somalia and then get the family to follow, but because of the general insecurity he ended up going all the way to Dadaab.

Dulane realized that the weather was at the root of most of his problems, but he had no idea that the abnormal weather conditions were due to climate change. Indeed, he had no idea what climate change meant.

And having escaped his drought-ridden home region and reached Dadaab, he and his family now face another feature of climate change – flooding. Meteorologists fear that torrential El Nino rains, a phenomenon caused by the periodic warming of the oceans, will once more cause widespread flooding over a wide area in eastern Africa this year and in early 2010.

UNHCR and its partners are on an emergency preparedness footing for the potential effects of flooding, including the mass outbreak of diarrhoea, water-borne diseases and cholera in the congested camps. El Nino rains have struck Dadaab before, causing turmoil and destruction in 1997, 2003 and 2006 and causing people to move to safer areas.

Meanwhile, much of northern Kenya, is suffering from the same drought affecting Dulane’s home area in Ethiopia and parts of south-central Somalia. Kenya’s Crisis Response Centre reported earlier this month that 3.8 million Kenyans were facing starvation as a result of a lack of rain over the past two years. Extreme climatic events such as flooding, soaring heat, storms and drought are on the rise in Africa. Temperature increase and its effect on crop production has been linked to an upsurge in conflict in Africa over the past decade.

Dealing with extreme climate conditions and their after-effects is often beyond the scope and capacity of humanitarian agencies, but UNHCR and its partners are working hard to mitigate the short-term effects in places like Dadaab while also putting in place more long-term strategic projects.

“UNHCR is addressing the immediate El Niño response needs by sandbagging vital areas of the camps, such as tapstands, boreholes, hospitals and health posts, as well as improving drainage in critical locations,” explained UNHCR’s Dinesh Shrestha, a water and climate specialist who recently spent two months in Dadaab.

He added that the refugee agency was investigating longer-term strategic projects, including reforestation, water harvesting and the possibility of using water from swamps, dams and shallow wells to meet the needs of livestock kept by the refugees and by the local communities around Dadaab.

“These projects require time, effort and donor support,” noted Dinesh, who was in Dadaab’s Ifo camp on December 16 when a two-hour downpour left areas of the camp under many feet of water and forced refugees to stow their aid packs up trees and make their way through waist-high water.

Meanwhile, Dulane’s mind is on the present and he takes a pragmatic approach to the possibility of floods. “If it is the will of God that this happens, then it will happen.”

By Andy Needham in Dadaab, Kenya

Source: Taken from UNHCR website <http://www.unhcr.org/4b2b76a79.html>

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### Climate Witness: Be Mangaoka, Madagascar

My name is Be Mangaoka and I am 50 years old. I live in the small village of Ankingameloka in the very north of Madagascar. Our village is right next to the Nosy Hara Marine Protected Area. There is no electricity and running water in our village. There is no school or health centre either.

I am a fisherman and a farmer. I collect fish and sea cucumbers and sell them to businessmen in Mangaoka. I plant rice and manioc for my family’s needs and maize for selling as well. I have four children. They will have to find another source of income, so I encourage them to study. I hope that they will do well in their studies so they can help us later.

In 1984, there was a cyclone called Kamisy that caused a lot of damage on the coastline. We had to move the village inland, 100 meters away from where it originally was! The cyclone destroyed our mangrove forests. For two years now we haven’t found any shrimp in the remaining mangroves. In the old days, we used to collect 10kg of crab, now we can only gather 3kg a day at most. Due to the sediments in the mangroves it is difficult for them to regenerate.

From 1999 to 2000 a severe drought passed through our village and we had problems cultivating the rice. Unfortunately, this was not a one-time occurrence; the seasons have really changed a lot. For the last 20 years, there has been less and less rain. Normally the rainy season is from November until May, but nowadays it is only from January until March. Rice cultivation is particularly affected by this shortage. We have to find other varieties. Some of our wells have run dry.

The varatraza – the main wind in northern Madagascar – used to blow from July to August. Now we get it from April to November. When the varatraza blows, we can’t fish! Our income is less and less. At the same time, the number of fishermen has increased over the last couple of years, especially fishermen from other places who do not respect our rules. Also, we have to walk very far to find fire wood due to the overexploitation of wood and bush fires. To find wood for construction, we have to walk many kilometres.

I don’t know, who or what is responsible for all those changes but I am really worried that our future generation will not have access any more to the natural resources we rely upon.

Source: Taken from: *WWF Climate Witness: Be Mangaoka, Madagascar*, [http://www.panda.org/about\\_our\\_earth/aboutcc/problems/people\\_at\\_risk/personal\\_stories/witness\\_stories/?184921](http://www.panda.org/about_our_earth/aboutcc/problems/people_at_risk/personal_stories/witness_stories/?184921)

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## Section E: Climate Change – Case Studies of Positive Action

### Fuel efficient small stoves in Mozambique

In Mozambique, around 91 per cent of energy use depends on fuelwood and charcoal. When biomass – including firewood and charcoal – is used inefficiently, it produces high levels of smoke, which damage health within households and the environment. Efficient combustion can reduce the amount of wood needed and with improved ventilation reduce smoke emissions, both when the charcoal is produced and also when it gets used for fuel, in improved stoves. An improved-efficiency stove, can produce a dramatic reduction in women's workload in fetching fuelwood. Some designs, such as the rocket stove, can also dramatically reduce emissions.

Mozambique is rich in renewable energy resources. Some of Africa's great rivers flow through the country. In the mountains in the northern and eastern provinces, there are many sites suitable for micro-hydro, which is free of carbon or any other pollutants and can be community managed. Currently large hydropower in Mozambique is transmitted over great distances to South Africa, with little gain to the local people where the power is generated.

There is abundant sunshine. Solar energy power photovoltaic cells for electrification. Solar stoves for cooking have potential for those households for whom the technology is appropriate.

#### Low-energy building materials: Soil stabilized blocks

There are many examples of African solutions to the energy crisis that need support. In Kenya and Zimbabwe low-cost and low-energy building blocks are being made from stabilized soil. Sun-dried, they can be made on or close to the building site, so no energy is used in transport. The other advantage is that the people engaged in production gain a livelihood, and can afford to build decent homes and community buildings. The technology is simple. Soil dug on-site, is suitable, is mixed with a small amount of cement. People are trained in soil-testing techniques to determine the best mix. Water is added and mixture is placed in block press. The bricks require cement, which often has to be imported, so there is an external energy input cost. However, the bricks offer an alternative to locally made baked-earth bricks, which are fired over 2-3 days in kilns burning fuelwood; this local industry has contributed to deforestation and is inefficient in energy use. This approach has helped to provide local affordable housing in low-income neighborhoods because the stabilized soil blocks compete favourably on cost with commercially made clay bricks. The technology uses little water, and produces no waste.

Source: Taken from Simms, Andrew (2005), *Africa –Up in Smoke? The Second Report from the Working Group on Climate Change and Development*, London: new economic foundation, pp. 23-25.

### Massaai Women Tackle Drought

The Maasai are struggling with frequent water shortages which are threatening their way of life. But one women's group is taking action. Day in and day out from the months of March through to June, grey and white clouds float across the blue skies above Kajiado, southern Kenya. But each passing day, the rain they promise frequently fails to show up. "There's been practically no rain in the region," says David Kirrinkai, the assistant chief of Oliteyani, a sub-location of Ngong Hills in Kajiado. "We just receive a few showers, with no means of tapping it for storage."

The lack of rain has had serious implications for the region as both people and animals are suffering. The Maasai people have to share the land with all kinds of wildlife here. And when water is short in supply, incidents of conflict arise.

The Maasai have lived and coped here for centuries, but the new weather patterns are threatening their way of life. In recent decades, seasonal patterns have become unpredictable and rainfall levels have become lower. As traditional cattle herders, the Maasai have found themselves leaving their homes for months at a time in search of pastures and water for their animals. In most cases this means vulnerable women, children and the elderly are left behind to

fend for themselves in the villages.

Maasai herders dressed in their bright red shuka cloaks, have now become a common feature on the outskirts of the capital, Nairobi, as they search for pastures. Others are dropping out of their pastoral lifestyle altogether and moving to the cities in search of employment. “The devastation can be too much to bear,” says James Lekurra, a Maasai elder who lost his entire herd to the drought. “Three decades ago, the rains used to come regularly and we had little stress. But now the atmosphere has changed. We are no longer sure that the rains will come as we expect.”

The recurrence of droughts in East Africa is a natural calamity that is delivering a serious blow to the region. Scientists blame the massive clearance of forests as well as the emission of carbon gasses into the atmosphere as a cause of the droughts. Women in particular face the challenge of fetching the scarce water for the household’s use. In some cases they are forced to walk for over ten kilometres in search of water. When droughts worsen and springs dry up, some are forced to return home empty-handed. Nevertheless, in the face of the crisis, some Maasai people have devised measures to lessen the impact of the droughts. The women of Kajiado, for instance, have taken the lead by constructing cement water tanks for their households. They collect rain water from their iron-sheet roofed houses and store it in the tanks. The project is being spearheaded by the United Nations Environment Programme and the Regional Land Management Unit of the World Agro-forestry Centre. The organisations are providing equipment and training for the women.

To date, over 200 tanks have been constructed under the initiative. The women are also involved in digging mini reservoirs or ‘earth-pans’ to collect run-off water from sloping land. This in turn is used for irrigation purposes to water their crop and vegetable fields. The women of Kajiado have also begun a tree-planting project to encourage the Maasai to adopt a more settled communal way of life as arable farmers. It makes it compulsory for every household to plant at least a hundred trees.

“It’s time to determine our own destiny. I am anticipating cooler weather. We are fed up with scorching temperatures and spending entire days searching for water,” says Luise Mwoiko, chair of the Mataanobo Women’s Group. The women’s initiative cooperates to construct water tanks from one homestead to another. And they are proud of their work, as Mwoiko makes clear. “We never bother our men to climb up the tanks and make the final touches. We do it ourselves.” Though she adds that the women’s husbands assist financially in their projects. Another member, Jerusha Lasoi, said their projects will ensure that the Maasai will no longer require food aid from outside their community. Pointing to her secure reservoir of water, a milk cow and thriving business in vegetable sales, Lasoi felt confident of their future.

There is however debate as to whether the Maasai should still keep large herds of livestock in the face of scarce pastures and water. Agnes Kiner who leads another women’s group thinks not, saying: “It would be wise for the Maasai community to abandon the system of keeping unmanageable herds of livestock and proposing instead to keep one or two dairy cows and goats.” Such a move would attract stiff resistance from most traditionalist Maasai tribesman as Kirrinkai attests: “Nature is dictating us. There is no water or pastures. People are getting land title deeds. No one is willing to let grazing take place in his territory due to scarce resources”. These factors are driving the Maasai from their culture, he adds, and Kirrinkai wants to see more rain-water harvesting and more trees planted to help to mitigate the droughts. Proposals and debates about the best approach to soften the impact of the drought will likely rage on for some time. But for many Maasai people now, the challenge appears to be a question of striking a balance between coping with a changing climate and retaining traditional norms and values.

Source: Panos London, ‘*Maasai Women Tackle Drought*’ written by Ebby Nanzala Wamatsi  
<http://panos.org.uk/features/maasai-women-tackle-drought/>  
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United Nations  
Educational, Scientific and  
Cultural Organization



# Regional Resource Pack

→ Asia



UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE

IN THE  
CLASSROOM



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## Overview

This resource pack contains region-specific information to be used as background for classroom lessons and activities. Specific activities that require information from this resource pack are indicated in the classroom activity descriptions. The contents are broken down as follows:

- Section A provides climate change status and predictions relevant to all four regions.
- Section B provides data on the impacts of climate change in Africa.
- Section C provides a selection of regional and national climate change mitigation and adaptation policies.
- Section D provides case studies on climate change impacts.
- Section E provides stories of positive action.

## Section A: Climate Change Emissions and Impacts – The Global Situation

### Intergovernmental Panel on Climate Change (IPCC) Information on Current Knowledge about Future Impacts

#### Freshwater resources and their management

By mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water-stressed areas. In some places and in particular seasons, changes differ from these annual figures.]

Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.

In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.

Adaptation procedures and risk management practices for the water sector are being developed in some countries and regions that have recognised projected hydrological changes with related uncertainties.

#### Ecosystems

The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).

Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.

The progressive acidification of oceans due to increasing atmospheric carbon dioxide levels increases the potential for the skeletons of coldwater coral reefs to dissolve, perhaps already within a few decades. The impacts will be greatest at high latitudes..

## Food, Fibre and forest products

Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3°C depending on the crop, and then decrease beyond that in some regions.

At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase the risk of hunger.

Globally, the potential for food production is projected to increase with increases in local average temperature over a range of 1-3°C, but above this it is projected to decrease.

Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes.

Adaptations such as altered cultivars and planting times allow low- and mid- to high-latitude cereal yields to be maintained at or above baseline yields for modest warming.

Globally, commercial timber productivity rises modestly with climate change in the short- to medium-term, with large regional variability around the global trend.

Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.

## Costal systems and low lying areas

Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas.

Corals are vulnerable to thermal stress and have low adaptive capacity. Increases in sea surface temperature of about 1-3°C are projected to result in more frequent coral bleaching events and widespread mortality, unless there is thermal adaptation or acclimatisation by corals.

Coastal wetlands including salt marshes and mangroves are projected to be negatively affected by sea-level rise especially where they are constrained on their landward side, or starved of sediment.

Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.

Adaptation for coasts will be more challenging in developing countries than in developed countries, due to constraints on adaptive capacity.

## Industry, settlement and society

Costs and benefits of climate change for industry, settlement and society will vary widely by location and scale. In the aggregate, however, net effects will tend to be more negative the larger the change in climate.

The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies.

Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

## Health

- Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity, through:
- increases in malnutrition and consequent disorders, with implications for child growth and development;
- increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts;
- the increased burden of diarrhoeal disease;
- the increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and,
- the altered spatial distribution of some infectious disease vectors.
- Climate change is expected to have some mixed effects, such as a decrease or increase in the range and transmission potential of malaria in Africa.

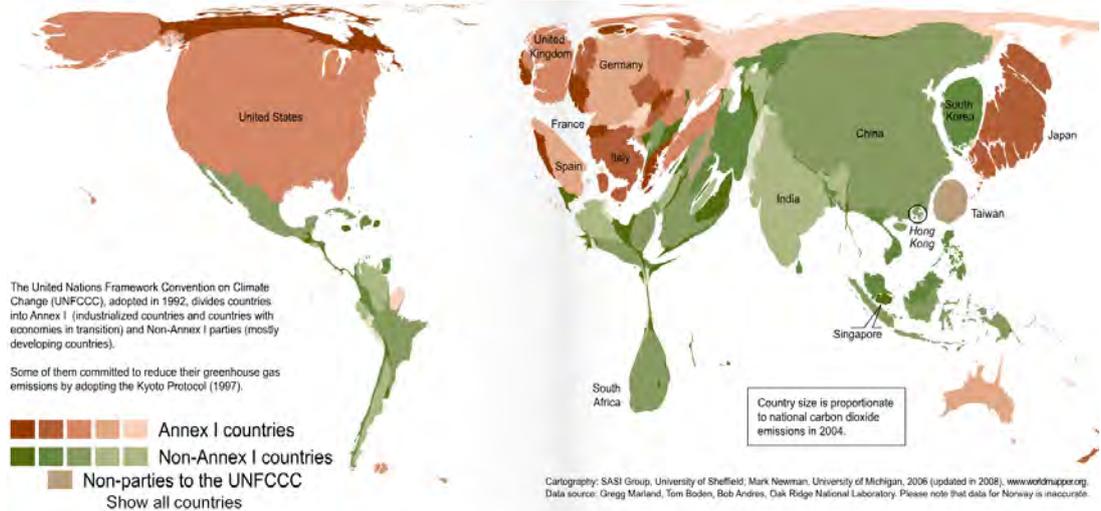
Studies in temperate areas have shown that climate change is projected to bring some benefits, such as fewer deaths from cold exposure. Overall it is expected that these benefits will be outweighed by the negative health effects of rising temperatures worldwide, especially in developing countries.

The balance of positive and negative health impacts will vary from one location to another, and will alter over time as temperatures continue to rise. Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives and infrastructure and economic development.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, pp. 11-13. Cambridge University Press. Reproduced here with permission.

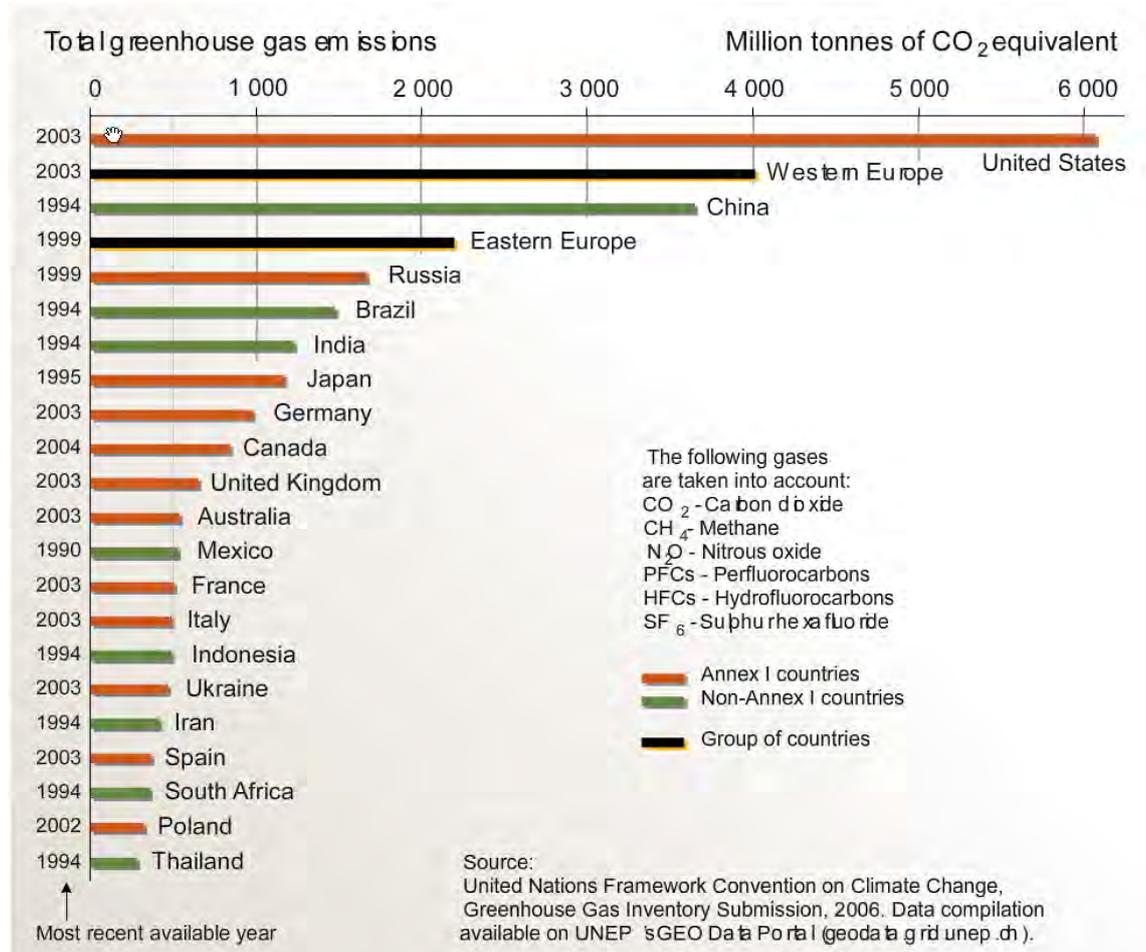
## Climate Change Infographics

### ↓ Total CO<sub>2</sub> Emissions from Fossil-Fuel Burning, Cement Production and Gas Flaring (2009)



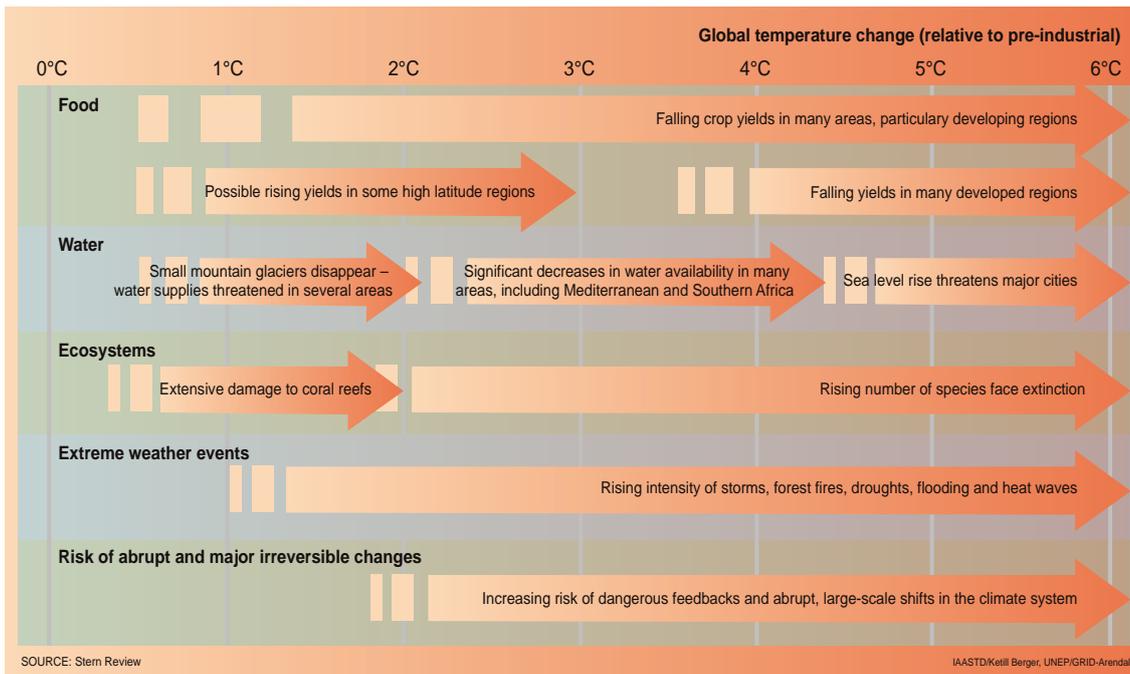
Source: From UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 16:05, June 12, 2011 from <http://maps.grida.no/go/graphic/total-co2-emissions-from-fossil-fuel-burning-cement-production-and-gas-flaring>. Reproduced here with permission.

### ↓ Top 20 Greenhouse Gas Emitters (including land use change and forestry)



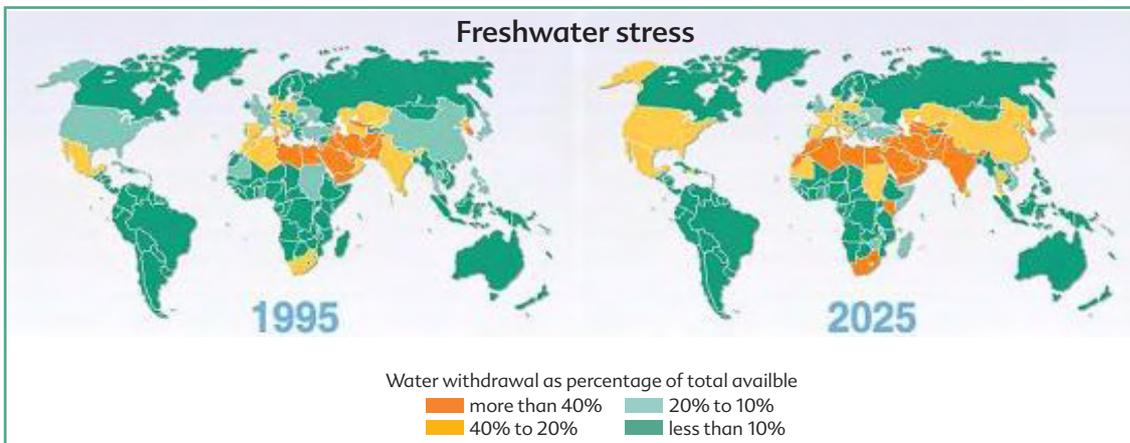
Source: Top 20 greenhouse gas emitters (including land use change and forestry). (2009). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 16:09, June 12, 2011 from. Reproduced here with permission.

Projected Impact of Climate Change



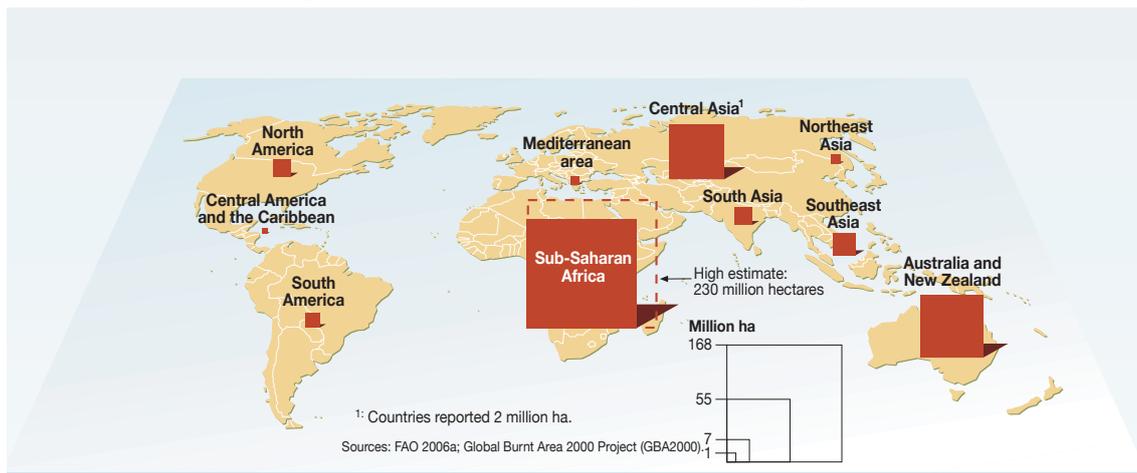
Source: Projected impact of climate change. (2008). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 17:02, June 13, 2011 from <http://maps.grida.no/go/graphic/projected-impact-of-climate-change>. Reproduced here with permission.

Freshwater Stress - Comparing 1995 to predictions for 2025



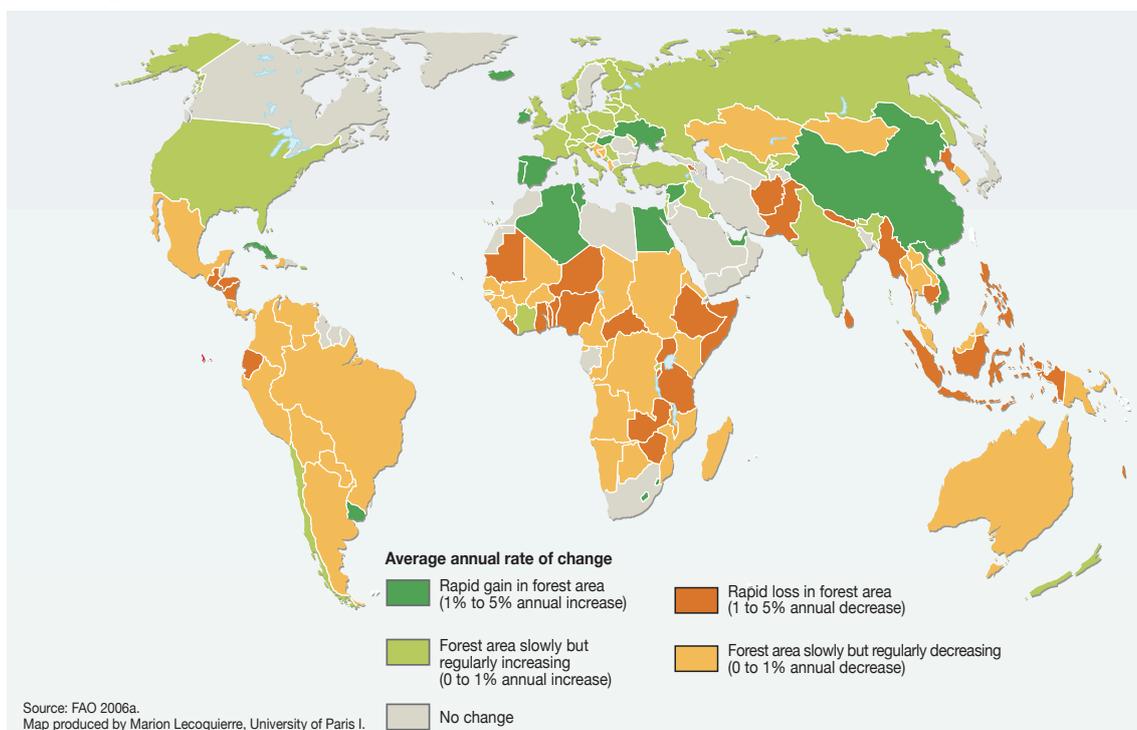
Source: Freshwater stress. (2000). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:41, June 11, 2011 from <http://maps.grida.no/go/graphic/freshwater-stress>. Reproduced here with permission.

Estimate of area of vegetation destroyed annually by fire by region



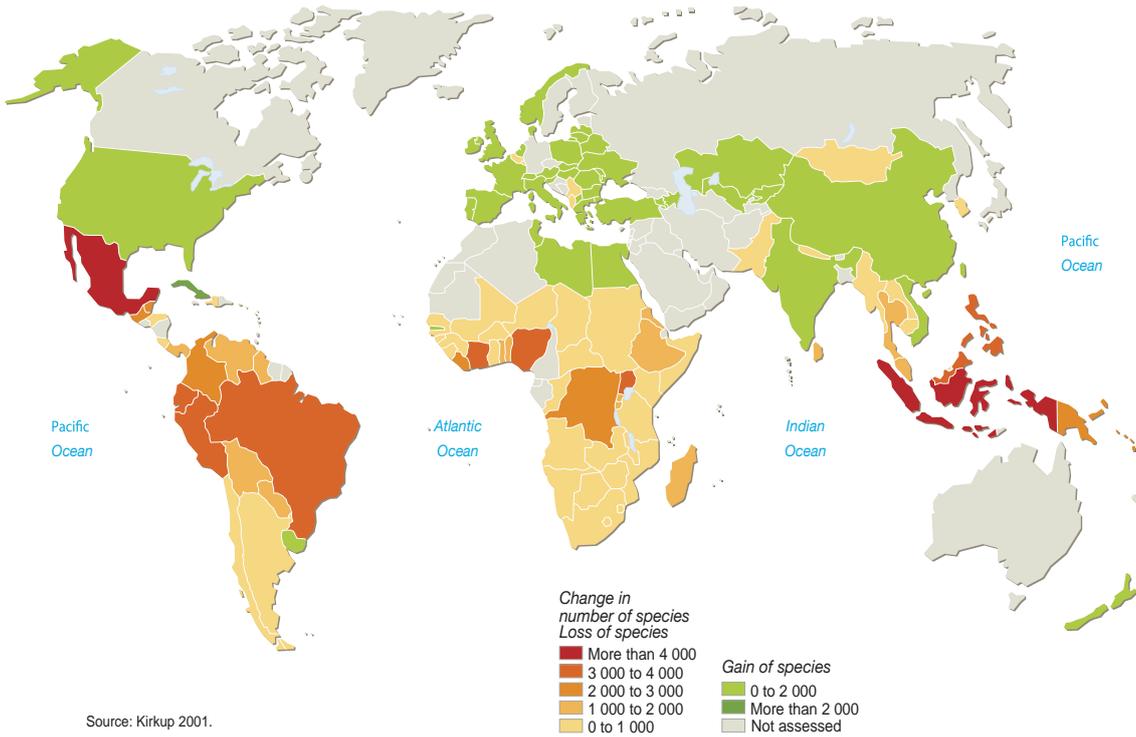
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 49 Reproduced here with permission.

Changes in area covered by forest, 1990-2005



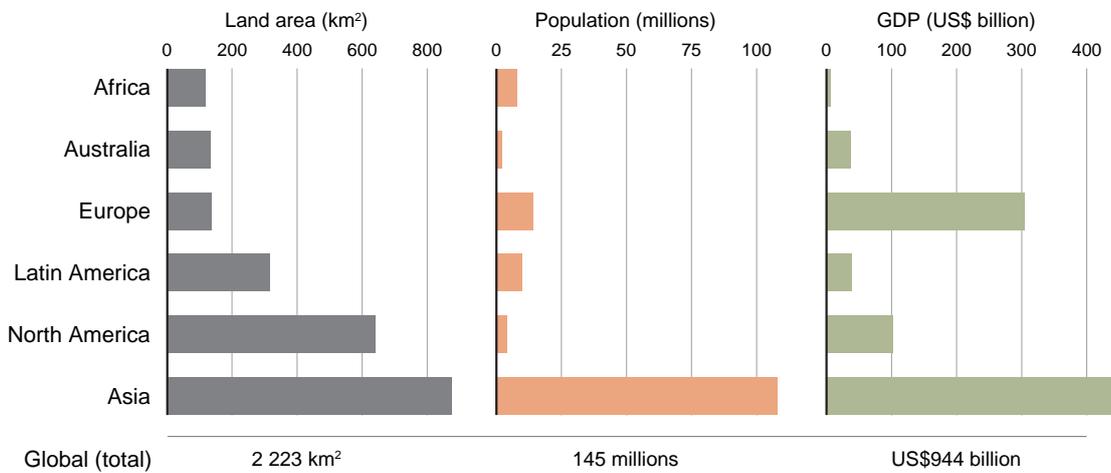
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 12. Reproduced here with permission.

Estimated loss of plant species, 2000-2050



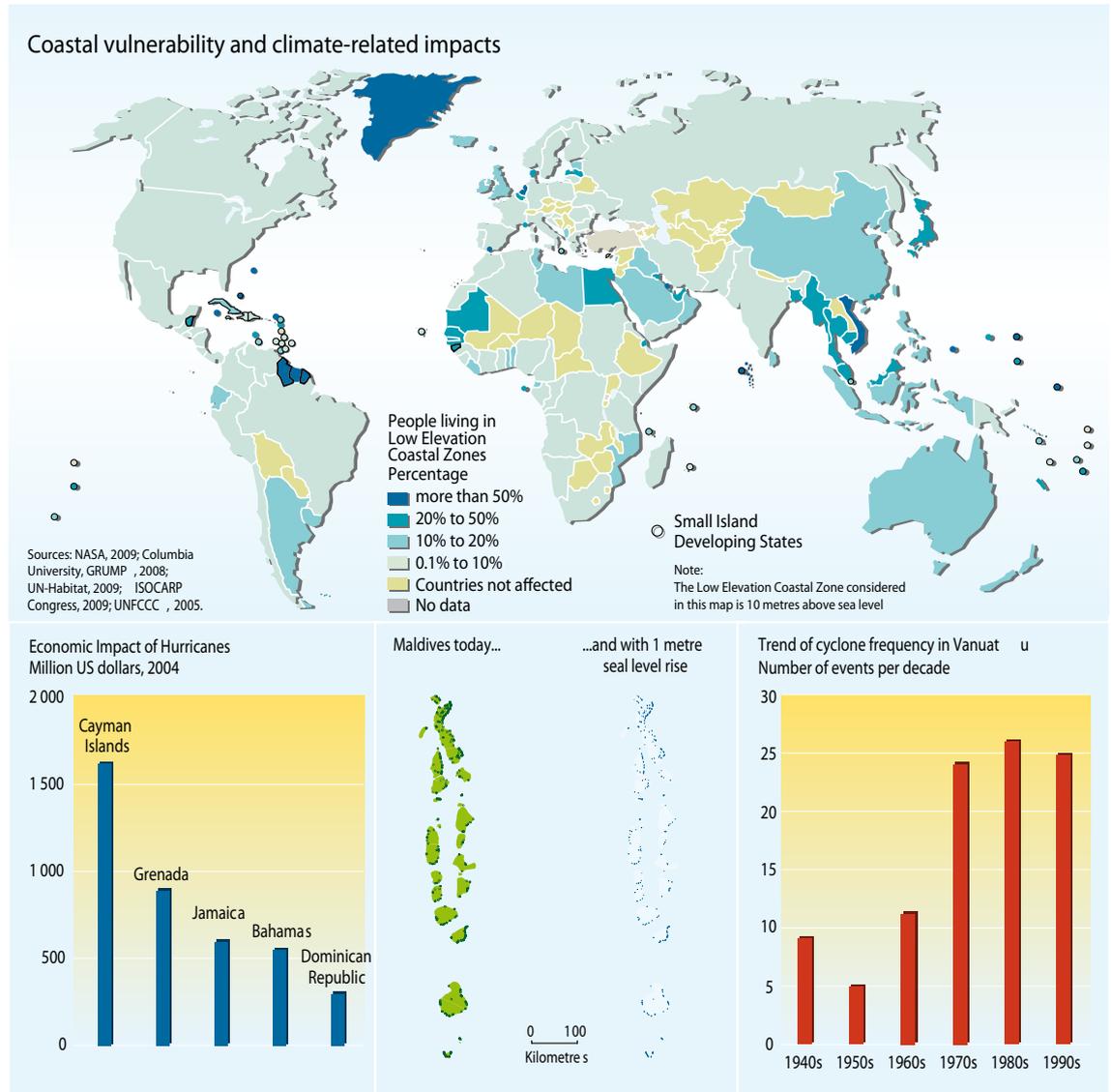
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 35. Reproduced here with permission.

A 1-meter sea level rise



Population, area and economy affected by a 1 m sea level rise (global and regional estimates, based on today's situation). (June 2007). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:35, June 11, 2011 from <http://maps.grida.no/go/graphic/population-area-and-economy-affected-by-a-1-m-sea-level-rise-global-and-regional-estimates-based-on->. Reproduced here with permission.

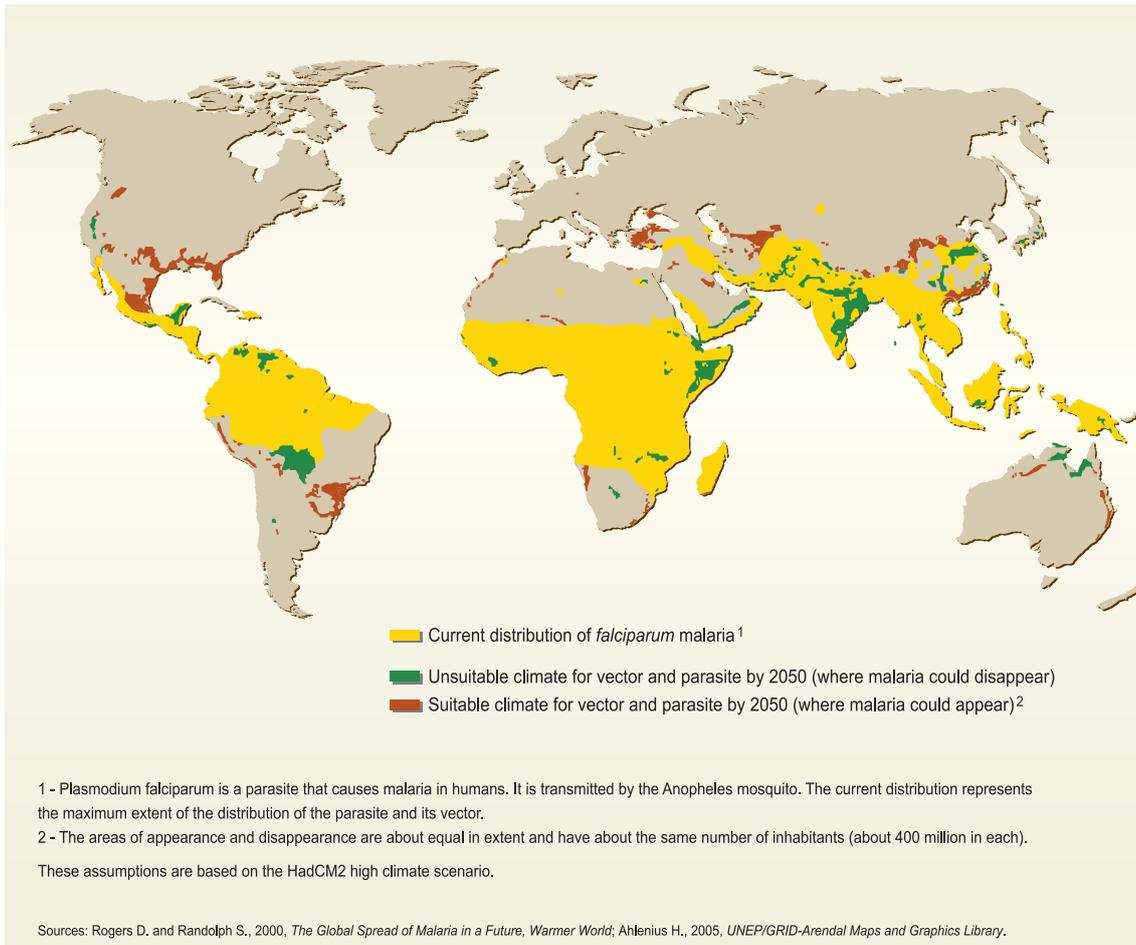
Coastal vulnerability and climate-related impacts



Source: UNEP/GRID-Arendal and CICERO (n.d.) Many Strong Voices - Turning Vulnerability into Strength, p. 14. Reproduced here with permission.

↓ Malaria by 2050

Malaria by 2050



Source: European Environment Agent.  
<http://www.eea.europa.eu/data-and-maps/figures/malaria-in-2050>  
 © European Environment Agent

## Section B: Climate Change Impacts in Asia

### Intergovernmental Panel on Climate Change (IPCC) Information

Glacier melt in the Himalayas is projected to increase flooding, and rock avalanches from destabilised slopes, and to affect water resources within the next two to three decades. This will be followed by decreased river flows as the glaciers recede.

Freshwater availability in Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease due to climate change which, along with population growth and increasing demand arising from higher standards of living, could adversely affect more than a billion people by the 2050s.

Coastal areas, especially heavily-populated megadelta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some megadeltas, flooding from the rivers.

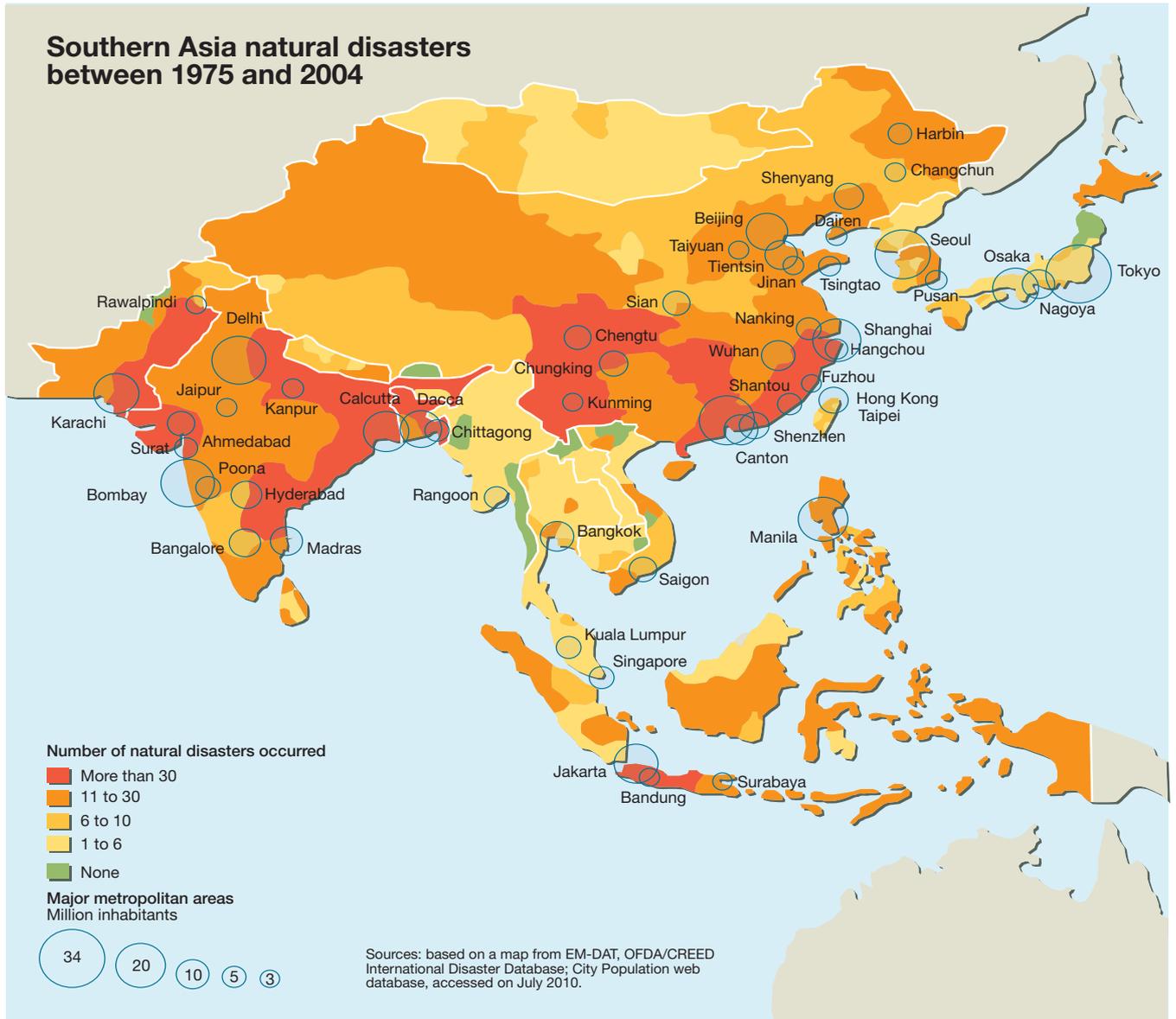
Climate change is projected to impinge on the sustainable development of most developing countries of Asia, as it compounds the pressures on natural resources and the environment associated with rapid urbanisation, industrialisation, and economic development.

It is projected that crop yields could increase up to 20% in East and South-East Asia while they could decrease up to 30% in Central and South Asia by the mid-21st century. Taken together, and considering the influence of rapid population growth and urbanisation, the risk of hunger is projected to remain very high in several developing countries.

Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and South-East Asia due to projected changes in the hydrological cycle associated with global warming. Increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p 13. Cambridge University Press. Reproduced here with permission.

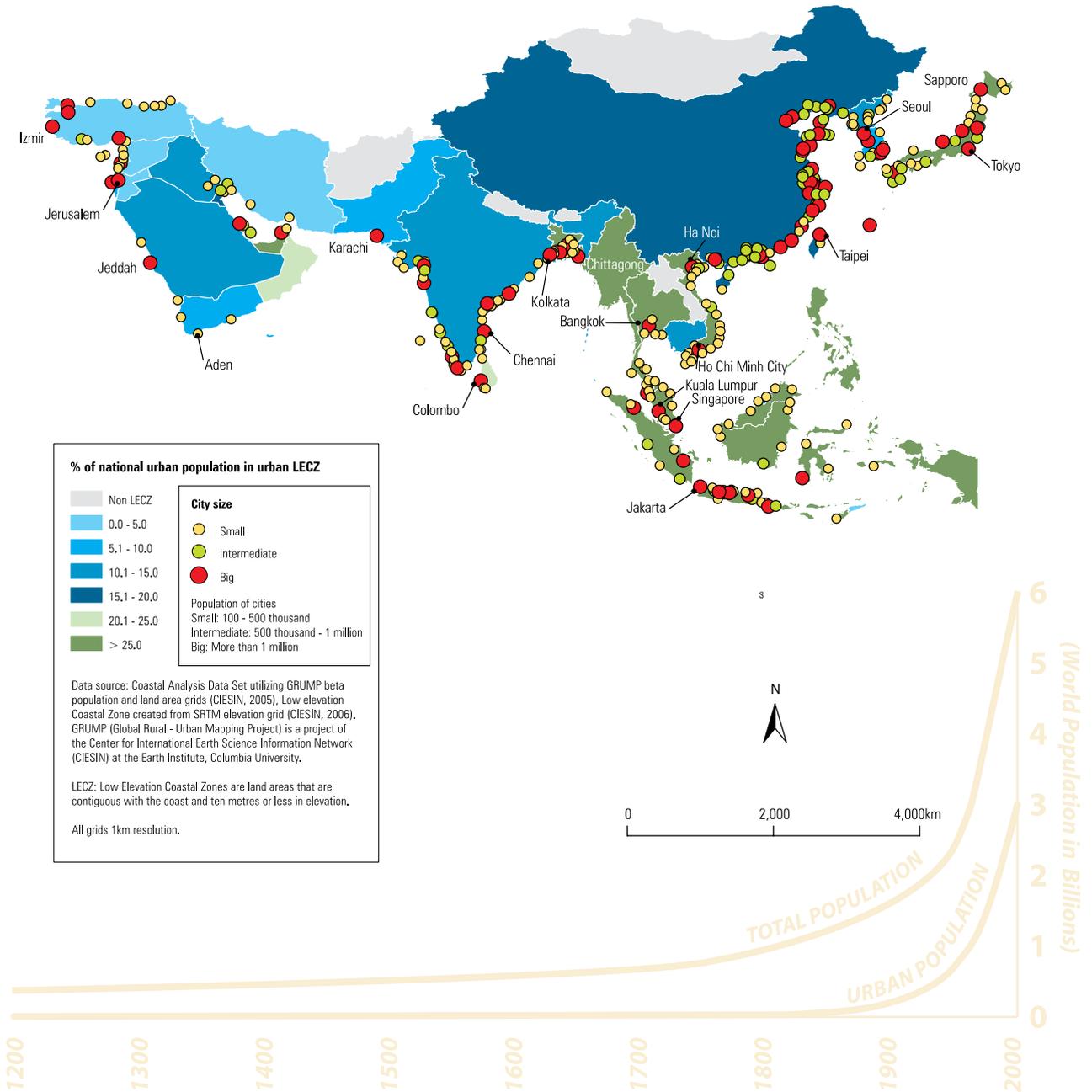
↓ Southern Asia natural disasters between 1975 and 2004



Source: Southern Asia natural disasters between 1975 and 2004. (2010). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 13:28, June 15, 2011 from <http://maps.grida.no/go/graphic/southern-asia-natural-disasters-between-1975-and-2004>. Reproduced here with permission.

↓ Drowned and dangerous: Cities and climate change in Asia

ASIAN CITIES AT RISK DUE TO SEA-LEVEL RISE



Source: UN-HABITAT(2008). *State of the World Cities 2008/9*.

## Section C: Glimpses into Climate Change Policies in Asia

### Energy-related National Policies

Table 1: Energy Efficiency Policies in Selected Asian Countries

Policy Type	East Asia					South east Asia						South Asia	
	China	Hong Kong	Japan	The Republic of Korea	Taiwan	Indonesia	Malaysia	The Philippines	Singapore	Thailand	Vietnam	India	Sri Lanka
Country Strategy	√		√	√			√	√		√		√	
National energy policies	√		√		√	√	√				√	√	√
Regulatory instruments	√		√	√	√			√		√		√	
Energy audits			√		√					√		√	
Energy conservation fund			√							√			
Financial incentives			√	√	√		√	√		√	√	√	
Tax incentives			√	√			√	√	√				
Energy performance standards	√		√	√	√		√	√		√			
Mandatory product labels			√	√				√		√			
Voluntary product labels	√	√	√	√	√	√			√	√	√	√	√

Source: Institute for Global Environmental Strategies (IGES) (2008). *Climate Change Policies in the Asia-Pacific: Re-uniting Climate Change and Sustainable Development*. IGES White Paper II, p. 232. Reproduced here with permission.

**Table 2: Renewable Energy Targets of Selected Asian Countries**

Country	Target
Bangladesh	10% electricity share by 2020
China	15% primary energy by 2020 (already exceeded existing target of 10GW of wind capacity plans new large scale “wind power bases” in six provinces that can generate 100GW new wind capacity by 2020)
Chinese Taipei (Taiwan)	10% of electricity by 2010
India	Increased target to 14GW of new renewable capacity by 2012
Indonesia	9.5GW of geo-thermal by 2025
Japan	New targets for 14GW of solar PV by 2020 and 53GW by 2030
Philippines	4.7GW total capacity by 2013
Singapore	50
South Korea	New primary-energy share 6.1% by 2020 and 11% by 2030
Thailand	8% by 2011

Source: REN21, 2009 *Renewables Global Status Report*; REN21, 2007 *Renewables Status Report*, taken from: Institute for Global Environmental Strategies (IGES) (2010). Sustainable Consumption in the Asia-Pacific Region: Effective Responses in a Resource Constrained World. IGES White Paper III, p. 202. Reproduced here with permission.

## United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme)

As of July 2011 there are four UN REDD Programme partner countries in the Asia-Pacific region that have been allocated funding for National UN-REDD Programmes.

Web links for each are given below. Excerpts from the UN-REDD Viet Nam Programme are included below.

- **Cambodia**  
<http://www.un-redd.org/AboutUNREDDProgramme/NationalProgrammes/Cambodia/tabid/6896/Default.aspx>
- **Indonesia**  
<http://www.un-redd.org/UNREDDProgramme/CountryActions/Indonesia/tabid/987/language/en-US/Default.aspx>
- **The Philippines**  
<http://www.un-redd.org/AboutUNREDDProgramme/NationalProgrammes/Philippines/tabid/6897/Default.aspx>
- **Viet Nam**  
<http://www.un-redd.org/UNREDDProgramme/CountryActions/VietNam/tabid/1025/language/en-US/Default.aspx>

### Box 1. What is REDD+?

Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. “REDD+” goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

Excerpts from the UN -REDD website. For further details, visit at <http://www.un-redd.org/AboutREDD/tabid/582/Default.aspx>

### UN-REDD Viet Nam Programme

The UN-REDD Viet Nam Programme started in August 2009. It aims to contribute to the outcomes and outputs formulated under the One UN Plan, in particular to Outcome 3: Economic growth takes into account environmental protection and rational use of natural resources for poverty reduction.

Specific objective of the Programme is to strengthen institutional and technical capacity of relevant MARD organizations at central, provincial and local levels to ensure that by the end of 2012 Viet Nam is REDD-ready and also to contribute to reducing emissions from deforestation and forest degradation.

The Programme’s interventions comprise three components:

**Component 1:** Improve technical and institutional capacity for national coordination to manage REDD activities in Viet Nam

**Component 2:** Improve capacity to manage REDD and provide other Payment for Ecological Services at district-level through sustainable development planning and implementation

**Component 3:** Establish cooperation on information on information and experiences sharing on REDD implementation in the Lower Mekong Basin, especially among the four countries selected under the Forest Carbon Partnership Facility (Cambodia, Lao PDR, Thailand, and Viet Nam)

Source: Excerpts from *UN-REDD Viet Nam Programme: Getting REDD+ Ready*. Reproduced here with permission

## National Adaptation Programmes of Action on Climate Change (NAPAs)

National adaptation programmes of action (NAPAs) from the following Asian countries are also available from the UNFCCC website <[http://unfccc.int/cooperation\\_support/least\\_developed\\_countries\\_portal/submitted\\_napas/items/4585.php](http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php)>

- Afghanistan
- Bangladesh
- Bhutan
- Cambodia
- Lao People's Democratic Republic
- Nepal

### Box 2. What are NAPAs?

National adaptation programmes of action (NAPAs) provide a process for Least Developed Countries (LDCs) to identify priority activities that respond to their urgent and immediate needs to adapt to climate change – those for which further delay would increase vulnerability and/or costs at a later stage.

Excerpts from UNFCCC website.  
For further details, visit: [http://unfccc.int/national\\_reports/napa/items/2719.php](http://unfccc.int/national_reports/napa/items/2719.php)

### Urgent Needs for Climate Change Adaptation in Lao PDR

In Lao PDR there are four main sectors which are directly and severely affected by climate change: agriculture, forestry, water and water resources, and public health. In this regard, the GoL NAPA Working Group identified needs and priority activities for climate change adaptation in four main sectors. These needs are prioritised in the following sections and have been divided into priority one, most urgent and priority two, less urgent groups.

#### Agriculture - Priority One:

- Strengthen the capacity of the National Disaster Management Committees.
- Promote secondary professions in order to improve the livelihoods of farmers affected by natural disasters induced by climate change.

#### Forestry - Priority One:

- Continue the slash and burn eradication programme and permanent job creation program.
- Strengthen capacity of village forestry volunteers in forest planting, caring and management techniques as well as the use of village forests.

#### Water - Priority One:

- Awareness raising on water and water resource management.
- Mapping of flood-prone areas.

#### Public Health - Priority One:

- Improve systems for the sustainable use of drinking water and sanitation with community participation in flood and drought prone areas.
- Improve knowledge and skills of engineers who design and build water and sanitation systems.

Source: Excerpts from Lao People's Democratic Republic's National Adaptation Programme of Action to Climate Change (April 2009), pp. 42-43. Reproduced here with permission.

## Section D: Climate Change Impacts – Case Studies

### Displacement due to Environmental Challenges in Central Asia – Kazakhstan, Kyrgyzstan and Tajikistan

The environmental challenges facing Central Asia include the industrial legacies of the former Soviet Union – contaminated land and pollution of soils and rivers. The area is also prone to earthquakes and landslides and it is anticipated that the melting of mountain glaciers will increase the frequency of floods and mudslides. The area has already seen significant changes in water usage. By 1991, for example, the level of the Aral Sea had fallen by about 15 metres, its surface area had been halved and its volume reduced by two-thirds.

Nowhere better exemplifies the inter-twining relationship between environmental degradation, climate change and migration than the Ferghana Valley. The Valley has a complex history, unclear property rights over the land and access to water, a varied ethnic mix and an extensive list of present or potential environmental threats. There are an estimated 10.5 million people living in the Ferghana Valley, and a significant part of this population may potentially be affected by forced migration.

Migration patterns in the Valley involve internal migration, crossborder migration among the three nation-states sharing the Valley and migration out of the Valley into other regions or countries. In the southern provinces of Kyrgyzstan, the population is regularly affected by natural disasters and entire communities are often displaced and in need of resettlement to safer areas. There are also significant population and refugee movements from an increasingly unstable Uzbekistan into the south of Kyrgyzstan.

Border regions between Uzbekistan, Tajikistan and Kyrgyzstan (where most pastures and grazing areas are located) are becoming a place of tension. A shortage of land for newcomers (and subsequent pressure on forests) increases environmental impacts. In addition, about 3,000 earthquakes are registered annually in Kyrgyzstan. Floods and landslides are frequent in the Valley, and their frequency is expected to increase as a result of climate change.

There is an urgent need to:

- secure better data in order to better analyse linkages between environment, migration, economics and security; this will require increased transparency from governmental agencies, harmonisation across countries and an increase in data-collection capacities.
- develop resettlement programmes for areas where public health and livelihoods are at risk
- reduce human vulnerability – i.e. adequately address the needs of victims of slow and fast natural disasters, uphold human rights and provide economic opportunities to settle and integrate elsewhere.
- forecast future flows: this is vital to help governments prioritise scarce budgetary resources.

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This article reflects discussions held at a workshop in March 2008 in Bishkek, Kyrgyzstan on environmental change and migration flows in Central Asia, organised by the OSCE and CEDEM. See [www.bishkek2008.org](http://www.bishkek2008.org)

Source: *Forced Migration Review*, Issue 31, October 2008, pp. 14-15. <http://www.fmreview.org/climatechange.htm>

## Marjorie — Filipina Shell Fisher in Warm Waters

The first thing that struck her was the space: on the island of Zaragoza, everything seemed enormous, so much sky and light, so many trees. Marjorie had spent her first five years in a slum in Cebu City, the capital of Cebu Island, in the southern Philippines. There, she had lived in a dark room where the only window was a television. Her father had been born there, and her mother had arrived a few years before, leaving behind that island, where life seemed too narrow. But the city was no better: he worked whenever he could in a hollow blocks factory and she did whatever jobs came her way — in a furniture store, in a tiny popular eatery — but there was never enough money. The city was too expensive, because they had to pay for everything — water, food, electricity, rent. On the island, on the other hand, they could build a cabin, plant corn, cassava, bananas and, mostly, fish: the sea promised food.

In 1996, they moved. Months later, when her mother asked her if she wanted to go back to the city, Marjorie was frightened by the mere question and said no, there was no way she wanted to go back. She liked her life on the island. She liked running around all day, playing with her cousins; she even liked it when they laughed at her because she couldn't swim like them: they had always played in these crystal clear blue waters. She liked it even more when, at low tide, they waited for her to teach her how to swim and laugh together.

The island of Zaragoza is separated from the coast of Southern Cebu by one kilometre of sea and coral. The island is a 170-hectare piece of stony land with wooden houses, sparse vegetation and amazing bougainvillea. The 300 families who live on the island have managed to domesticate it, planting gardens and raising pigs and chickens. But the Islanders' main occupation has always been fishing: sardine, danggit, tuna, mackerel, squid and so many others that the men would bring in every morning or afternoon, which the women would sell at the market in Badian, the town on the other side of the water.

On the island — where it is uncommon for a woman to have fewer than six or seven children — Marjorie's parents had more kids. Marjorie started elementary school and, like all the children, soon would go out fishing with her father. Her father and her grandfather would toss the net off of what the locals call bancas, narrow canoes with a rocker on each side. Then her father would dive in the water to scare the fish into the net. From the banca, Marjorie would help them pull in the net. For her it was more fun and play than work: fishing was for men.

But things were getting harder. There were more and more fishermen competing for the catch. And the older folks noticed that the water was warmer and, as a result, the seaweed that the fish used to eat was drying out. That meant that fewer fish were able to find food in the waters surrounding the island. Specialists say the rise in the temperature of ocean waters is one of the most striking effects of climate change. But even before they had heard of global warming, the fishermen from Zaragoza knew that something was going on. It was even harder to make ends meet: many families could no longer afford to eat three times a day and some had to ask their children to help out.

- » One day, when I was 13, my mother asked me if I could start fishing more seriously, as if it were a job.
- » **How did you feel then?**
- » I was happy, because I had noticed the hard times we were going through, and I knew I could help to catch more fish. The problem was one year later, when my mother told me that things were worse and I had to leave school, so I could work more and save the costs of studying.

Marjorie's school is public, and there are no fees for public schools in the Philippines: when she speaks of the costs of studying, she is referring to notebooks, pencils, and the occasional book that her cousins couldn't lend her. For two years, Marjorie and her mother went out fishing in one banca every day while her father and younger brother went out in another. To get just as much as before, if not less, it was necessary to work harder.

- » **Who would get more fish, you and your mother or them?**
- » They would, because they went to the deeper parts.
- » **Why didn't you go to the deeper parts?**
- » Because the net would be very heavy there, it's more appropriate for the men.

After a time, Marjorie was able to catch enough alone so that her mother could stay home and take care of the other six children. During the day, she would go out to fish sea shells: in good times, the Islanders only fished them for their own consumption, but lately they had come to represent an important source of income. Marjorie fishes sea shells in the same way her ancestors did for centuries: the only difference is that she wears a tiny pair of goggles when she dives into the coastal waters to look for the animals hiding in the coral or buried in the sand. She also has a string tied to her waist, whose other end is tied to the bow of her small banca. If she works constantly for five hours, diving in and out of the water time and again, she can, on a good day, earn 50 Philippine pesos, or about one dollar.

- » **Are you ever afraid in the water?**
- » Sometimes I am. When the water is not clear I imagine that there may be a shark or an eel.
- » **Are there sharks here?**
- » Yes.
- » **Do they kill people?**
- » We've heard a lot of stories.

All the time in the water could however not make Marjorie forget about school. Her cousins had already graduated and Marjorie thought that she would never be able to finish, that she had missed her one chance.

- » I really wanted to go, because once I graduate I will be able to help my parents send my other siblings to school, says Marjorie, shedding a few tears that she tries to hide.

Last year she and her mother had a serious conversation: Marjorie promised that, if her mother let her go back to school, she would not neglect her work; in fact, she would work a little more to pay for school supplies. Her mother agreed, and Marjorie has finished a whole year. Now she is about to begin her second to last year of school.

- » I'm just so excited at the thought of finishing school. I was supposed to graduate two years ago, and now I'm afraid that I won't be able to make it.

Marjorie works hard. During the season of small fish, she goes out at night in a larger boat; the only one that can carry the large nets needed to catch those fish. There, Marjorie is an employee who gets a share of the money — and who works, of course, at the same pace as the others. But in recent years it's gotten harder to catch these fish: they always used to come in the summer, when it was dry and hot, but now it rains in the summer too and the small fish flee to the open sea: another side effect of climate change, says Isyang, Marjorie's aunt and the captain of the boat. It is not the only one: before, the Islanders used to plant corn in the rainy season; now, since they never know when the rainy season will be, they plant when it has rained two or three days in a row. But they never know: oftentimes, the rains stop and the plants die. They can no longer get salt from the sea, another of their resources; the salt is ruined if it gets wet during the drying process. Hence, the Islanders' income has been infringed upon from all directions.

So, in search of fish or sea shells, Marjorie often goes out alone in her banca. And every morning, at seven, she sails to the high school in Badian. If she has been fishing all night, all she has time to do is to stop by her house and pick up her stuff. Those days, she gets everything ready in advance, to save time. Other days she comes home earlier, at around one in the morning, and sleeps for a while. Marjorie tries to be organized to take full advantage of her time, but some things she cannot control: like that day, a few months ago, when her banca was capsized by winds that eventually brought in a typhoon. Marjorie was really scared but somehow managed to swim back to the coast; then she went home to change and rowed her way to school again. Marjorie really wants to graduate.

- » If I don't, people will assume that I don't know anything and I won't be able to work in the city.
- » **So you want to go the city? Your mother went there and came back.**
- » Well, that's why I need to study. And I want to go because I want to work there. If here on the island there were fish like before, I would stay, because people lived well

here. But now, with the climate change, it's impossible to make a living here.

- » **What kind of work do you imagine yourself doing?**
- » I want to be a soldier.

Marjorie says that since she was a child she has liked the independence boys have, and that she wants to be able to make her dream come true.

- » I don't like what they call feminine work. I like the way soldiers are trained and I feel that I can do it as well.
- » **Soldiers are trained to kill people, and sometimes they do. If you were a soldier and had to kill somebody, what would you do?** Marjorie laughs discretely and shyly. Marjorie is always trying not to bother anyone, not to call any attention to herself:
- » Well, I'd be happy if I could shoot before the other person did.
- » **You wouldn't feel any regret?**
- » No, I wouldn't, because I know that if I didn't do it, my mates may be killed by that person.

Marjorie says that, for now, she does not want a boyfriend. She can't see herself carrying around so many children like women on the island do. A small man and father of twelve, Rogelio, the president of the Zaragoza Cooperative, says that having so many children is the ancestors' commandment and it must be respected. If not, the ancestors will get angry, he says. Ysiang counters by saying that the ancestors know nothing about how hard life is now: those were ideas for other times, she says. Marjorie listens in from afar, and smiles. She prefers studying, swimming and fishing with the children from the island to going out with her classmates, "who spend all their time texting and dancing, and I'm not like that." Except when it comes to the cube: recently the Rubik's cube has been all the rage in the Philippines, and even the high school in Badian organized a contest. Marjorie liked the challenge, but she did not have 500 pesos — 10 dollars — to buy the cube, so she had to make do with a generic version that she could afford. That cube was so stiff it was hard to rotate; Marjorie tried everything to loosen it up including oil and shampoo but to no avail. So she started getting to school a little earlier to borrow an original cube from a rich girl in her class who had one. Then the day of the contest came.

- » It was a memorable day for me: I won. No one expected me to win; I didn't expect to win. I won 5 pesos, and I was so happy! I saved the money to buy something I need or want.

That evening Marjorie thought that maybe someday she would be able to finish school, maybe even go on to get a degree afterwards, and live her dream of becoming a soldier, or become a teacher like her mother wants her to, and go to the city. She says that she will miss the island, her family, the sea, the open space. And that if there were just still enough fish around, she would stay. But everyone says that things will not get better — in fact, they will only get worse, she says. And what can a small person like me do, she asks, in the face of something so big?

Source: United Nations Population Fund (UNFPA) (2009). *At the Frontier: Young People and Climate Change*. State of World Population 2009. Youth Supplement. pp. 1-4.  
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## Section E: Climate Change – Case Studies of Positive Action

### Women Organize as Environmental Activists - Women Reduce Disaster Risk by Building Community Action and Resilience – A Case Study of Dasholi Gram Samaj, Chamoli, Uttarakhand, India

This project deals with disaster risk reduction, risk-free development and livelihood issues. Both women and men have been active participants, although women founded the initiative through development activism.

The initiative started in 1976 as a spontaneous non-violent protest against indiscriminate deforestation, which had been resulting in frequent floods and landslides. Women prevented trees from being cut by acting as human shields. This was not a project-driven initiative, but a people-led movement, which has now transformed the way the state and local government looked at forestry and natural resource management. It is an on-going process, now organized in the form of a registered body called the Dasholi Gram Samaj Mandal.

Disaster risk reduction has been integral to the initiative as a core survival concern. The national and federal governments have recognized the Dashol Gram Samaj Mandal as a major community-led environmental conservation movement, but it has yet to be understood and documented as an initiative having far-reaching disaster risk reduction implications.

The movement was initiated in Dasholi village of Chamoli district of the then undivided state of Uttar Pradesh. The women of Dasholi Gram then mobilized women's groups from neighbouring villages. Chamoli district now falls in Uttarakhand, the hill state carved out in 2000. The initiative later spread to other districts in the region that included Uttarkashi, Tehri Garhwal and Pauri Gahrwal.

Dasholi Gram Swaraj Mandal is the institution anchoring the endeavor, which now covers issues related to conservation of natural resources - jal, jangal aur jameen or water, forest and land - to reduce disaster risk in the region.

The partners are women's groups from villages that are dependent on the local forest for their essential needs, like water, fodder and firewood. The women, in their roles as providers of essential household and community services, and managers of natural resources, are greatly sensitive to the risk of damage and loss from natural hazards such as earthquakes (the area is in seismic zone 5 with the highest risk regions in the country), cloud bursts, flash floods and landslides.

Women established that natural resource conservation was a matter for community concern, and that the issue demanded action involving men as partners. The initiative introduced fundamental shifts in gender relations due to women's positioning as community leaders. Their actions resulted in the regeneration of the forest, a reduction in the drudgery borne by the village women, and less land damage from floods and landslides.

Source: UN/ISDR (2008). *Gender Perspectives: Integrating Disaster Risk Reduction into Climate Change Adaptation. Good Practices and Lessons Learned* 2008. p. 40.  
Reproduced here with permission.

## Community-based Educational and Partnership Actions – Carbon Neutral Initiatives for Community Empowerment and Climate Change Mitigation in Indonesia (Indonesia, Showcase 2007)

The project intends to promote non-fossil fuels by installing micro-hydro powergenerators to provide alternatives to fossil fuel and local fuel wood. The project is promoted by the Indonesian Institute of Science (LIPI), Bogor Institute of Agriculture and local communities. Micro-hydro generators can supply electricity through the use of abundant water resources flowing in streams that provide water for local paddy land. The schemes match local topographic and climatic conditions as the communities are situated in humid, hilly areas that provide essential conditions for micro-hydro power generation. In addition, by generating electricity in the backyard of the house, the households that manage micro-hydro collectively reduce their electricity bill payments, and the surplus can be invested in productive activities thereby raising income levels and providing savings to send children to schools.

### Economic size

- The community is in a rural area where agriculture is the major source of income. Community members are mainly small scale farmers. A few are engaged in shoe making for infants. The average income ranges around the national poverty line.

### Conflicts of stakeholder interests

- Water resources are abundant as the volume of water flows in paddy land irrigating streams constantly remains high. No conflict is observed over water use. Community members are mainly Muslim and no ethnic or commercial interest conflict is observed.
- As the cost for installing micro-hydro power generators remains high, it is basically impossible for community members to install generators without grant fund provisions by the government or an aid agency. Micro-hydro does not pose any threat to the State Power Company, PLN.
- Micro-hydro options may be favourable to PLN in the long run as it would be very costly to meet the government's target of achieving universal access to electricity across the country particularly in remote rural areas.

### Actor dominance

- The installation of micro-hydro power generators is carried out within the compound of a privately-owned property. There is no administrative procedure that hinders the use of waters flowing adjacent to the private land. The village chief was said to be supportive of the innovative action for experimenting on the first micro-hydro scheme in the community. No actor exercises any power over the decision making process of the individual community members who have decided to install and operate the micro-hydro power generators.

Source: Institute for Global Environmental Strategies (IGES) (2010). *Sustainable Consumption in the Asia-Pacific Region: Effective Responses in a Resource Constrained World*. IGES White Paper III, pp. 122-123. Reproduced here with permission.



United Nations  
Educational, Scientific and  
Cultural Organization



# Regional Resource Pack

→ Europe & North America



UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE IN THE CLASSROOM



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## Overview

This resource pack contains region-specific information to be used as background for classroom lessons and activities. Specific activities that require information from this resource pack are indicated in the classroom activity descriptions. The contents are broken down as follows:

- Section A provides climate change status and predictions relevant to all four regions.
- Section B provides data on the impacts of climate change in Africa.
- Section C provides a selection of regional and national climate change mitigation and adaptation policies.
- Section D provides case studies on climate change impacts.
- Section E provides stories of positive action.

## Section A: Climate Change Emissions and Impacts – The Global Situation

### Intergovernmental Panel on Climate Change (IPCC) Information on Current Knowledge about Future Impacts

#### Freshwater resources and their management

By mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water-stressed areas. In some places and in particular seasons, changes differ from these annual figures.]

Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.

In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.

Adaptation procedures and risk management practices for the water sector are being developed in some countries and regions that have recognised projected hydrological changes with related uncertainties.

#### Ecosystems

The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).

Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.

The progressive acidification of oceans due to increasing atmospheric carbon dioxide levels increases the potential for the skeletons of coldwater coral reefs to dissolve, perhaps already within a few decades. The impacts will be greatest at high latitudes..

## Food, Fibre and forest products

Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3°C depending on the crop, and then decrease beyond that in some regions.

At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase the risk of hunger.

Globally, the potential for food production is projected to increase with increases in local average temperature over a range of 1-3°C, but above this it is projected to decrease.

Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes.

Adaptations such as altered cultivars and planting times allow low- and mid- to high-latitude cereal yields to be maintained at or above baseline yields for modest warming.

Globally, commercial timber productivity rises modestly with climate change in the short- to medium-term, with large regional variability around the global trend.

Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.

## Costal systems and low lying areas

Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas.

Corals are vulnerable to thermal stress and have low adaptive capacity. Increases in sea surface temperature of about 1-3°C are projected to result in more frequent coral bleaching events and widespread mortality, unless there is thermal adaptation or acclimatisation by corals.

Coastal wetlands including salt marshes and mangroves are projected to be negatively affected by sea-level rise especially where they are constrained on their landward side, or starved of sediment.

Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.

Adaptation for coasts will be more challenging in developing countries than in developed countries, due to constraints on adaptive capacity.

## Industry, settlement and society

Costs and benefits of climate change for industry, settlement and society will vary widely by location and scale. In the aggregate, however, net effects will tend to be more negative the larger the change in climate.

The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies.

Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

## Health

- Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity, through:
- increases in malnutrition and consequent disorders, with implications for child growth and development;
- increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts;
- the increased burden of diarrhoeal disease;
- the increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and,
- the altered spatial distribution of some infectious disease vectors.
- Climate change is expected to have some mixed effects, such as a decrease or increase in the range and transmission potential of malaria in Africa.

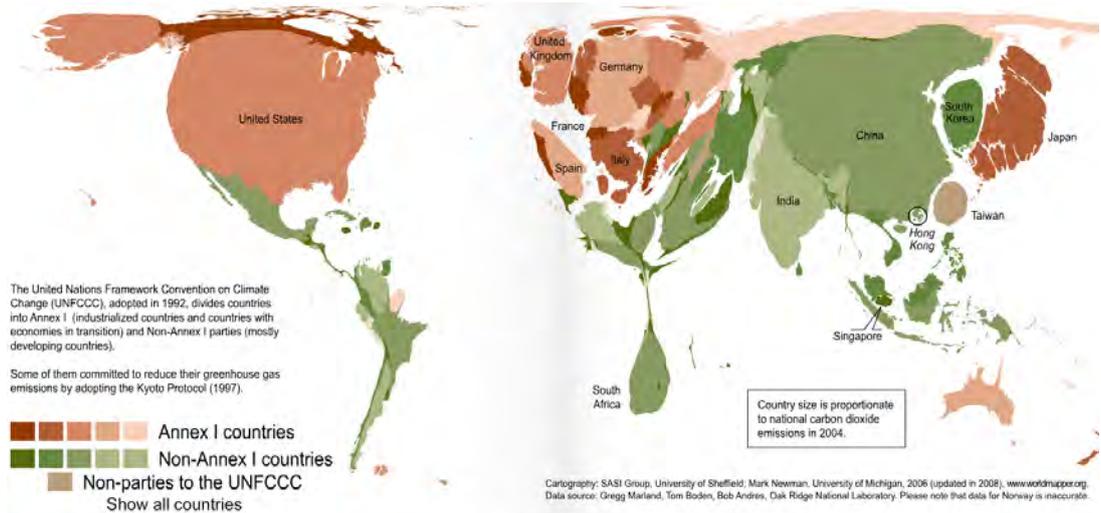
Studies in temperate areas have shown that climate change is projected to bring some benefits, such as fewer deaths from cold exposure. Overall it is expected that these benefits will be outweighed by the negative health effects of rising temperatures worldwide, especially in developing countries.

The balance of positive and negative health impacts will vary from one location to another, and will alter over time as temperatures continue to rise. Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives and infrastructure and economic development.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, pp. 11-13. Cambridge University Press. Reproduced with permission.

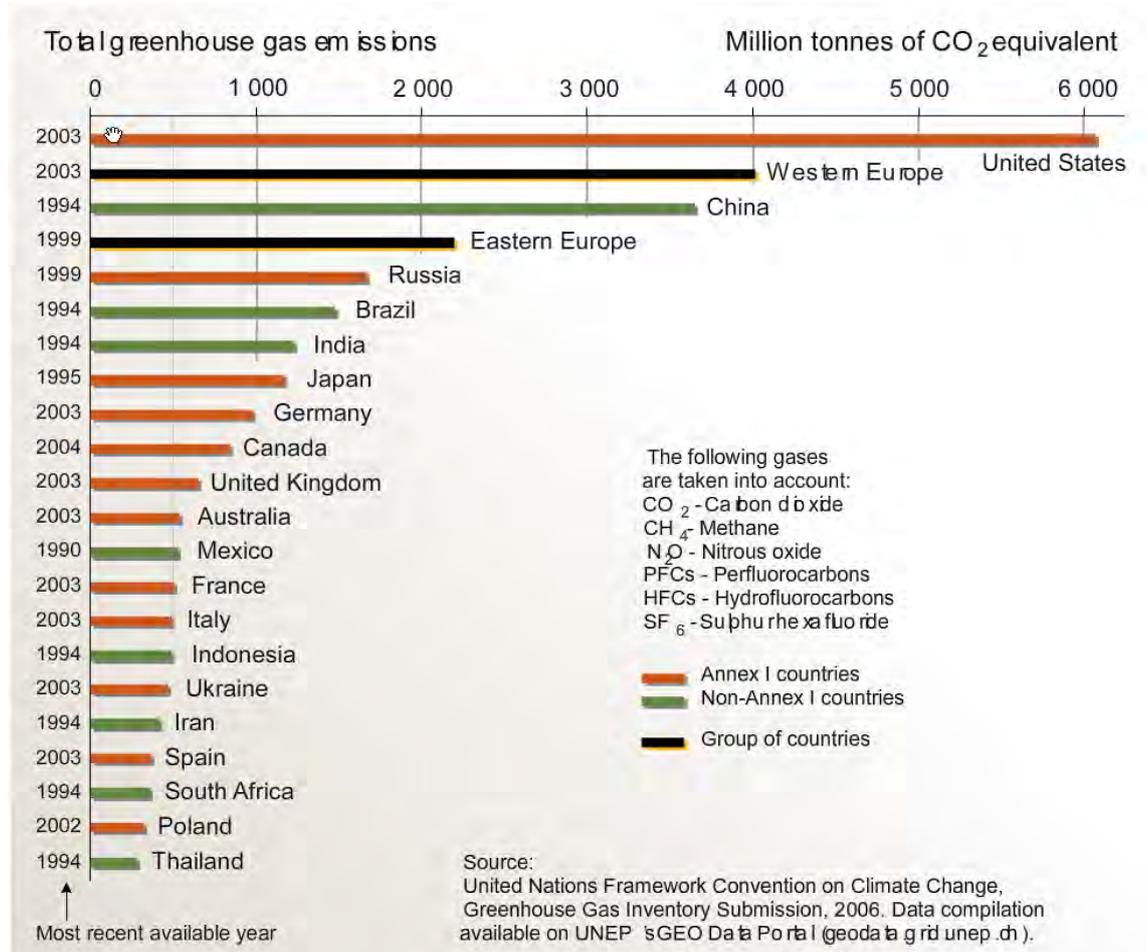
## Climate Change Infographics

### ↓ Total CO<sub>2</sub> Emissions from Fossil-Fuel Burning, Cement Production and Gas Flaring (2009)



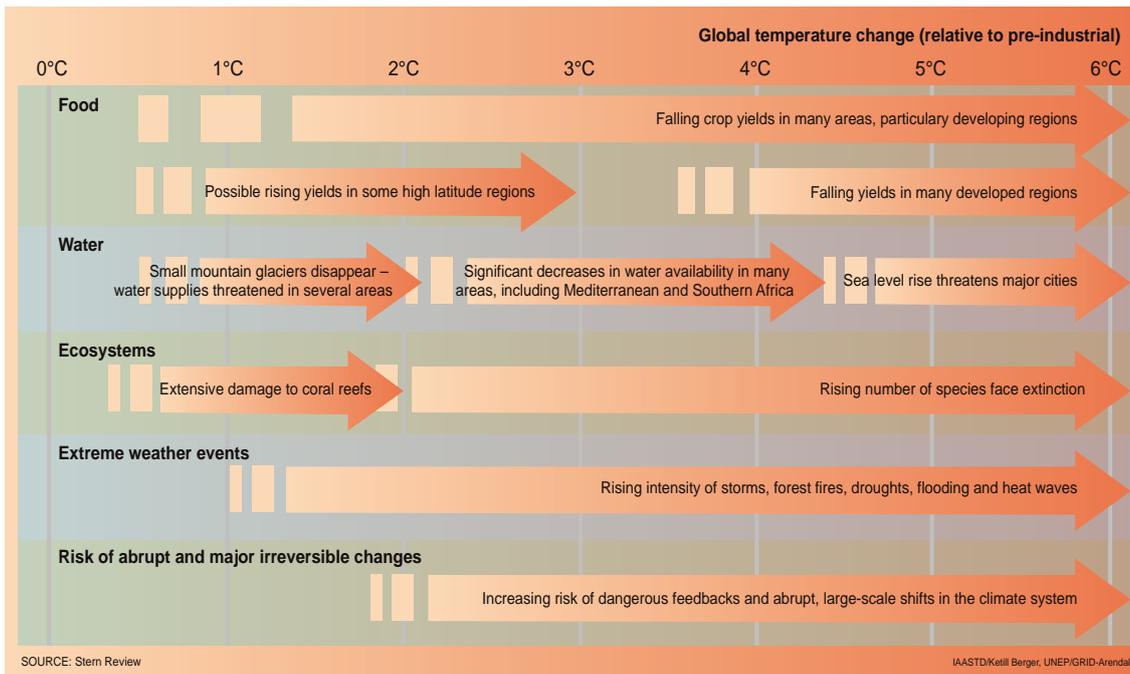
Source: From UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 16:05, June 12, 2011 from <http://maps.grida.no/go/graphic/total-co2-emissions-from-fossil-fuel-burning-cement-production-and-gas-flaring>. Reproduced with permission.

### ↓ Top 20 Greenhouse Gas Emitters (including land use change and forestry)



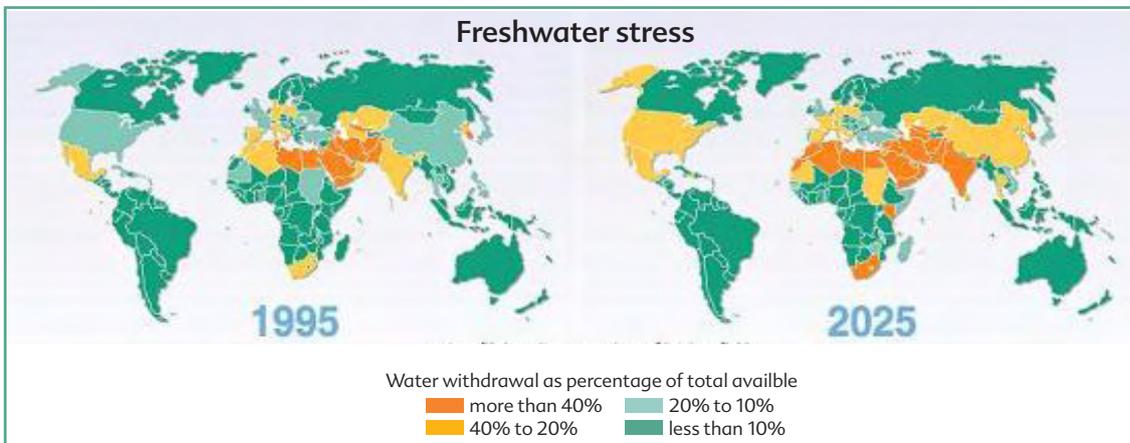
Source: Top 20 greenhouse gas emitters (including land use change and forestry). (2009). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 16:09, June 12, 2011 from. Reproduced with permission.

Projected Impact of Climate Change



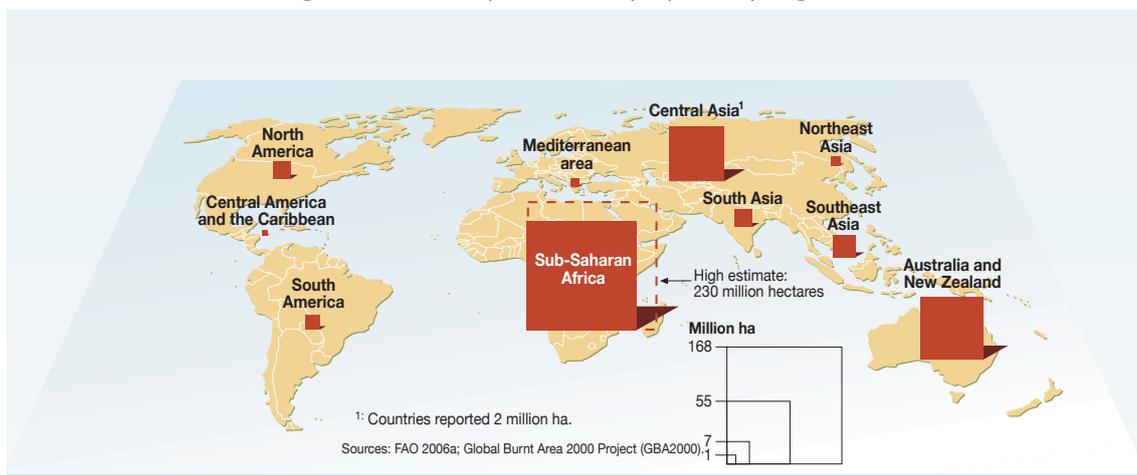
Source: Projected impact of climate change. (2008). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 17:02, June 13, 2011 from <http://maps.grida.no/go/graphic/projected-impact-of-climate-change>. Reproduced with permission.

Freshwater Stress - Comparing 1995 to predictions for 2025



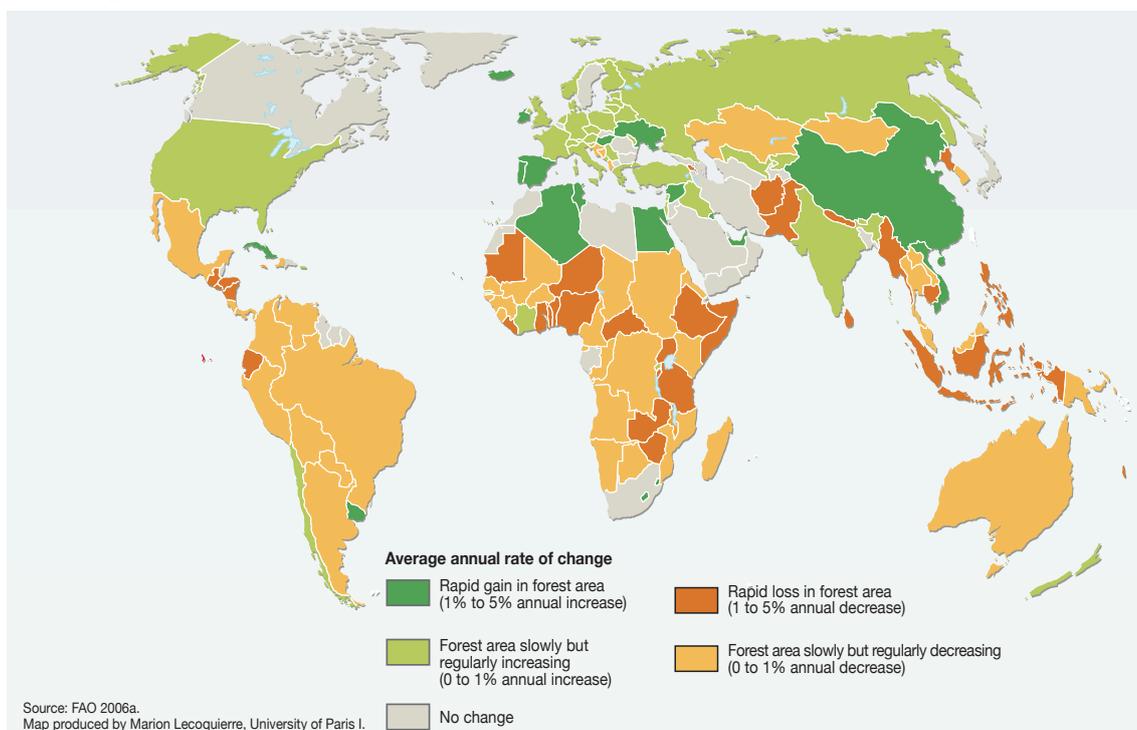
Source: Freshwater stress. (2000). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:41, June 11, 2011 from <http://maps.grida.no/go/graphic/freshwater-stress>. Reproduced with permission.

Estimate of area of vegetation destroyed annually by fire by region



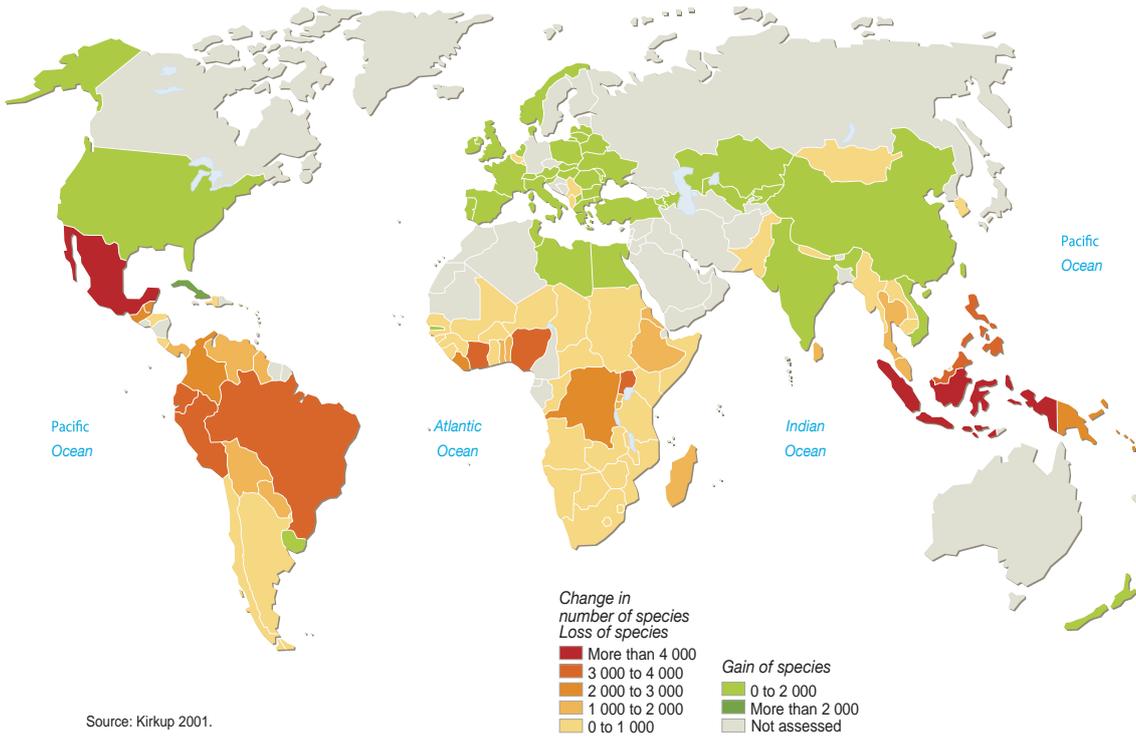
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 49 Reproduced with permission.

Changes in area covered by forest, 1990-2005



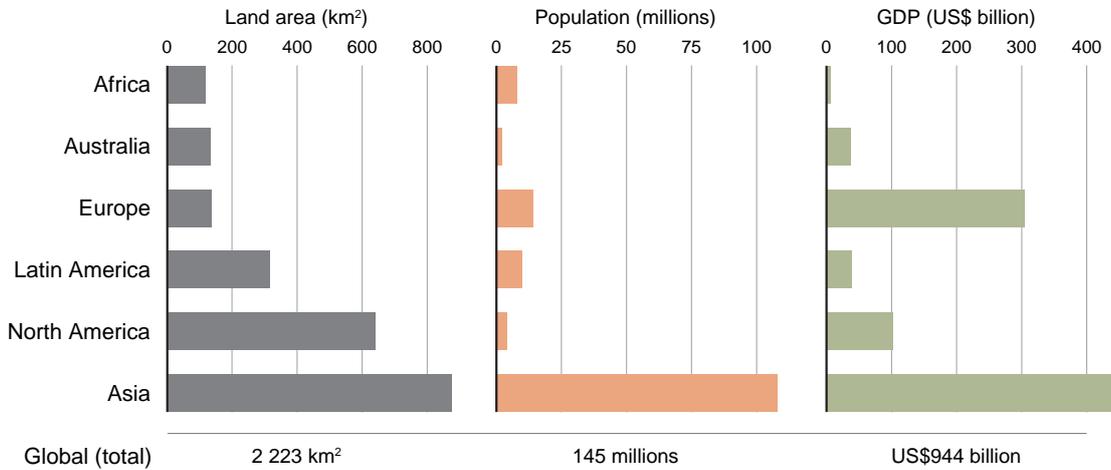
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 12. Reproduced with permission.

Estimated loss of plant species, 2000-2050



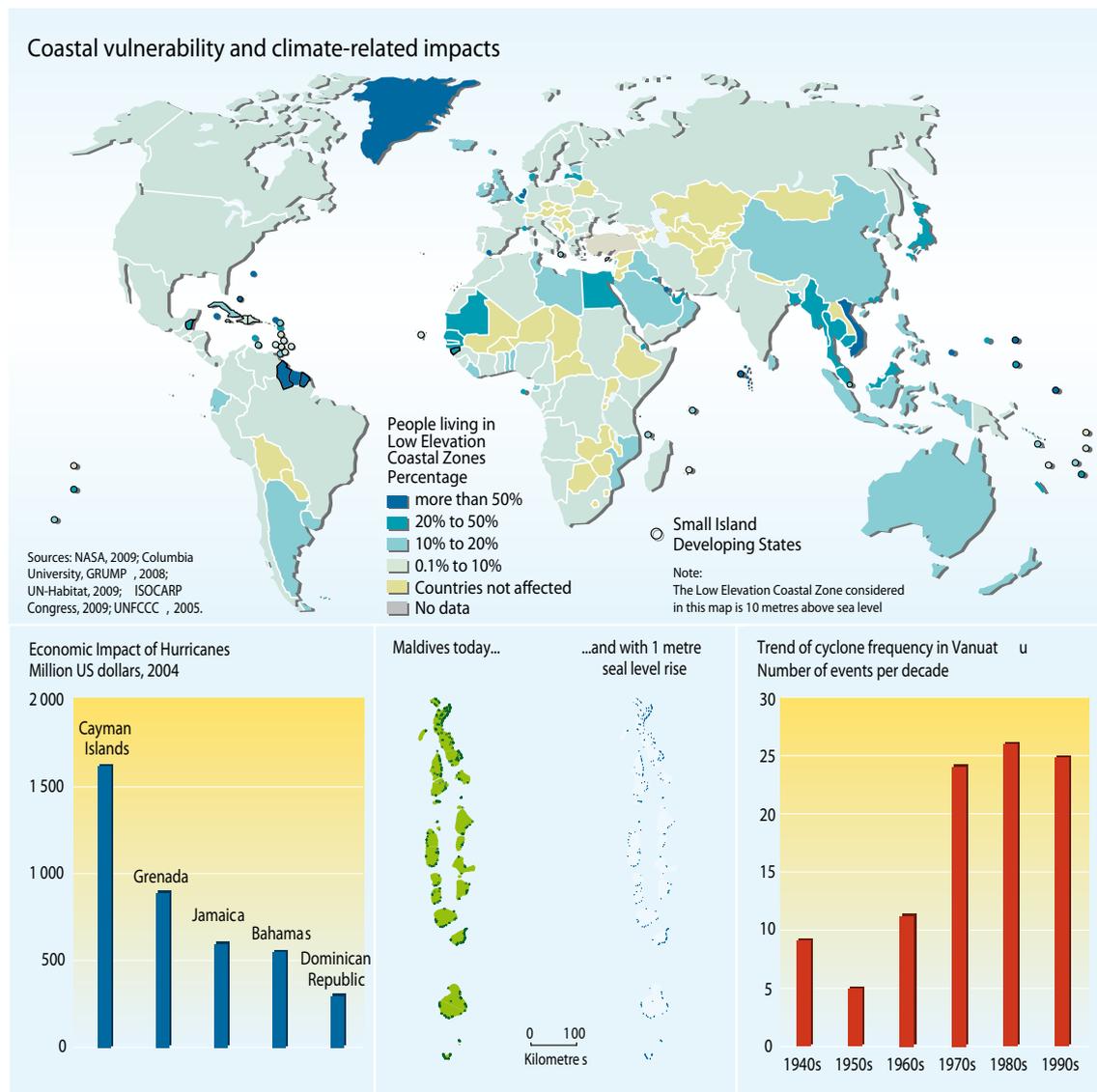
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 35. Reproduced with permission.

A 1-meter sea level rise



Population, area and economy affected by a 1 m sea level rise (global and regional estimates, based on today's situation). (June 2007). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:35, June 11, 2011 from <http://maps.grida.no/go/graphic/population-area-and-economy-affected-by-a-1-m-sea-level-rise-global-and-regional-estimates-based-on->. Reproduced with permission.

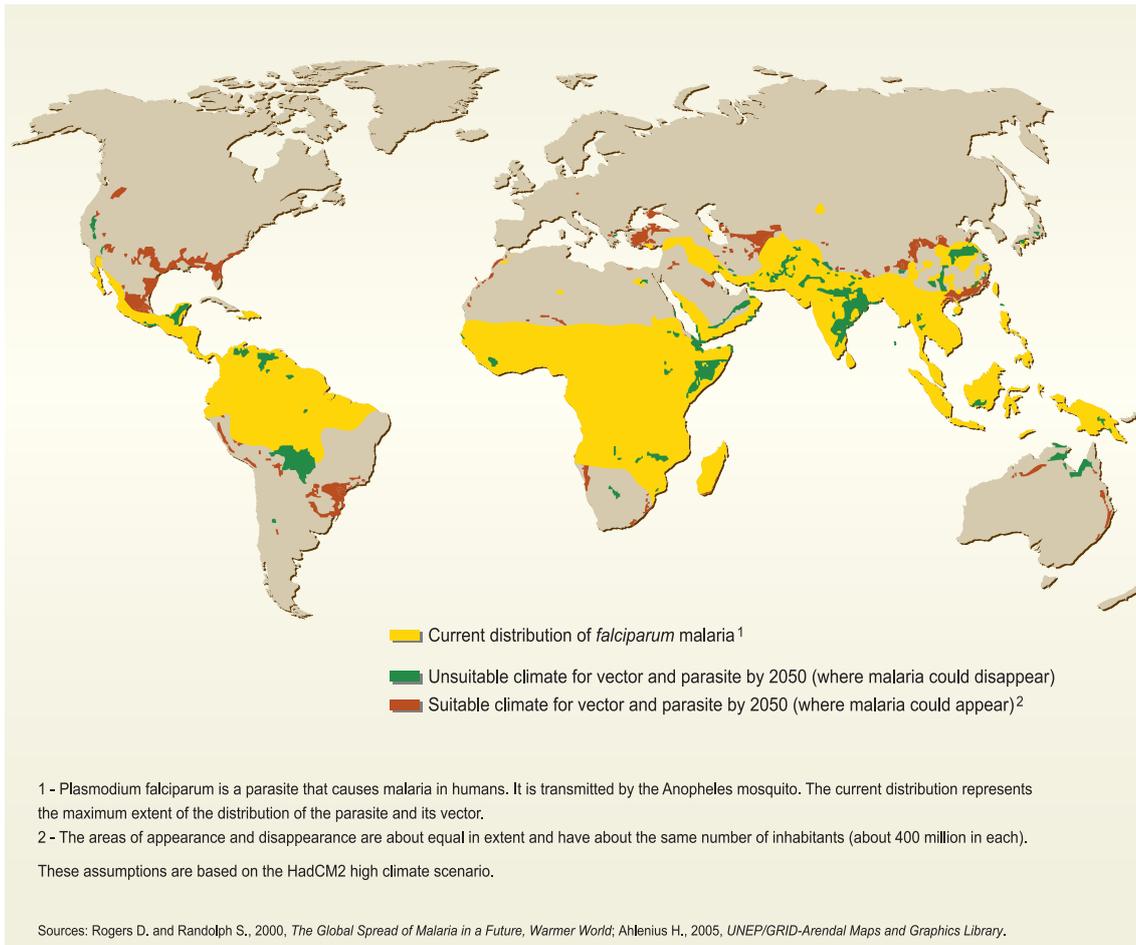
Coastal vulnerability and climate-related impacts



Source: UNEP/GRID-Arendal and CICERO (n.d.) Many Strong Voices - Turning Vulnerability into Strength, p. 14. Reproduced with permission.

↓ Malaria by 2050

Malaria by 2050



Source: European Environment Agent.  
<http://www.eea.europa.eu/data-and-maps/figures/malaria-in-2050>  
 © European Environment Agent

## Section B: Climate Change Impacts in Europe and North America

### Intergovernmental Panel on Climate Change (IPCC) Information

#### Europe

- For the first time, wide-ranging impacts of changes in current climate have been documented: retreating glaciers, longer growing seasons, shift of species ranges, and health impacts due to a heat wave of unprecedented magnitude. The observed changes described above are consistent with those projected for future climate change.
- Nearly all European regions are anticipated to be negatively affected by some future impacts of climate change, and these will pose challenges to many economic sectors. Climate change is expected to magnify regional differences in Europe's natural resources and assets. Negative impacts will include increased risk of inland flash floods, and more frequent coastal flooding and increased erosion (due to storminess and sea-level rise). The great majority of organisms and ecosystems will have difficulty adapting to climate change. Mountainous areas will face glacier retreat, reduced snow cover and winter tourism, and extensive species losses (in some areas up to 60% under high emission scenarios by 2080).
- In Southern Europe, climate change is projected to worsen conditions (high temperatures and drought) in a region already vulnerable to climate variability, and to reduce water availability, hydropower potential, summer tourism and, in general, crop productivity. It is also projected to increase health risks due to heat-waves, and the frequency of wildfires.
- In Central and Eastern Europe, summer precipitation is projected to decrease, causing higher water stress. Health risks due to heatwaves are projected to increase. Forest productivity is expected to decline and the frequency of peatland fires to increase.
- In Northern Europe, climate change is initially projected to bring mixed effects, including some benefits such as reduced demand for heating, increased crop yields and increased forest growth. However, as climate change continues, its negative impacts (including more frequent winter floods, endangered ecosystems and increasing ground instability) are likely to outweigh its benefits.
- Adaptation to climate change is likely to benefit from experience gained in reaction to extreme climate events, specifically by implementing proactive climate change risk management adaptation plans.

#### North America

- Warming in western mountains is projected to cause decreased snowpack, more winter flooding, and reduced summer flows, exacerbating competition for over-allocated water resources.
- Disturbances from pests, diseases and fire are projected to have increasing impacts on forests, with an extended period of high fire risk and large increases in area burned.
- Moderate climate change in the early decades of the century is projected to increase aggregate yields of rain-fed agriculture by 5-20%, but with important variability among regions. Major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilised water resources.
- Cities that currently experience heatwaves are expected to be further challenged by an increased number, intensity and duration of heatwaves during the course of the century, with potential for adverse health impacts. Elderly populations are most at risk. .
- Coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. Population growth and the rising value of infrastructure in coastal areas increase vulnerability to climate variability and future climate change, with losses projected to increase if the intensity of tropical storms increases. Current adaptation is uneven and readiness for increased exposure is low.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, pp. 14-15. Cambridge University Press. Reproduced with permission.

## Key Past and Projected Impacts and Effects of Climate Change for the Main Biogeographical Regions of Europe



Source: IPCC, 2007; EEA.

Source: European Environment Agency.

<http://www.eea.europa.eu/data-and-maps/figures/key-past-and-projected-impacts-and-effects-on-sectors-for-the-main-biogeographic-regions-of-europe-1> © European Environment Agent

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## Section C: Glimpses into Climate Change Policies in Europe and North America

### European Union Policies on Climate Change

#### Climate change mitigation (reduction of greenhouse gases)

Many European countries have adopted national programmes aimed at reducing emissions. Various policies and measures have also been adopted at the EU level through the European Climate Change Programme, for example:

- increased use of renewable energy (wind, solar, biomass) and combined heat and power installations;
- improvements in energy efficiency in e.g. buildings, industry, household appliances;
- reduction of carbon dioxide emissions from new passenger cars;
- abatement measures in manufacturing industry;
- measures to reduce emissions from landfills.

The EU's carbon dioxide Emission Trading Scheme is the cornerstone of EU efforts to reduce emissions cost-effectively.

In March 2007, the EU leaders endorsed an ambitious climate change and energy plan to limit EU greenhouse gas emissions by at least 20 % by 2020 (from 1990 levels) and achieve, by 2020, a target of 20 % of total EU primary energy use through renewable energy.

In January 2008, the European Commission proposed an energy and climate package to achieve objectives of reducing greenhouse gas emissions and boosting renewable energies by 2020:

- Emissions from sectors not included in the EU ETS – such as transport, housing, agriculture and waste – will be cut by 10% from 2005 levels by 2020. Each Member State will contribute to this effort according to its relative wealth, with national emission targets ranging from -20% for richer Member States to +20% for poorer ones.
- For energy-intensive sectors, such as steel and chemicals, the EU will strengthen its emission trading scheme (ETS) to help reach the 20% objective.
- Reducing greenhouse gas emissions will require an increased use of renewable energies, which also implies a more diversified energy supply for Europe.
- Additional emission reductions will be achieved from measures targeting aviation, CO<sub>2</sub> and cars, and carbon capture and storage.
- Following an agreement between the European Council and the European Parliament on the climate and energy package in December 2008, six legislative acts were adopted on 23 April 2009.

#### Adaptation to climate change

Some EEA member countries have prepared National Climate Change Adaptation Strategies or have started preparing these. The European Commission published a Green Paper on 'Adapting to climate change in Europe — options for EU action' in 2007 and a White Paper on adaptation to climate change in 2009 (EU policy on climate change and adaptation).

Source: Excerpts from European Environment Agency, *Climate Change Policies*.  
<http://www.eea.europa.eu/themes/climate/policy-context>. Reproduced with permission.

## Climate Action Plans in the U.S.

Many states have completed comprehensive Climate Action Plans, or are in the process of revising or developing one. The plans detail steps that the states can take to reduce their contribution to climate change. The process of developing a climate action plan can identify cost-effective opportunities to reduce GHG emissions that are relevant to the state. The individual characteristics of each state's economy, resource base, and political structure provide different opportunities for dealing with climate change. However, without targets for emissions reductions, incentives for cleaner technologies, or other clear policies, climate action plans will not achieve real reductions in GHG emissions.

Source: Excerpts from Pew Centre on Global Climate Change  
[http://www.pewclimate.org/what\\_s\\_being\\_done/in\\_the\\_states/action\\_plan\\_map.cfm](http://www.pewclimate.org/what_s_being_done/in_the_states/action_plan_map.cfm)

## Canada's Action on Climate Change

Canada recognizes that climate change is a global challenge requiring a global solution. Canada supports an approach to climate change that achieves real environmental and economic benefits for all Canadians. Given the highly integrated nature of the North American economy, this includes aligning our climate policies with the United States.

The Government of Canada is committed to reducing Canada's total greenhouse gas emissions by 17 per cent from 2005 levels by 2020 - a target that is inscribed in the Copenhagen Accord and aligned with the United States.

To meet this ambitious target, Canada will proceed on three parallel pathways with strong domestic, continental and international action. To this end, we are:

- implementing tough new regulations to limit greenhouse gas emissions from the automotive sector through Environment Canada's Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations
- implementing Renewable Fuel Regulations, requiring an average renewable fuel content of five per cent in gasoline that will come into effect starting December 15, 2010;
- working with the United States to regulate emissions from heavy-duty trucks;
- introducing new regulations on coal-fired electricity generation that will have a significant impact on reducing emissions from the electricity sector, thereby making one of the cleanest electricity systems in the world even cleaner;
- continuing to advance the Clean Energy Dialogue with the United States and collaborate on clean energy research and development, the development and deployment of clean energy technologies and building a more efficient electricity grid based on clean and renewable energy;
- investing in green infrastructure, energy efficiency, clean energy technologies and the production of cleaner energy and cleaner fuels as shown through the Government of Canada's investment of more than \$10 billion since 2006
- providing new investments totaling \$190 million to support a cleaner, more sustainable environment in Budget 2010;
- playing an active and constructive role at the UN climate change talks;
- working constructively to implement the Copenhagen Accord and to complete the negotiations under the UNFCCC for a legally binding post-2012 agreement that is fair, effective and comprehensive; and
- contributing \$400 million in new and additional climate change financing for the 2010-2011 fiscal year as part of Canada's commitment under the Copenhagen Accord to provide our fair share of fast-start financing. The financing will go towards supporting developing countries' efforts to reduce greenhouse gas emissions and adapt to the adverse impacts of climate change, with a focus on three priority areas - adaptation, clean energy, and forests and agriculture.

In April 2007, the Government of Canada announced Turning the Corner, which provided the ground work for Canada's approach to tackling climate change. To ensure the effectiveness of our approach, we are working to realign our policies and regulations in order to maintain economic prosperity while protecting the environment and aligning with the United States.

The Government of Canada supports an approach to climate change that achieves real environmental and economic benefits for all Canadians.

Source: Taken from the website of Environment Canada. *Canada's Action on Climate Change*.  
<http://www.climatechange.gc.ca/default.asp?lang=En&n=72F16A84-0>  
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## Section D: Climate Change Impacts – Case Studies

### Climate Change Witness: Georg Sperber, Germany

I am Georg Sperber from Bavaria, Germany. I have worked as a forester for more than 30 years, and the forests I have worked in have changed over these years. Especially in the past 20 years I have seen changes that were remarkable in their nature and intensity. I believe climate change is the main reason.

You hear a lot about global warming in the media, but out there in the woods you can feel the difference, even without knowing the alarming facts of climate science. The Nineties have been the warmest decade in climate history, and this was obvious to anyone who lives in touch with nature.

**With global warming, Spruce is a tree without future in most parts of Bavaria**

In my forests the consequences for spruce trees are especially dramatic. Spruce is the backbone of the German forest industry, covering 28% of Germany's forests. However, higher average temperatures and more frequent droughts due to climate change weaken these trees.

They are under attack from bark beetle populations, which have massively increased because of the warming. And over past years storms like Vivian, Wiebke and Lothar – probably worse in intensity due to climate change - have wrecked havoc on spruce forests.

Rainfall patterns have also changed significantly. In the Steigerwald forest, rainfall used to peak in spring and early summer when the plants needed the extra water most. But since the Nineties this peak has moved to autumn. All in all the weather has become unpredictable, and the changes affect the forest industry badly. With global warming, spruce is a tree without future in most parts of Bavaria.

The bark beetle is not the only harmful parasite that loves the warmer temperatures. The oak procession moth also spreads heavily and even attacks people with its poisonous hairs, causing painful skin irritations that can last two years. When I studied forestry in the Fifties, the moth was an entomological rarity. But nowadays local authorities in the Mainfranken region are forced to hire fire brigades to battle them. Again and again oak forests – where you find the moth – are sealed off to protect the public. And the fire workers have to wear protective clothing when entering the affected forests.

After I retired 8 years ago, I am out in the woods even more often. Migratory birds always had my special attention, and climate change is also troubling their lives. Each year in spring they return a bit earlier than usual, and they leave much later in autumn. Some Chiffchaffs or Blackcaps don't leave at all these days, but try to stay over winter. Sometimes I see species I would not have seen in the past. I am excited about these encounters, but they also worry me a lot, because they show that things are changing.

Climate change is the biggest challenge mankind is facing. Currently we are about to put a huge burden on the shoulders of our children and grandchildren. We are absolutely aware that we are doing it, but we know that we shouldn't be doing it.

Source: Taken from: WWF *Climate Witness: Georg Sperber, Germany*, [http://wwf.panda.org/about\\_our\\_earth/aboutcc/problems/people\\_at\\_risk/personal\\_stories/witness\\_stories/?uNewsID=51780](http://wwf.panda.org/about_our_earth/aboutcc/problems/people_at_risk/personal_stories/witness_stories/?uNewsID=51780) © 2007WWF (panda.org). Some rights reserved.  
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## Homeless? Shishmaref, Alaska

Story: Renee Kuzuguk

Photograph: ©Patrick Iyatunguk

Did you ever lose your home? Have you been homeless? We are about to lose our homes -- from erosion. Most importantly, erosion eats our Island and we have less land. Erosion happens from our ocean. The ocean takes away land from our Island. It takes away our land by taking sand and moving it someplace else. And when storms come it takes lots of land.



We moved some of our homes from the west side of Shishmaref to the east side. We moved some of our homes because we live in them and if we hadn't moved they would've fallen into the ocean. The ocean takes more land on the west side of Shishmaref than the east side. And this is why we moved our homes.

Finally, workers put out a huge seawall along the beach. They put a huge seawall because the ocean was eating too much land, and they tried to stop it. If we hadn't put the huge seawall up the ocean would've eaten more land. And so it wouldn't catch up to our homes. There was an old seawall, but it sank into the ocean.

After having reviewed all the evidence it's obvious -- my family is the most important thing in my life. And I think everybody in Shishmaref is a family. And I don't want to lose them.

Source: UNEP/GRID-Arendal and CICERO, *Many Strong Voices: Portraits of Resilience*  
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## Greenland with no ice? Uummannaq, Greenland

Story: Michael Jakobsen

Photograph: ©Nina Nielsen

Hi, my name is Michael. I'm sixteen years old I live in Uummannaq and I think this climate change may change the lives of many people of Greenland. I hope someone can do something fast so our way of life will not change.



Because ice has been important for our culture and our lives for many, many years -- hunting, ice roads, dog sledge races -- and people around Greenland have somehow adapted to it. Climate change may affect it all, especially animals, like dogs. What if there won't be any ice left in Greenland, what will happen to them? I wonder if there will be species that will be here or won't be here after climate change, like fishes, birds, seals and whales?

If there were less fish or different fish species because of climate change then the fish factories may have a hard time because fish is one of the most important incomes for Greenland. I hope that we find a way to make things less hard for all. I mean Greenland with no ice? I can't picture it in my head. Climate change will happen slowly but surely. Like it or not it will change. I don't know what will happen but why concentrate on the bad news? Why not some good news, like it may be summer for a whole year?

Luckily this year we have ice. A few years ago, there was no ice. It was boring. I couldn't walk from a settlement to another settlement.

Source: UNEP/GRID-Arendal and CICERO, *Many Strong Voices: Portraits of Resilience*.  
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## Section E: Climate Change – Case Studies of Positive Action

### Energy Efficiency in Churches, Ethics & Energy, Sweden

Photograph: ©Thad Mermer

In 2004, the organisation Etik & Energi (Ethics & Energy) was created to help congregations of all faiths to conserve energy and become more energy efficient. The Lutheran Church of Sweden alone owns more than 20,000 buildings, the majority of which are heated using traditional fossil fuels. There is therefore a potential for energy savings.

#### The aim of the scheme

Working with a network of religious bodies, Ethics & Energy promotes the use of renewable energy, energy efficiency and energy conservation in religious buildings in order to cut costs and protect the environment. By increasing the use of renewable energy sources and decreasing energy consumption levels, churches can minimise the impact of soaring fuel prices, help prevent climate change, and play a part in the better preservation of these historic buildings and the cultural treasures that they house.



#### The partners

Ethics & Energy is a not-for-profit organisation that advises congregations, church organisations, and people of faith in local communities. It collaborates with experts on energy conservation, the preservation and heating of historic buildings, renewable energies, the environment, and other relevant topics. Around 50 parishes and five dioceses have become members and, in the future, personal memberships will also be available.

#### How it works

Parishes join the association and pay a membership fee based on the number of buildings they own. Members follow a three-year programme, which begins with an energy audit, carried out by the parish with support from Ethics & Energy. By conducting the survey themselves, parishes save money and also learn about their buildings' energy systems and consumption. An Ethics & Energy's energy conservation expert then recommends improvements that can be made in each building. The suggestions may include anything from installing an entirely new heating system to something as simple as replacing incandescent light bulbs with compact fluorescents. The employees and volunteers who use the buildings are then asked to review the recommendations and add any suggestions of their own.

Education plays an important role in the scheme and all employees and volunteers receive a day's training on energy issues to learn more about sustainable development, responsibility for the local and global environment, energy conservation and cost-cutting.

Each parish then creates a plan of action for the coming year, deciding which investments are to be implemented and setting personal goals for conserving energy. Each year these action plans are reviewed and new goals set for the next year, functioning as an efficient energy management system.

Ethics & Energy produces a monthly newsletter, and provides information about government subsidies and other benefits.

Could it be repeated? This project, contributing as it does to tackling the energy problem, is particularly relevant for other countries as well. Reducing energy consumption concerns everyone, and the church, with its important role in society in all European countries, can play an important role in changing the ways in which we use energy.

Important lessons to remember when setting up such a scheme include the need for education: teaching people about energy and the environment is vital. In addition, it is not always necessary to make expensive changes; big savings can be achieved just by using existing technologies more efficiently. It is particularly important to focus on how to decrease the amounts of energy used before making changes to the supply.

### **The results**

Changes made vary from parish to parish according to their energy needs and use. An example that shows the type of results being achieved is the Karlstad diocese, in central Sweden, which consists of 156 parishes with around 600 buildings, 75% of which are heated by oil or electricity. The Ethics & Energy programme estimated the efficiency could be boosted on average by 30%, meaning a similar saving in energy costs. The total payback time for all of the recommended changes is about six years.

Source: Taken from European Commission Directorate-General for Energy and Transport (2008). *EU Local Energy Action: Good Practices 2008*.

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## Central Management and Education cut Energy Consumption, Slovenia

Energy Management in Public Buildings and Educational Campaign in Schools in the City of Maribor (Energy Agency of Podravje, EnergaP, Slovenia)

### Summary

The energy agency of Prodravje (EnergaP) set out to reduce energy consumption in public buildings and raise awareness of the importance of energy saving among pupils, teachers and other building users in Maribor, Slovenia. Central energy management system (CEMS) software has been installed in 70 public buildings. This offers a 2 to 3% potential energy saving through monitoring and an 8% cost-saving in the first year by identifying errors in billing and in the metering system. At the same time, the CEMS data from the local primary schools is used in an educational campaign aimed at the pupils and teachers in these schools, allowing them to monitor the impact of their energy saving actions on energy use.

### Results

CEMS enables the online monitoring, processing, analysis and verification of energy data, making it possible to identify cost anomalies, mistakes and weak points in the buildings. Savings can be used for future energy investments. CEMS has already helped the municipality to reduce energy costs by 160,000 EUR annually. In the first year, the reduction in energy use was around 3% (805 109 kWh and 1 365 tonnes CO<sub>2</sub>), purely through organizational measures. In addition to being used to manage energy use, the CEMS data is also used for educational purposes. CEMS and energy bookkeeping improve user awareness of the importance of reducing energy consumption, particularly when coupled with an educational campaign encouraging teachers and pupils as well as their parents to become more responsible energy consumers. During school “energy days”, EnergaP demonstrates the system of energy bookkeeping and CO<sub>2</sub> emission calculation, and sets the pupils exercises on how to calculate their home energy use and emissions. EnergaP is also involved in the ongoing training of caretakers, financial officers and head teachers.

### Replicability

The results are very encouraging; we see slow but long-lasting positive changes in attitudes towards energy use, not only in workplaces but also in homes and in society as a whole. Of the city energy balance for 2010, it can be seen that the savings made in public buildings totaled 4.5%. Effective information and education campaigns raise awareness of both energy issues in public buildings and the maintenance cost incurred by the city administration and building managers. The campaign has become well-known, both in the city among a range of sectors and targeted groups and in Slovenia more broadly, where the system has already been installed in many buildings and has been shown to work. It is now being demonstrated in other EU countries and cities for new IEE projects. The software system used in CEMS is merely the instrument; co-operation between people is the most important element. It is therefore likely that all cities could implement this initiative.

Source: Taken from European Union (2011). *Sharing Success: Local Approaches to Energy Efficiency and Renewable Energy*. <http://www.managenergy.net/resources/1254>  
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## Ahead of the Storm: Preparing Toronto for Climate Change, Canada

Work is underway to develop a strategy to prepare Toronto for the long-lasting changes in weather patterns that are caused by climate change. Ahead of the Storm: Preparing Toronto for Climate Change outlines a series of actions to improve Toronto's resilience to climate change. It was unanimously endorsed by City Council in July, 2008. It includes:

A series of short-term actions beginning in 2008 that will help prevent and/or minimize the impacts of climate change in Toronto

a series of actions that will guide the City's development of a comprehensive, long-term strategy to adapt to climate change.

### Adaptive Actions

Examples of actions that will make Toronto's infrastructure and buildings more resilient to climate change and improve the city's overall sustainability include:

- planting more trees to increase shade and clean and cool the air
- using rain barrels to capture rainwater for reuse
- using permeable surfaces (rather than asphalt for example) to reduce runoff from heavy rainfalls
- landscaping with drought-resistant plants and
- using cool/reflective materials on the roofs of homes and buildings to reduce urban heat.

**“While mitigation remains on the forefront of our climate change agenda, it's clear that we must take action now to adapt to the realities of climate change that we see today, and the realities we will see with greater intensity in the future.**

**National governments are falling behind in taking action on this important issue so it's up to cities to act and that's what Toronto is committed to doing.”**

- Former Mayor David Miller

Credit: The City of Toronto

Adapted from the City of Toronto website.

For further details visit: <http://www.toronto.ca/teo/adaptation.htm>

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United Nations  
Educational, Scientific and  
Cultural Organization



# Regional Resource Pack

## → Small Island States



UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE

## IN THE CLASSROOM



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## Overview

This resource pack contains region-specific information to be used as background for classroom lessons and activities. Specific activities that require information from this resource pack are indicated in the classroom activity descriptions. The contents are broken down as follows:

- Section A provides climate change status and predictions relevant to all four regions.
- Section B provides data on the impacts of climate change in Africa.
- Section C provides a selection of regional and national climate change mitigation and adaptation policies.
- Section D provides case studies on climate change impacts.
- Section E provides stories of positive action.

## Section A: Climate Change Emissions and Impacts – The Global Situation

### Intergovernmental Panel on Climate Change (IPCC) Information on Current Knowledge about Future Impacts

#### Freshwater resources and their management

By mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water-stressed areas. In some places and in particular seasons, changes differ from these annual figures.]

Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.

In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.

Adaptation procedures and risk management practices for the water sector are being developed in some countries and regions that have recognised projected hydrological changes with related uncertainties.

#### Ecosystems

The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).

Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.

The progressive acidification of oceans due to increasing atmospheric carbon dioxide levels increases the potential for the skeletons of coldwater coral reefs to dissolve, perhaps already within a few decades. The impacts will be greatest at high latitudes..

## Food, Fibre and forest products

Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3°C depending on the crop, and then decrease beyond that in some regions.

At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase the risk of hunger.

Globally, the potential for food production is projected to increase with increases in local average temperature over a range of 1-3°C, but above this it is projected to decrease.

Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes.

Adaptations such as altered cultivars and planting times allow low- and mid- to high-latitude cereal yields to be maintained at or above baseline yields for modest warming.

Globally, commercial timber productivity rises modestly with climate change in the short- to medium-term, with large regional variability around the global trend.

Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.

## Costal systems and low lying areas

Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas.

Corals are vulnerable to thermal stress and have low adaptive capacity. Increases in sea surface temperature of about 1-3°C are projected to result in more frequent coral bleaching events and widespread mortality, unless there is thermal adaptation or acclimatisation by corals.

Coastal wetlands including salt marshes and mangroves are projected to be negatively affected by sea-level rise especially where they are constrained on their landward side, or starved of sediment.

Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.

Adaptation for coasts will be more challenging in developing countries than in developed countries, due to constraints on adaptive capacity.

## Industry, settlement and society

Costs and benefits of climate change for industry, settlement and society will vary widely by location and scale. In the aggregate, however, net effects will tend to be more negative the larger the change in climate.

The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies.

Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

## Health

- Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity, through:
- increases in malnutrition and consequent disorders, with implications for child growth and development;
- increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts;
- the increased burden of diarrhoeal disease;
- the increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and,
- the altered spatial distribution of some infectious disease vectors.
- Climate change is expected to have some mixed effects, such as a decrease or increase in the range and transmission potential of malaria in Africa.

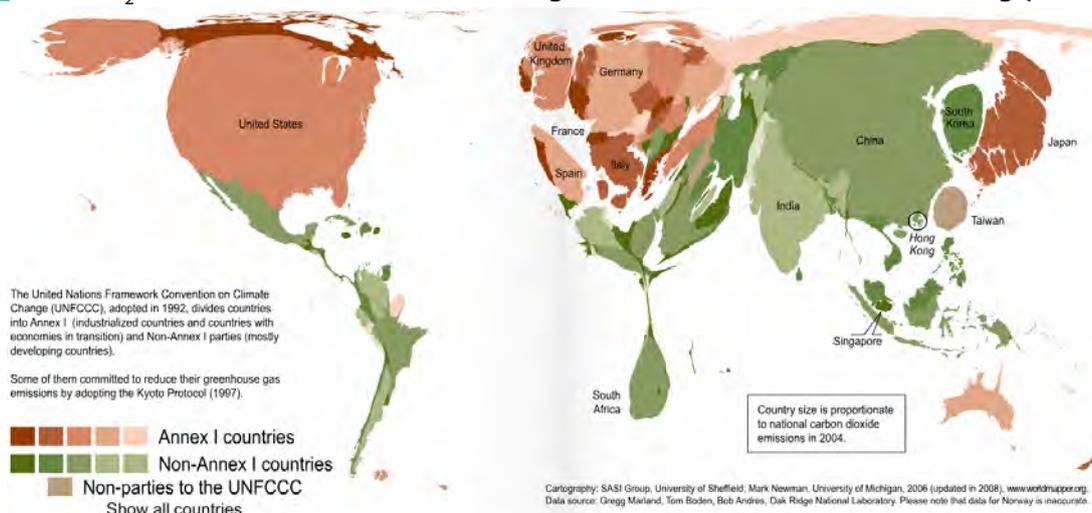
Studies in temperate areas have shown that climate change is projected to bring some benefits, such as fewer deaths from cold exposure. Overall it is expected that these benefits will be outweighed by the negative health effects of rising temperatures worldwide, especially in developing countries.

The balance of positive and negative health impacts will vary from one location to another, and will alter over time as temperatures continue to rise. Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives and infrastructure and economic development.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, pp. 11-13. Cambridge University Press. Reproduced here with permission.

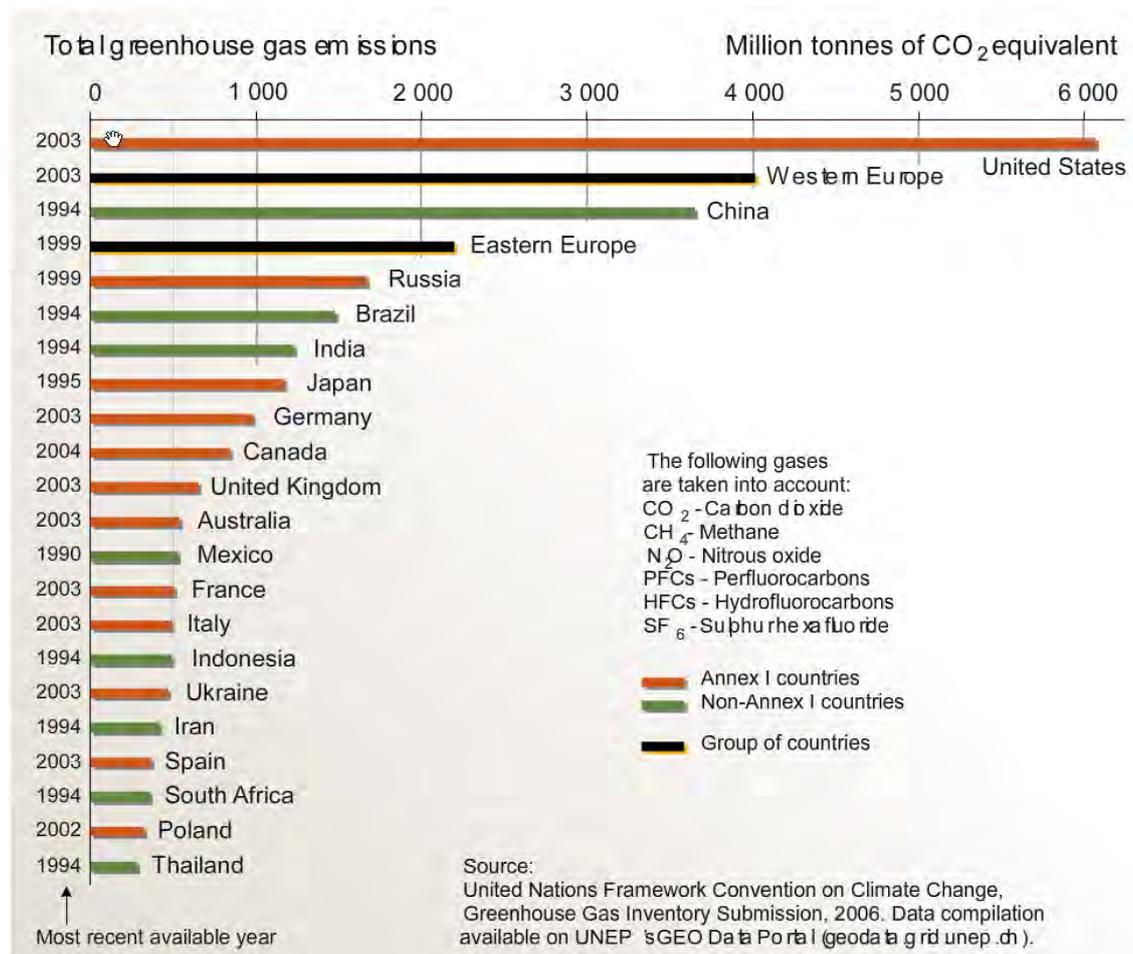
## Climate Change Infographics

### ↓ Total CO<sub>2</sub> Emissions from Fossil-Fuel Burning, Cement Production and Gas Flaring (2009)



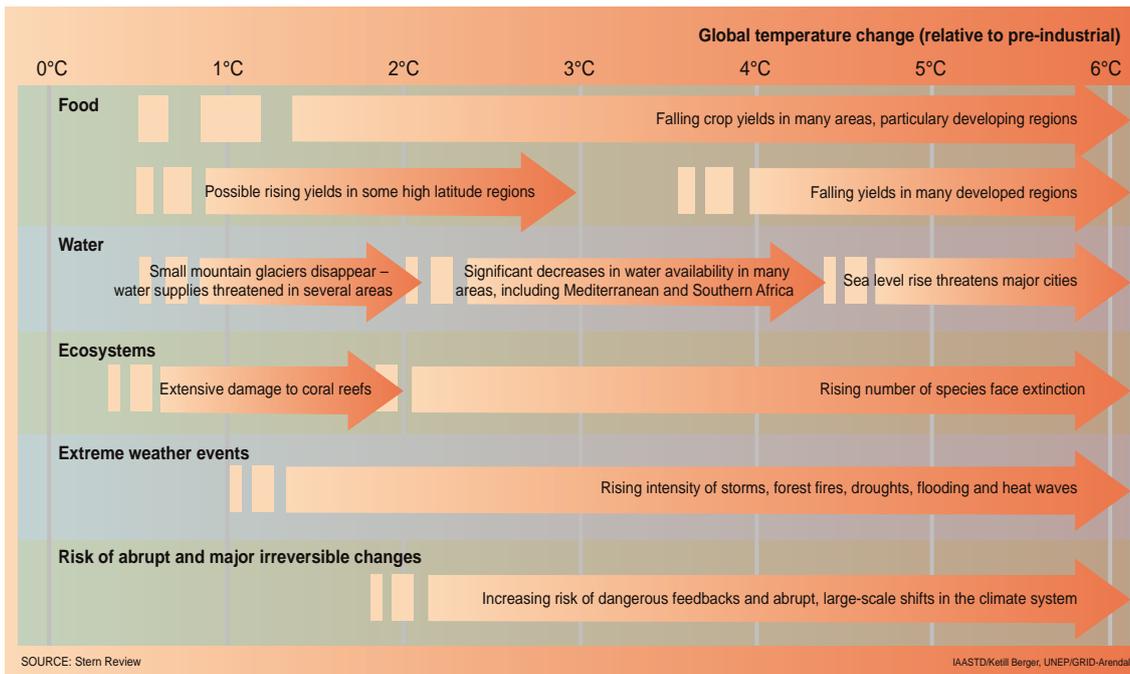
Source: From UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 16:05, June 12, 2011 from <http://maps.grida.no/go/graphic/total-co2-emissions-from-fossil-fuel-burning-cement-production-and-gas-flaring>. Reproduced here with permission.

### ↓ Top 20 Greenhouse Gas Emitters (including land use change and forestry)



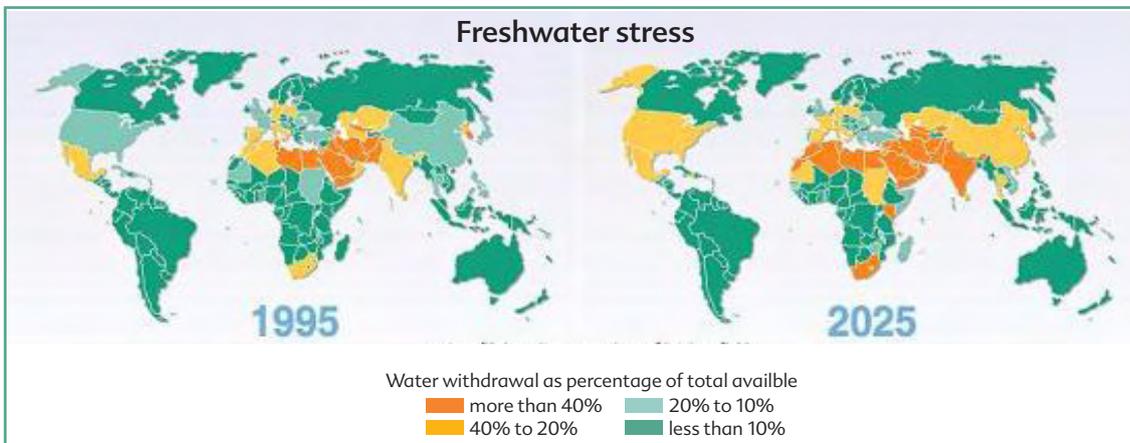
Source: Top 20 greenhouse gas emitters (including land use change and forestry). (2009). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 16:09, June 12, 2011 from. Reproduced here with permission.

Projected Impact of Climate Change



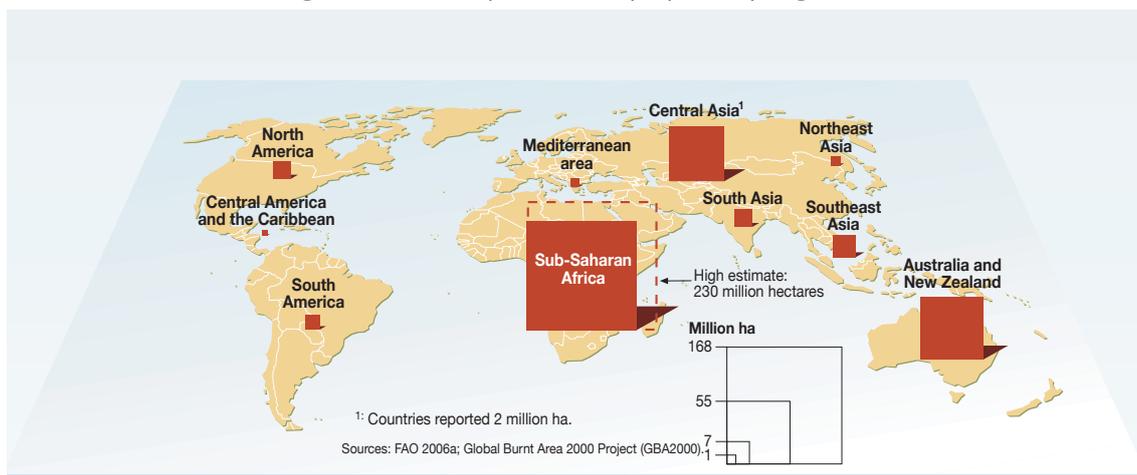
Source: Projected impact of climate change. (2008). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 17:02, June 13, 2011 from <http://maps.grida.no/go/graphic/projected-impact-of-climate-change>. Reproduced here with permission.

Freshwater Stress - Comparing 1995 to predictions for 2025



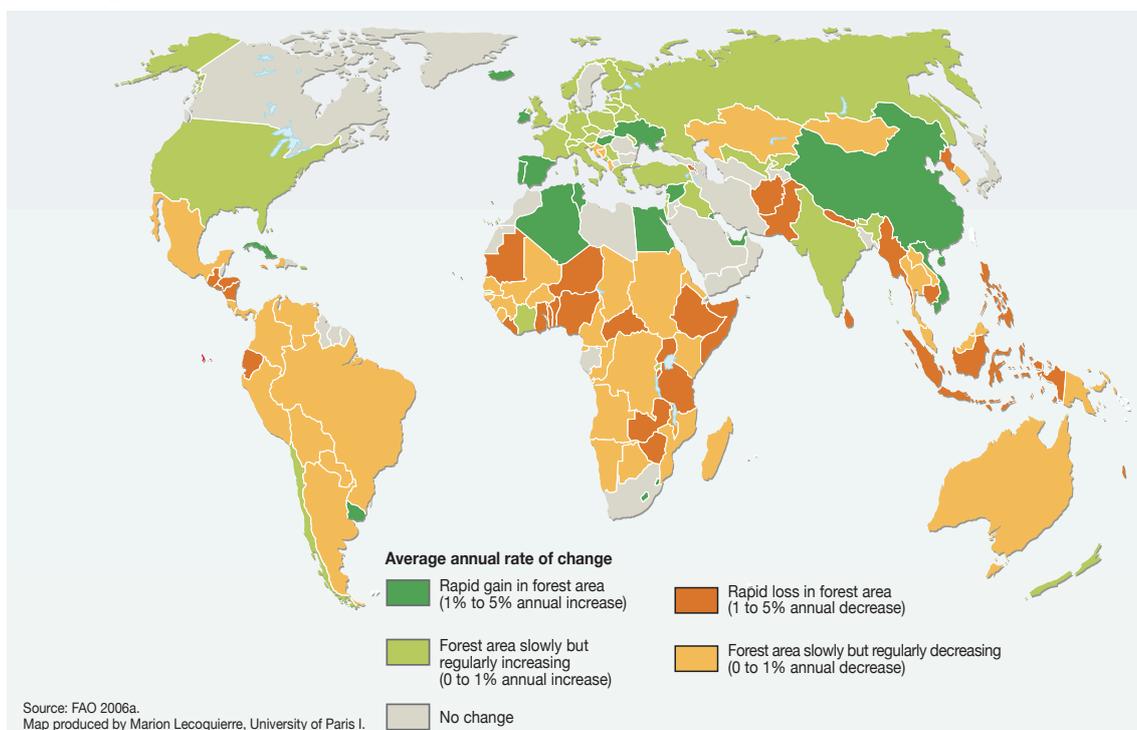
Source: Freshwater stress. (2000). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:41, June 11, 2011 from <http://maps.grida.no/go/graphic/freshwater-stress>. Reproduced here with permission.

Estimate of area of vegetation destroyed annually by fire by region



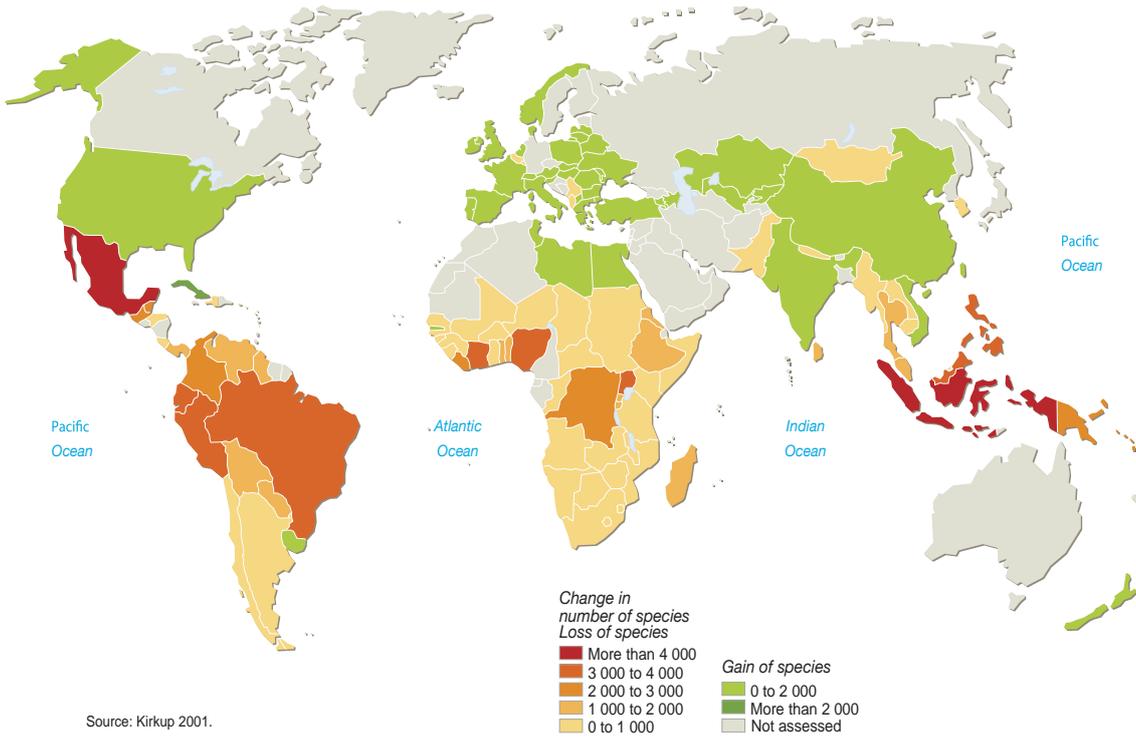
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 49. Reproduced here with permission.

Changes in area covered by forest, 1990-2005



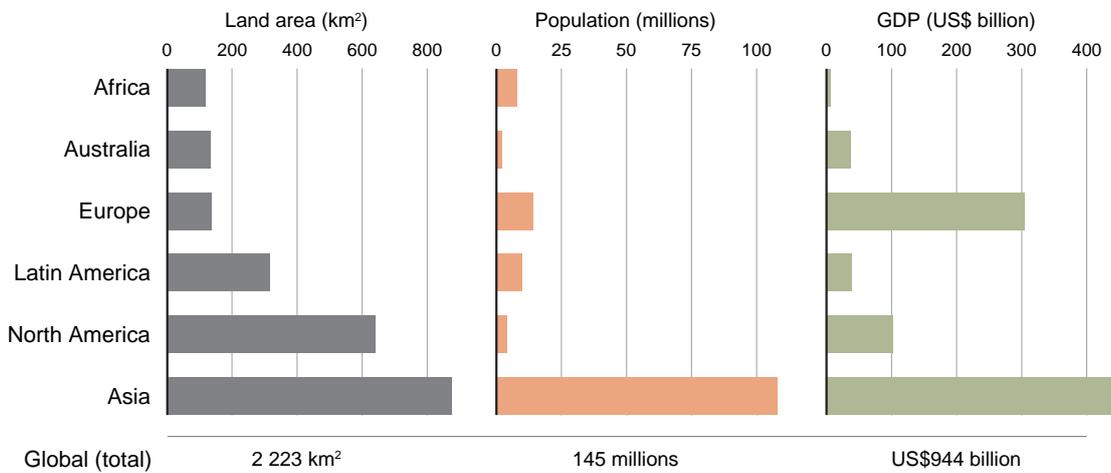
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 12. Reproduced here with permission.

Estimated loss of plant species, 2000-2050



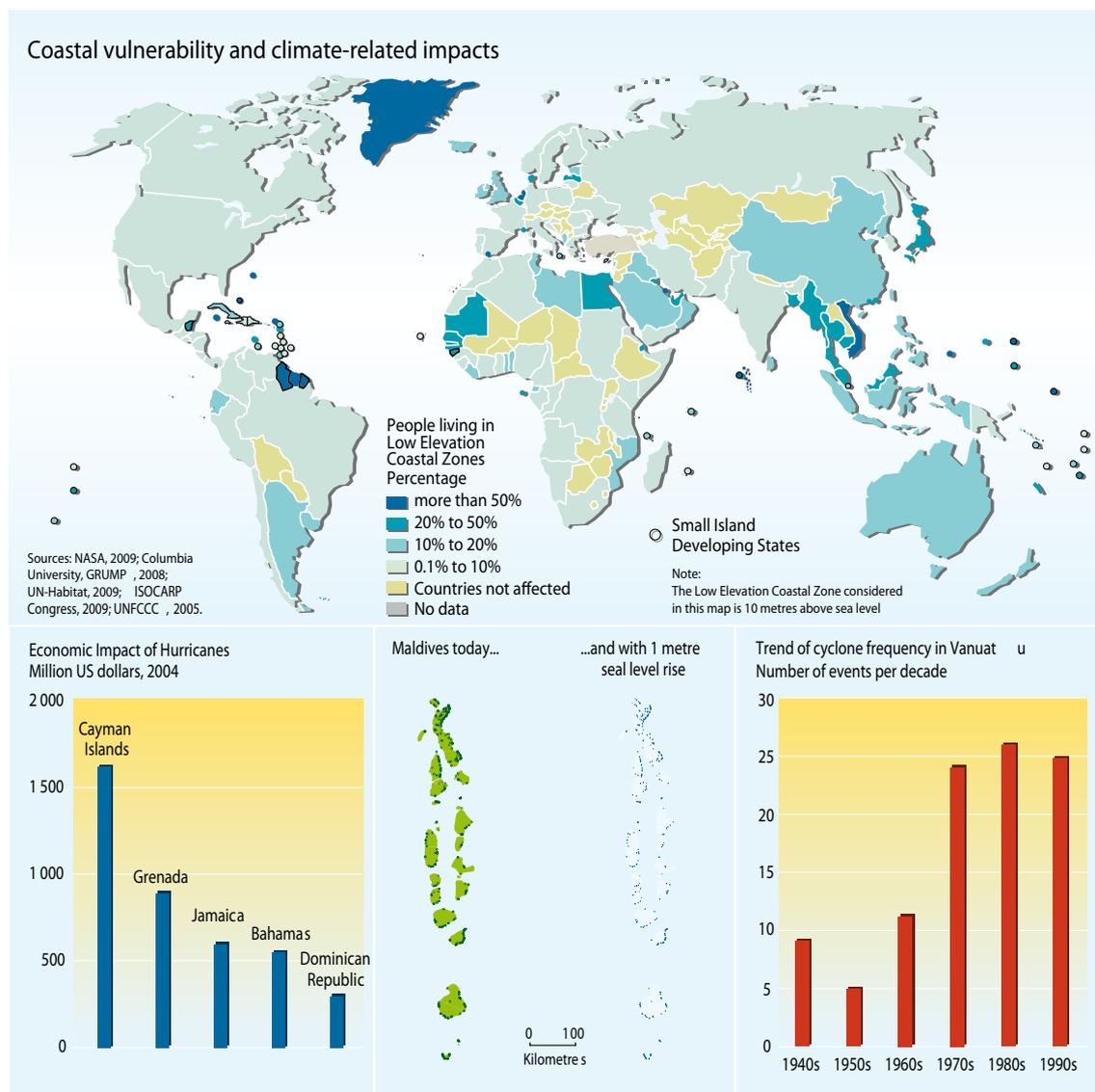
Source: UNEP/ GRID-Arendal (2009) Vital Forest Graphics, p. 35. Reproduced here with permission.

A 1-meter sea level rise



Population, area and economy affected by a 1 m sea level rise (global and regional estimates, based on today's situation). (June 2007). In UNEP/GRID-Arendal Maps and Graphics Library. Retrieved 19:35, June 11, 2011 from <http://maps.grida.no/go/graphic/population-area-and-economy-affected-by-a-1-m-sea-level-rise-global-and-regional-estimates-based-on->. Reproduced here with permission.

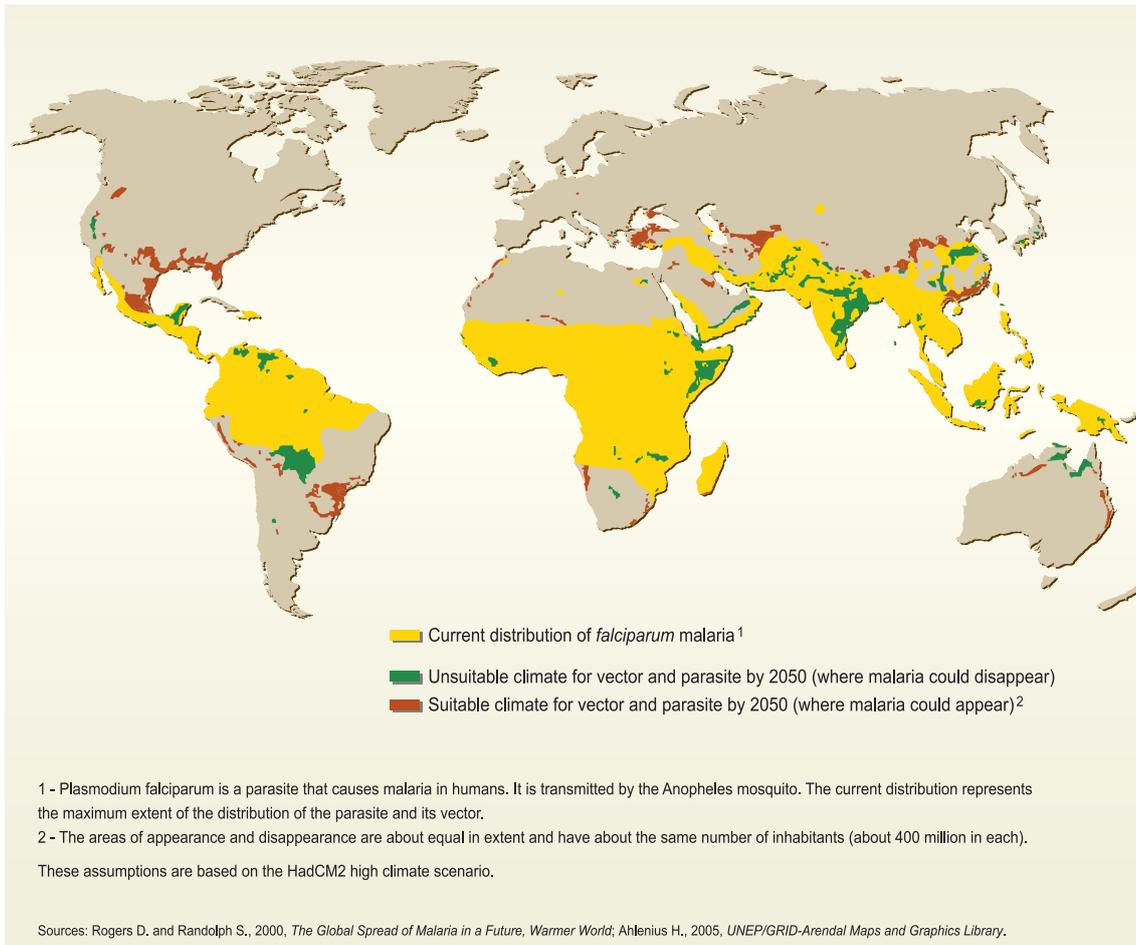
Coastal vulnerability and climate-related impacts



Source: UNEP/GRID-Arendal and CICERO (n.d.) Many Strong Voices - Turning Vulnerability into Strength, p. 14. Reproduced here with permission.

↓ Malaria by 2050

Malaria by 2050



Source: European Environment Agent.  
<http://www.eea.europa.eu/data-and-maps/figures/malaria-in-2050>  
 © European Environment Agent

## Section B: Climate Change Impacts in Small Island States

### Intergovernmental Panel on Climate Change (IPCC) Information

Small islands, whether located in the tropics or higher latitudes, have characteristics which make them especially vulnerable to the effects of climate change, sea-level rise and extreme events.

Deterioration in coastal conditions, for example through erosion of beaches and coral bleaching, is expected to affect local resources, e.g., fisheries, and reduce the value of these destinations for tourism.

Sea-level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards, thus threatening vital infrastructure, settlements and facilities that support the livelihood of island communities.

Climate change is projected by mid-century to reduce water resources in many small islands, e.g., in the Caribbean and Pacific, to the point where they become insufficient to meet demand during low-rainfall periods.

With higher temperatures, increased invasion by non-native species is expected to occur, particularly on mid- and high-latitude islands.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p 15. Cambridge University Press. Reproduced here with permission.

## Regional Impacts and Vulnerabilities to Climate Change in Small Island Developing States

Impacts	Sectoral Vulnerabilities	Adaptive Capacity
<p><b>Temperature</b></p> <p>Warming above the global mean is predicted in most of Latin America.</p> <p>In southern South America warming similar to global mean.</p> <p>Precipitation, snow and ice</p> <p>Decrease in annual precipitation in most of Central America and in the southern Andes, although large local variability in mountainous areas.</p> <ul style="list-style-type: none"> <li>– Increase in winter precipitation in Tierra del Fuego.</li> <li>– Increase in summer precipitation in south-eastern South America.</li> <li>– Uncertain rainfall changes over northern South America, including the Amazon forest.</li> <li>– Increasing reduction and disappearance of Andean glaciers.</li> </ul> <p><b>Extreme events</b></p> <p>Increasing frequency and intensity of extreme events, many related to ENSO, particularly:</p> <ul style="list-style-type: none"> <li>– intense rainfall events causing landslides and severe floods;</li> <li>– dry spells and drought, such as in northeast Brazil;</li> <li>– heat waves, with particularly major effects in megacities due to heat island effects;</li> <li>– Increase in intensity of tropical cyclones in the Caribbean basin.</li> </ul>	<p><b>Water</b></p> <ul style="list-style-type: none"> <li>– Increase in the number of people experiencing water stress — likely to be 7–77 million by the 2020s.</li> <li>– Runoff and water supply in many areas compromised due to loss and retreat of glaciers.</li> <li>– Reduction in water quality in some areas due to an increase in floods and droughts.</li> </ul> <p><b>Agriculture and food security</b></p> <ul style="list-style-type: none"> <li>– Reductions of crop yields in some areas, although other areas may see increases in yields.</li> <li>– By the 2050s, 50% of agricultural lands are very likely to be subjected to desertification and salinization in some areas.</li> <li>– Food security a problem in dry areas where agricultural land subject to salinization and erosion-reducing crop yields and livestock productivity.</li> </ul> <p><b>Health</b></p> <ul style="list-style-type: none"> <li>– Risks to life due to increases in the intensity of tropical cyclones.</li> <li>– Heat stress and changing patterns in the occurrence of disease vectors risk to health.</li> <li>– Terrestrial Ecosystems</li> <li>– Significant habitat loss and species extinctions in many areas of tropical Latin America, including tropical forests, due to higher temperatures and loss of groundwater with effects on indigenous communities.</li> </ul> <p><b>Coastal Zones</b></p> <ul style="list-style-type: none"> <li>– Impacts on low lying areas, such as the La Plata estuary, coastal cities and coastal morphology, coral reefs and mangroves, location of fish stocks, availability of drinking water and tourism due to sea level rise and extreme events.</li> </ul>	<p>The lack of modern observation equipment and climate monitoring hinders the quality of forecasts lowering public trust in climate records and applied meteorological services. This has a negative impact on the quality of the early warning and alert advisory services.</p> <p>Some social indicators have improved in recent decades including life expectancy, adult literacy and freshwater access. However, adaptive capacity is limited by high infant mortality, low secondary school enrolment and high levels of inequality both in income and in access to fresh water and health care as well as gender inequalities.</p>

Source: UNFCCC (2007). *Climate Change: Impact, Vulnerabilities and Adaptation in Developing Countries*, p. 23. Reproduced here with permission.

## Section C: Glimpses into Climate Change Policies in Small Island States

### Regional Climate Change Strategies

#### Pacific Islands Framework for Action on Climate Change 2006-2015

In 2005, the Leaders endorsed the Pacific Islands Framework for Action on Climate Change. The Framework's goal is to ensure that Pacific Island peoples and communities build their capacity to be resilient to the risks and impacts of climate change with the key objective to deliver on the expected outcomes under the following Principles:

- Implementing adaptation measures
- Governance and decision-making
- Improving our understanding of climate change
- Education, training and awareness
- Contributing to global greenhouse gas reduction; and
- Partnerships and cooperation.

Source: Excerpts from *Pacific Islands Framework for Action on Climate Change 2006-2015*.  
For the full document, visit at: [http://www.sprep.org/publication/pub\\_detail.asp?id=438](http://www.sprep.org/publication/pub_detail.asp?id=438)

### United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme)

As of July 2011 there are only two UN-REDD Programme partner countries in the Small Island region that have been allocated funding for National UN-REDD Programmes.

Web links for each are given below. Excerpts from the Initial Programme Document – Solomon Islands (UN-REDD Programme 5th Policy Board Meeting, November 2010) are included below.

#### Papua New Guinea

<http://www.un-redd.org/UNREDDProgramme/CountryActions/PapuaNewGuinea/tabid/1026/language/en-US/Default.aspx>

#### Solomon Islands

[http://www.un-redd.org/AboutUNREDDProgramme/NationalProgrammes/Solomon\\_Islands/tabid/6898/Default.aspx](http://www.un-redd.org/AboutUNREDDProgramme/NationalProgrammes/Solomon_Islands/tabid/6898/Default.aspx)

#### Box 1. What is REDD+?

Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. “REDD+” goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

Excerpts from the UN-REDD website.  
For further details, visit <http://www.un-redd.org/AboutREDD/tabid/582/Default.aspx>

## UN-REDD in the Solomon Islands

The logging industry is the single most significant economic sector in the Solomon Islands; it contributes 67% of export earnings, and some 12-13% of total government revenue. As much as 50% of the employed workforce may be associated directly or indirectly with the forest sector. Officially, annual export earnings in 2007 were approximately USD 110 million, through this is likely to be a significant under-estimate, as it is known that not all of exports are accurately assessed.

Key governance issues preventing sustainable management of forest resources in the Solomon Islands include:

- Out-dated and incomplete legislation.
- Uneven application of the rule of law.
- Incomplete enforcement.
- Inaccessibility and cost of legal proceedings, which act as a deterrent to seeking advice and compensation.
- Weak coordination and cooperation within and among customary ownership groups.
- Weak formal governance structures.

The Objective of this initial UN-REDD programme is “to establish the necessary institutional and individual capacities required to develop full REDD+ readiness in the Solomon Islands”. This Objective will be secured through three Outcomes and associated Outputs. They are:

**Outcome 1:** REDD+ readiness supported by effective, inclusive and participatory management processes.

- Output 1.1: A broad-based, multi-stakeholder national REDD+ working group
- Output 1.2: Collated and analyzed forest resource data

**Outcome 2:** REDD+ stakeholders have a comprehensive understanding of the potential benefits and risks associated with REDD+.

- Output 2.1: A constituency-based education and awareness raising programme.
- Output 2.2: A process to ensure the right of free, prior and informed consent for actions to be undertaken on REDD+

**Outcome 3:** Preliminary capacity developed for REL formulation and MRV.

- Output 3.1: REL and MRV capacity assessment
- Output 3.2: Assessment of potential for regional cooperation on MRV.

Source: Excerpts from: *Initial Programme Document – Solomon Islands (UN-REDD Programme 5th Policy Board Meeting, November 2010)* pp. 4-5.  
Reproduced here with permission.

## National Adaptation Programmes of Action on Climate Change (NAPAs)

National adaptation programmes of action (NAPAs) from the following Small Island States are available from the UNFCCC website:  
[http://unfccc.int/cooperation\\_support/least\\_developed\\_countries\\_portal/submitted\\_napas/items/4585.php](http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php)

- Cape Verde
- Comoros
- Haiti
- Kiribati
- Maldives
- Mauritania
- Samoa
- Sao Tome and Principe
- Solomon Islands
- Tuvalu
- Vanuatu

### Box 2. What are NAPAs?

National adaptation programmes of action (NAPAs) provide a process for Least Developed Countries (LDCs) to identify priority activities that respond to their urgent and immediate needs to adapt to climate change – those for which further delay would increase vulnerability and/or costs at a later stage.

Excerpts from UNFCCC website.  
For further details, visit: [http://unfccc.int/national\\_reports/napa/items/2719.php](http://unfccc.int/national_reports/napa/items/2719.php)

## Priority Adaptation Strategies in Maldives

The adaptation needs were prioritised by community, government and private sector stakeholders using analytical hierarchy process.

**Table 1: List of priority adaptation strategies**

Adaptation Measure	Score	Rank
Build capacity for costal protection, coastal zone management and flood control.	76.14	1
Consolidate population and development.	44.47	2
Introduce new technologies to increase local food production	35.62	3
Acquire support for the speedy and efficient implementation for Safer Island Strategy.	32.94	4
Develop coastal protection for airports and development focus islands	32.94	5
Integrate climate change adaptation into national disaster management framework.	32.03	6
Strengthen tourism institutions to coordinate climate response in the tourism sector	29.78	7
Improve building designs to increase resilience and strengthen enforcement of building code.	29.09	8
Acquire appropriate sewage treatment and disposal technologies to protect water resources.	28.32	9
Incorporate climate change adaptation measures to upcoming resorts	27.83	10
Promote healthy lifestyles, healthy islands and healthy buildings	27.45	11
Enhance the capacity for waste management to prevent pollution of marine environment	27.03	12
Provide alternatives to coral and sand as construction materials and enforce the ban on coral mining	26.54	13
Integrate reef fishery management.	24.42	14
Streamline the planning of healthcare services and strengthen medical emergency response.	23.72	15
Increase safe rainwater harvesting.	23.66	16
Develop measures to protect coral reefs from development activities.	22.83	17
Undertake recharging of aquifers and other measures to reduce salinisation from saltwater intrusion and storm surge flooding.	19.37	18
Undertake research and disseminate information on climate change related diseases.	19.26	19
Strengthen the capacity for healthcare delivery.	19.02	20
Strengthen capacity for planning and design of ports, harbours and jetties.	17.40	21
Develop climate change adaptation policy and strategy for tourism.	16.84	22
Protect house reef to maintain natural defense of islands.	16.27	23
Protect and preserve natural water catchment areas.	15.15	24
Experiment new and alternative species and breeding methods for livebait	14.54	25
Enforce and strengthen quarantine and integrated pest control to prevent pests and diseases.	13.89	26
Strengthen regulatory and institutional capacity for vector control.	13.74	27
Protect beaches and tourist infrastructure.	13.02	28
Review the market strategy of tourism to diversify the tourism production and reduce over-dependency on coral.	12.89	29
Acquire desalination technologies appropriate for small islands.	11.93	30

Source: Excerpts from: *National Adaptation Programme of Action –Maldives*. pp. 43-44.  
Reproduced here with permission.

## Section D: Climate Change Impacts – Case Studies

### Our Sinking Heritage, Bau Island, Fiji

Story by Siobhan Turner

Photographs © Siobhan Turner

At the edge of Namata Village, in amongst the mangroves, we waited for our transport to arrive. The sky was dark and cloudy. We would travel by boat, as it is one of two ways to get to Bau Island; the other is on foot at low tide.

Coming out of the mangroves we saw the island of Bau lying still in the distance, waiting patiently, as if she was expecting us for thousands of years. The rain pelted down on us as we visited Mateiweilagi, the residence of the Vunivalu (High Chief) who is from the Cakobau Family.

Unfortunately, the soil here is being washed away. A sea wall had been constructed around the island. It is now damaged and chunks of the wall are broken off. It looked as if it had battled thousands of waves and is now weathered by time. I also learned that their fishing grounds have changed. There aren't any fish in the usual fishing areas. Now they're forced to move out into deeper waters.

Bau Island, which is a symbol of respect, chieftainship, and high authority, is slowly being erased by the effects of climate change. If things continue this way, I'm afraid there won't be anything left of Bau Island. This island has witnessed centuries of traditions, ceremonies and events. Its people will eventually evacuate and move to the mainland and a change in culture will be inevitable.

For the generations to come, Bau Island will be a home no more.

Source: UNEP/GRID-Arendal and CICERO, *Many Strong Voices: Portraits of Resilience*.  
Reproduced here with permission.



## Sinking Beneath the Waves, Serua Island, Fiji

Story by Jeremy Kuinikoro

Photograph © Jeremy Kuinikoro

Serua Island is a very small but beautiful island located off the south coast of Viti Levu between Pacific Harbour and the Coral Coast. The island has about 30 homes and almost everyone fishes for a living.

Because it was low tide, we were able to walk from the mainland to Serua Island. The chief, Ratu Peni Latianara, gladly received us and gave us permission to explore the island. The villagers of Serua welcomed us with a hearty lunch.



Our guide - Master Navosa - told us stories of how Serua Island used to be and how it is now being affected by climate change. The island is gradually losing land. The sea has slowly claimed 20 feet of the island for the past decade or so, and the villagers with houses near the coastline have moved to Viti Levu on the mainland. On the south coast of the island a small dyke had been built to keep the sea from eroding the land. Unfortunately this is not enough to keep the sea from the land, so the men of the village brought huge boulders and left them on the shore to act as wave breakers.

Promised help to supply sand and gravel to extend island boundaries has not come. An elder said very little assistance is given to climate-change affected villages. The chief of the village and its people appreciated our visit hoping that their problems would be noticed and they would receive help.

Source: UNEP/GRID-Arendal and CICERO, *Many Strong Voices: Portraits of Resilience*. Reproduced here with permission.

## Fishing in the Seychelles

Story by Mikael Barbe, Ryan Benstrong, James Ernesta, Mario Dubel.

Photograph © Mikael Barbe

According to local fishermen, these days they have to fish deeper because the sea surface temperatures are rising and fish are going deeper in the ocean.

They also need to go out fishing for longer periods of time and further out than usual. Because of a warmer sea temperature, they also report that the fish they are catching are changing shape.

In addition, they have to spend more money on food supply, fuel and fishing materials. We need to be aware about our ecosystem and how climate change will impact on it. The impacts mentioned above that mean fish are more expensive on the local market.



Fishing livelihoods are getting harder and our economy suffers.

Source: UNEP/GRID-Arendal and CICERO, *Many Strong Voices: Portraits of Resilience*. Reproduced here with permission.

## Section E: Climate Change – Case Studies of Positive Action

### 100 per cent renewable energy for Niue

In 2004, Niue, the smallest nation on earth, had 70 per cent of its infrastructure destroyed by cyclone Heta. Once the immediate needs of the population were met, Greenpeace began helping the Government to make Niue the first nation on earth to meet all its energy requirements from renewable sources.

Niue is the largest uplifted coral island in the world. It is an independent country in free association with New Zealand and has a population of 1,700. Niue has one of the highest wind-energy intensities in the South Pacific and ample solar resources, more than sufficient to meet all its energy needs. Electricity prices in Niue are currently six times higher than the typical Australian consumer price, which means renewables should be commercially viable.

Currently most Pacific Island countries depend on increasingly expensive imported diesel, oil and bottled gas to produce power for electricity, transport and cooking. This trend will only continue unless steps are taken to reverse this development path. The 100 per cent Niue Greenpeace Renewable Energy Project will reduce Niue's dependence on imported fossil fuels, while also creating jobs because people will be trained to maintain and operate the cleaner technologies. The project will also draw new investment into the economy, and help promote local businesses.

Source: Excerpts from Reid, H., Simms, A. and Johnson, V.. 2007. *Up in smoke? Asia and the Pacific – The threat from climate change to human development and the environment. Fifth report of the Working Group on Climate Change and Development*. London: NEF. p. 86.

## Women Planning Sustainable Agriculture

### The Development of Sustainable Agriculture in the Pacific Programme (DSAP); Secretariat of the Pacific Community

The Development of Sustainable Agriculture in the Pacific programme (DSAP) uses a participatory approach to work with local farmers throughout the region to improve their food security and livelihoods. This improves their resilience to disasters and climate change. While the focus is on sustainable agriculture production, related benefits have been improvements to the quality of soil, more use of drought resistant or saltwater resistant crops, improved irrigation systems, better management of pests and diseases, evaluation of tissue plant cultures, terraced and planted hillsides to prevent landslides and runoff, and support for widespread home gardens for better access to nutritious food.

In the atolls, DSAP focused on identifying problems and testing technologies with farmers to improve their traditional agriculture systems. Traditionally, the farmers used tree crop-based multi-story agricultural systems. DSAP worked to integrate livestock into these systems.

In the lowlands, the emphasis moved from research to identification and promotion of promising technologies, such as improved crop varieties, pest and disease management, land conservation, and agroforestry technologies.

DSAP also produces and uses communication outreach tools to better promote project efforts within member countries, for example, nationally-based production and use of radio, posters, handbooks, brochures and videos.

The project:

- Used a gender analysis in its Participatory Rural Approach model, and in the design of the project, working with women, men, youth, and considering other social factors of the community, such as age.
- Has gender a focal point and an advisory board.
- Gives gender sensitivity training to staff and members to incorporate gender analysis approaches.
- Builds capacity of both men and women.
- Has increased technological training and participation of women.

The project was designed on a model that encourages country level planning, implementation and coordination. This has been achieved by establishing National Steering Committee (NSCs) involving a range of relevant stakeholders from both government and civil society.

The primary beneficiaries are men and women farmers in 17 Pacific Island Countries and multiple local communities. Since 2003, thousands of people are likely to have benefited. The project's extension agents work with communities to build local ownership of projects.

The Secretariat of the Pacific Community (SPC) works through DSAP with villages and communities in each of the islands. The DSAP project is an important part of the SPC Agriculture and Forestry Programme, drawing on valuable SPC technical assistance and training.

The design and content of the DSAP project was finalized at a participatory planning workshop in October 2001 which involved representatives from various government, non-governmental organizations, and donor organizations from numerous Pacific Island Countries and Territories and the SPC.

DSAP has been implemented in: Fiji, Cook Islands, Federated States of Micronesia, French Polynesia, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Wallis and Futuna, and Vanuatu. It is ongoing in 17 Pacific Island Countries, with a first and second phase.

SPC receives donor funding for a Land Programmes from the Australian Centre for International Agriculture Research (ACIAR), the Food and Agriculture Organization (FAO), International Plant Genetic Resources Institute (IPGRI), and the United Nations Development Programme (UNDP).

Source: UN/ISDR (2008). *Gender Perspectives: Integrating Disaster Risk Reduction into Climate Change Adaptation. Good Practices and Lessons Learned* 2008. p. 23. Reproduced here with permission.

## Youth Leaders for Waste-Wise Communities, Fiji

The acronym “3Rs” calling for society to ‘reduce, reuse and recycle’ waste has been influential in raising awareness and promoting actions to improve resource use efficiency even at the community level. Live and Learn Environmental Education (LLEE), a Fijian NGO, has undertaken a project to encourage the community to conserve and promote efficient use of environmental resources and product materials. Training workshops were conducted to promote environmentally sound resource and waste management practices such as composting and recycling. Organic and resource circulating farming practices have been introduced as well. A unique feature of the project is the involvement of youth leaders in the training programme to encourage them to disseminate their newly acquired knowledge and skills within their own community. As a part of the project implementation process, monitoring and evaluation are carried out to share successes and failures, and to ensure the delivery of expected outcomes. Throughout the project activities, the people participating in the project have been changing the consumption patterns, thereby reducing waste generation and promoting resource circulation.

### Economic size

The project has been undertaken in remote rural areas with limited economic activities. Youth groups are engaged in farming and fishery or otherwise unemployed.

### Conflict of stakeholder interests

People participating in the project generally promote the use of personal bags to be used repeatedly as a substitution for one-time-use and disposable plastic shopping bags, and composting by processing biodegradable kitchen wastes to be used as organic fertiliser. Such activities have not resulted in conflict with other stakeholders. The activities are widely accepted by the community.

### Actor dominance

LLEE and youth groups operate through communication and mutual understanding, and there is no evidence of a particular stakeholder group dominating decision-making and project implementation processes.

Source: Institute for Global Environmental Strategies (IGES) (2010). *Sustainable Consumption in the Asia-Pacific Region: Effective Responses in a Resource Constrained World*. IGES White Paper III, p. 127  
Reproduced here with permission.

## Using Climate Forecasting for the Benefit of Vulnerable Communities

Climate forecasting can benefit vulnerable communities in several ways. Many Red Cross Red Crescent National Societies in the Asia Pacific region implement community-based disaster risk reduction programmes targeting the most vulnerable communities. Some of the essential components of these programmes are:

- Participatory community risk assessments or hazards vulnerability and capacity assessments
- Establishment of community-based action teams.
- Conducting community and household preparedness activities, such as evacuation planning, drills and community-based early warning dissemination.

Red Cross Red Crescent branches and community-based action team volunteers can be warned of seasonal climate forecasts and enhanced levels of risk of organize community members and plan evacuations well in advance, which will reduce the risk of deaths and injury to people, as well as protect their valuable assets. Short term climate forecasting will help community-based action teams to maintain their readiness and be alert to the imminent threats of disasters.

Seasonal calendars (annual weather patterns, harvesting, cultivation seasons etc.), village historical profiles and visualization of past events, are some of the participatory tools that communities use to discuss and analyse flood seasons and climate variations that affect the community's day to day lives and livelihood. Climate-related information generated at the IFRC disaster management unit can be used to enhance Red Cross Red Crescent staff, volunteers and the community's knowledge to better analyse and understand climate-related risks and enable them to prepare accordingly. This will also enable communities to develop short, medium and long term adaptation strategies to suit local conditions.

Source: International Federation of Red Cross Society and Red Crescent Societies Climate Centre. Reproduced here with permission.

## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE IN THE CLASSROOM



## Day 1 - Learning About Climate Change

### Facilitation Guide for Classroom Activities



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## Climate Change People Search

### Time Needed

- 35-40 minutes (15-20 minutes of activity; 20 minutes of discussion)

### Objectives/Explanation

- To help students learn more about each other
- To enable students to share personal experiences, knowledge and feelings concerning climate change
- To look for what is common across those experiences and feelings
- To bring out students' collective experience and level of understanding of climate change and pool questions they have.

### Materials Needed

- One Climate Change People Search sheet (Handout 1) for each student
- Flip chart and marker or board and chalk

### Procedure

- Invite students to move around the classroom and join up with someone who can respond in a positive way to one of the items in the handout.
- Ask them to write the name of the person into the space on the sheet and ask questions of their partner so as to encourage sharing of detail of their experiences and/or feelings.
- Let the group know that they can only have one positive response from any one person. They must move on to other people to fill in other lines on the handout.
- Encourage them to complete as much of the handout as possible in the time available but without rushing so they benefit from listening to each other's stories.
- Lead the group in discussion and reflection on stories they have encountered and write the group's questions about climate change on the flip chart or board.

### Facilitation Guidance

This is a busy activity. A 'busy' classroom mood should be encouraged but not so busy that students are bent on completing the sheet rather than really listening to each other. Possible discussion questions:

Did you learn anything from anybody that really surprised you?

Did you find you had experiences in common with others? What were those experiences?

What feelings were commonly expressed?

Did you argue? About what?

What has the activity shown that we know about climate change?

What has it shown that we don't know or are uncertain about? What questions has it raised in your mind?

## Circle Sharing

### Time Needed

- 50 - 60 minutes

### Objectives/Explanation

- To enable students to share personal experiences and knowledge of climate change
- To recognize and pool questions and blind spots the class has about climate change

### Materials Needed

- Flip chart and marker or board and chalk

### Procedure

- Ask students to make two circles. Have half the students make an inner circle facing outwards; have the other half make an outer circle facing inwards, each person standing opposite someone in the inner circle.
- Ask everyone to quietly think about what they know about and have experienced of climate change.
- Ask facing pairs to take turns and, given two minutes each, share their knowledge and stories.
- The sharing finished, ask students in the outer circle to move one position to the left and discuss the same topic with their new partner.
- Possibly repeat the same process one more time.
- Now ask students in the outer circle move two positions to the left to face a new partner. Have the newly formed pairs exchange their views on what causes climate change. After four minutes, give a signal, and ask students in the outer circle to move two positions to the left and discuss the same topic with a new partner.
- Possible repeat the same process one more.
- Ask students in the outer circle to move three positions to the left to face a new partner. Have pairs exchange views on what needs to happen to reduce climate change. After four minutes ask students in the outer circle to move three positions to the left and discuss the same topic with a new partner.
- Possibly repeat the same process one more time.
- Hold a whole class reflection on what they heard as they discussed each of the three topics. What surprised them? What was new to them? What did they agree with? Disagree with?
- Finish by asking for a sharing of questions and blind spots on climate change. Note these down on the flip chart or board. Ensure they are addressed in subsequent work and research in class.

### Facilitation Guidance

This activity is a good introductory activity to climate change learning using peer learning. Each student is given space to share their own experiences, views, and perspectives, while each is exposed to and challenged by the experiences, views and perspectives of others.

The facilitator should judge the optimum number of repetitions of each stage but at least one repetition should happen.

The facilitator can also employ different topics relating to climate felt appropriate including ones particularly appropriate to the local context.

This is helpful for finding commonalities and differences, agreements and disagreements between students and for building empathetic understanding through a sharing of experiences.

It is important that the facilitator subsequently addresses — and is seen to address — the questions and blind spots raised in the final stage of the activity.

## Climate Change Picture Gallery (1)

### Time Needed

- 45 minutes (25 minutes pairs; 25 minutes whole class discussion)

### Objectives/Explanation

- To practice photograph interpretation as a means of approaching climate change issues
- To articulate personal responses to photographs before negotiating a joint response

### Materials Needed

- One set of 15 climate change photographs (Handout 2)

### Procedure

- Hang the photographs on the walls around the classroom.
- Ask students to form pairs and to go on a tour around the picture gallery. Their task is to discuss each photograph, what it is saying, what its implications are, and what their personal emotional response is to what they see.
- Have them in particular decide which photograph makes them feel most helpless, which most angry, which most concerned for the future, and which most motivated to do something about climate change. Have them also determine which photograph begs most questions and what those questions are.
- Collect photographs and bring the class together for a debriefing of the activity.

### Facilitation Guidance

This activity uses media interpretation (decoding and deconstruction) as a means of engaging with the impacts of climate change on the lives and wellbeing of humans and the other-than-human around the world. It can provoke powerfully emotional responses in students.

In debriefing the activity, the facilitator should have the photographs to hand. It is a good idea to start by holding up the photographs one by one and asking for interpretations of the message of each photograph. The debriefing should continue by reviewing decisions made one by one, i.e. asking for responses and facilitating debate and discussion on which photograph caused most helplessness, then moving on to which photograph elicited most anger, and so on. It is likely that some photographs were chosen under more than one heading. The question should be posed as to why this might be and if there are implications and insights for how we view climate change.

## Climate Change Webs

### Time Needed

- 80 minutes (30 to critically review, personally respond to, and arrange the statements; 15 to work on interconnections between statements; 15 minutes to consider the challenge presented by each statement; 20 minutes whole group discussion)

### Objectives/Explanation

- To critically examine a diverse range of explanations of human factors driving climate change
- To explore interrelationships between the explanations
- To reflect upon the nature and degree of the challenge that each explanation presents

### Materials Needed

- One cut-up set of Climate Change Explanations statements (Handout 3) for each group of three students
- One sheet of chart paper, a paste stick and two markers, each of a different color, for each group of three students. [Preferably, all groups should have markers of the same two colors.]

### Procedure

- Ask students to form groups of three.
- Distribute a set of Climate Change Explanations statements to each group.
- Ask the group to read and critically reflect on the significance of each of the ten statements, and encourage members to share their personal views on each statement.
- Ask groups to arrange the statements on their sheet of chart paper according to a system of their own choice (e.g. most significant in centre, least significant to the edges), and to stick them down.
- Go on to ask them to look for interconnections between all the statements and to indicate them on their chart by drawing in two-way arrows using one of their markers. Explanations of an interconnection should be written along each two-way arrow.
- Now invite groups to consider each of the statements in terms of how challenging it would be to tackle the problem described in each statement and so reduce the severity of climate change. Using their second marker, they write a number against each statement according to the following: 4 = hugely challenging; 3 = very challenging; 2 = somewhat challenging; 1 = not very challenging.
- One by one invite groups to briefly explain the main things they have learnt out of the exercise before widening into general discussion and reflection.

### Facilitation Guidance

This activity takes the climate change debate beyond science and into social, economic and cultural domains. All statements have serious implications for human society, some perhaps more profound and far-reaching than others. The statements themselves are likely to trigger keen debate but consideration of the challenges they face even more so. Questions to take the discussion forward:

- Which statement did you find the most provocative (convincing, significant), and which did you disagree about most, and why?
- Which statement had the most emotional effect on you, and why?
- What interconnections between statements did you find that made you think about climate change in new ways?
- Did you find that significant statements were also 'hugely challenging' statements? What does that suggest?
- Do you think climate change is mainly a scientific issue?

## Climate Change Stories

### Time Needed

- 60 minutes (10 minutes, brainstorming; 30 minutes, reading stories and considering them in groups; 20 minutes, sharing and discussion)

### Objectives/Explanation

- To consider the impact of climate change on peoples' lives by considering stories from around the world
- To consider where responsibility lies for helping those afflicted by climate change

### Materials Needed

- A flip chart and marker or board and chalk
- A few copies of each of the Climate Change Stories (Handout 4) so that each student has a story and so that groups of three or four can be formed of members having the same story. Alternatively use stories in Section D of the Regional Resource Pack
- One sheet of chart paper and marker for each group

### Procedure

- Begin by inviting students to brainstorm the effects climate change is having on their own lives or the lives of others. Write all ideas down on the flipchart or board without comment. Close the brainstorm session when ideas dry up.
- Distribute the story copies randomly amongst students. Then ask for groups of three or four to be formed of those with the same story.
- Ask individual group members to quietly read their story. Invite them to divide their chart paper into three columns titled Effects, Feelings, Who Should Do What? Following discussion of the story, ask groups to list the effects of climate change they see in the story in the first column, the feelings they experienced on reading the story in the second, their ideas on who should take responsibility for putting things right in the third.
- Have groups in turn summarize the story they have read before going on to identify the climate change effects they identified and to share emotions felt on reading the story.
- Open the general issue of responsibility to the whole group, encouraging participants to share ideas from their own charts.

### Facilitation Guidance

The facilitator should be prepared for an emotional response to the task and significant identification with those afflicted. It is important to allow for emotional release through quiet reflection, hugging, deep breathing or other modalities, as appropriate.

In facilitating the closing discussion on responsibility, the following questions can be used:

- Where does responsibility lie for the plight of people in the stories?
- Who should be helping out? The community? Regional authorities? National governments? International organizations? Wealthy nations? All, but in different ways?
- What are the implications of the stories for the prospect of sustainable communities?

## Sustainable Development and Climate Change Collages

### Time Needed

- 75 minutes (30 minutes Stage 1; 20 minutes Stage 2; 25 minutes Stage 3)

### Objectives/Explanation

- To have students share and pool their perceptions and understandings of sustainable development
- To challenge them by introducing other perceptions and understandings
- To consider the implications of present and future climate change for progress towards sustainable development

### Materials Needed

- 4 slips of blank paper per student
- One large sheet of chart paper for each group of 4 students
- One paste or glue stick
- Three markers for each group, each of a different color
- One cut-up set of statements from Perspectives on Sustainable Development (Handout 5) for each group
- One copy of Handout 5 for each student

### Procedure

#### Stage 1

- Ask students to work individually, avoiding discussion, as they write four statements each beginning 'Sustainable development is...'. There should be one statement on each of the four slips of paper. The four statements should capture their own understandings of what 'sustainable development' means and involves.
- Invite students to form groups of four to share and discuss what each has written. Then ask them to create a 'sustainable development' collage by arranging their 16 statements on a large sheet of chart paper, pasting them down, writing in comments and further explanations, and adding graphics (e.g. two-way arrows, cartoons). All this should be done using a marker of one color. They should also agree on and write down a one-sentence summary definition of 'sustainable development'.
- Ask each group to share their collage, closing their presentation with their one-sentence definition of 'sustainable development'.
- After each presentation encourage feedback and comment from the whole group on what has been said.

#### Stage 2

- Distribute a set of Perspectives on Sustainable Development statements to each group.
- Ask them to reconsider their collage in the light of the statements and in response to feedback to their Stage 1 presentation. They should add new ideas and insights they had previously overlooked, pasting in any of the statements that they wish and adding comments. For this stage, ask them to use a marker of a second color.
- Invite each group to report back briefly on what they have added.

### Facilitation Guidance

This activity again works on the principle of encouraging a sharing of what is known amongst students — in this case about sustainable development -before challenging them with new information and asking them to reflect and reconsider. Potential impacts of climate change on sustainable development are then considered, the facilitator moving attention towards how climate change action is crucial for sustainability prospects. Possible general questions to conclude Stage 3 are:

- How are different aspects of sustainable development likely to be affected by climate change?
- Will understandings of sustainable development need to be re-thought as climate change impacts worsen?
- If climate change proceeds unchecked, is sustainable development likely to become an impossible idea?
- What climate change actions should we take to ensure that sustainable development is something we can continue to work with and towards?

### Stage 3

- Ask groups to consider the implications for sustainable development of what they have learned so far about climate change.
- Invite them to add notes to their chart in a marker of a third color suggesting how present and future climate change is likely to affect prospects for sustainable development as variously interpreted on their chart. Also invite them to add in initial ideas on what might be done to limit or prevent negative impacts of climate change on future sustainability.
- Facilitate a reporting back and discussion session.

## Climate Change Notice Board

### Time Needed

- Short periods of time periodically

### Objectives/Explanation

- To encourage alertness to climate change in the news
- To have students consider and discuss recent news items on climate change

### Materials Needed

- News items collected and brought to school by students

### Procedure

- Have a classroom notice board reserved for climate change news items.
- Encourage students to keep an eye out for news items on climate change in newspapers and magazines, cut the items out and bring them to class to display on the notice board.
- Allot a period of time periodically for students to introduce and speak to items they have contributed and initiate a discussion on each item.

### Facilitation Guidance

The notice board is a useful device for helping maintain student alertness to climate change while providing a springboard for periodic student-led discussion.



United Nations  
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## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY ONE HANDOUTS

## Handout 1. Climate Change People Search

Find someone who:		Name	Notes from your discussion
1	Has joined in climate change community action		
2	Is worried about what the future might bring		
3	Has heard that a warming climate will bring new diseases		
4	Is not sure what the difference is between climate and weather		
5	Feels the normal rhythm of the seasons is changing		
6	Knows of people who have had to move because of the effects of climate change		
7	Can think of changes being made to stop climate change getting worse		
8	Blames wealthy nations for climate change		
9	Can share a recent climate change story		
10	Is trying to be 'green' by cutting down on energy use		
11	Believes that climate change is not that serious		

Day One: Climate Change Learning for Sustainable Development

12	Knows of a farmer who is worried about climate change		
13	Feels that their lifestyle and culture are under threat from climate change		
14	Thinks that girls and women will suffer most as the climate heats up		
15	Has seen the effects of climate change where they live		
16	Can think of changes being made to adapt to climate change		
17	Feels very emotional about climate change		
18	Has heard or read of awful climate change predictions		
19	Has learned of species going extinct because of climate change		
20	Thinks that their children will not be able to live as they have		

## Handout 2. Climate Change Photographs

Photo 1



**Have a close look at it and reflect on solutions**

Source: Shoot Nations

© Katharina Kuehnel, Germany

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Photo 2



**Improper disposal of hazardous waste in playing fields**

Source: Shoot Nations

© Lameck Nyagudi, Kenya

Reproduced here with permission.

Photo 3



**Drought=reduced harvest=hunger=death**

Source: © Thad Mermer

Reproduced here with permission.

Photo 4



**The desert keeps growing**

Source: © UNESCO/Alcoceba, Felipe

Reproduced here with permission.

Photo 5



**The farm field died because of extremely bad weather**

Source: Shoot Nations

© Denys Ostryk, Ukraine

Reproduced here with permission.

Photo 6



**Full of smiles and all hands with a cup of water**

Source: Shoot Nations

© Denys Ostryk, Ukraine

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Photo 7



**Water water everywhere, but not a drop to drink...**

Source:  Sherlock77 (James)

Photo 8



**Year 2050: Hey! It's Raining here at the North Pole**

Source: Shoot Nations

© Mehtab Singh, India

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Photo 9



**The price we have to pay for the sake of civilization**

Source: Shoot Nations

© Zahir Hasan, Bangladesh

Reproduced here with permission.

Photo 10



**We need a happy ending of our story. Don't you think so?**

Source: Shoot Nations

© Zahir Hasan, Bangladesh

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Photo 11



**Snow at unusual times**

Source: Shoot Nations

© Katharina Kuehnel, Germany

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Photo 12



Nowadays, the summers are hot, humid, and smouldering

Source:  Letizia Airoidi

Photo 13



**River my river, where are you**

Source: Shoot Nations

© Joel Suganth, India

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Photo 14



**To teach children to save their own health is our duty!**

Source: © UNESCO/Roger, Dominique

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Photo 15



**Sadness in the mind, in emotion, in action...**

Source: Shoot Nations

© Ulziibat Enkhtor, Switzerland

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### Handout 3. Climate Change Explanations

<p>1. Transport</p> <p>Transport currently causes 14% of global greenhouse gas emissions. Part of the problem is that wealth and carbon-based transport have tended to go hand in hand. When a nation gets richer, its citizens change from walking and cycling, through buses and local trains, to cars, high-speed trains and air travel.</p>	<p>2. Disconnection from Nature</p> <p>Climate change arises from separating ourselves from nature. Urbanization and technology have isolated people from the effects of nature, especially weather. With ‘progress’ we have also become psychologically separated from nature, feel ‘above’ nature, and treat it as a ‘resource’ to exploit.</p>
<p>3. Population growth</p> <p>Population growth typically means increased greenhouse gas emissions. The world’s population is expected to grow from today’s 7 billion to between 8.0 and 10.5 billion by 2050. The majority of this growth is likely to be concentrated in areas and among populations – poor, urban and coastal – that are already highly vulnerable to climate change impacts.</p>	<p>4. Deforestation</p> <p>Deforestation and forest degradation, through agricultural expansion, conversion to pastureland, infrastructure development, destructive logging, and fires, account for nearly 20% of global greenhouse gas emissions, more than the entire global transportation sector and second only to the energy sector.</p>
<p>5. Agriculture</p> <p>Industrial agriculture is a major contributor to climate change, and a significant portion of the greenhouse gas emissions created by industrial agriculture are generated by agricultural pesticides and chemicals, deforestation and the burning of biomass.</p>	<p>6. Consumerism</p> <p>Climate change is a symptom of a larger issue – consumerism – that is to say, consumption beyond the level of dignified sufficiency. It is fuelled by human wants not needs. Advertising manufactures desire for things that we don’t really need, the result being that we desire and consume more to feel good about ourselves. As the market works to produce supplies to meet the demand, the economy grows, and the planet heats up.</p>
<p>7. Urban areas</p> <p>With half of the global population living in urban areas, cities are already consuming 75 per cent of the world’s energy and are contributing to a similar proportion of all waste, including greenhouse gas emissions.</p>	<p>8. Economic growth</p> <p>Belief in economic growth has become a faith not to be questioned. Governments tell us growth is necessary to build schools and hospitals, save the poor, and cure unemployment. But economic growth built on fossil fuel usage is the key reason the climate is changing. The term ‘Green Economy’ has been coined to describe economic growth based on renewable energy sources and green jobs.</p>
<p>9. About people</p> <p>Population growth typically means increased greenhouse gas emissions. But unsustainable consumption and per capita emissions are generally much higher in rich, industrialized countries. So it is important to remember that population is not just about numbers, it’s about people, their choices and lifestyles.</p>	<p>10. Fossil fuels</p> <p>Fossil fuels (oil, natural gas, and coal) provide most of the energy used to produce electricity, run automobiles, heat houses, and power factories. Carbon dioxide from the burning the fossil fuels is the largest single source of greenhouse emissions from human activities.</p>

**Sources:**

1. Amended from: Gabrielle Walker and David King (2008) *The Hot Topic: How to Tackle Global Warming and Still Keep the Lights on*. London: Bloomsbury, 118.
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## Handout 4. Climate Change Stories

### Story 1: Nguyen Thi Lahn: A Climate Change Story from Viet Nam

Life has never been easy for Nguyen Thi Lahn, 51, from Quang Tri Province in Viet Nam. Viet Nam, with some 3,500 kilometres of coastline and large populations concentrated in low-lying delta regions, is especially vulnerable to the effects of climate change. Storms have become more intense and frequent, and the storm season now lasts longer.

The toll taken by extreme weather began at least a decade ago, recall Lanh and her husband, Phi, referring to the 1999 floods. 'We lost our rice, our pigs and chickens, everything. The water came up to the window. The flood came suddenly, and we could not prepare anything in advance,' Phi says. 'We moved to the temple, looking for shelter. We did not have time to take our belongings, just the clothes we were wearing, Lanh adds. In recent years, rains have become unusually heavy, making it impossible for farmers to plant on time, and harvests have therefore been smaller.

'Now we have to work harder because there often are floods, and we are afraid that in the future the situation will be even worse,' Lahn says. She's not alone — women, especially those in poor countries — are among the most vulnerable to climate change. In Viet Nam and in many other countries affected by climate change, men migrate to the cities in search of jobs, while women are usually left behind to take on all the responsibilities for their households, often including planting and harvesting, taking care of livestock and providing for their families. 'When my husband is not at home, I have to work in the field. And in order to pay the school fees, I work extra time in construction, even though I am not in good health,' she goes on, adding that she does her best to remain prepared for floods. Her home, like many in the area, has raised lofts so she can move belongings to higher places and keep the children safe when the waters rise, she explains.

Lanh — and many other women in Quang Tri — know that weather is no longer predictable and that flooding can happen almost any time. She and her neighbours participate in meetings and workshops organized once or twice per month by the Women's Union in Hai Ba Commune, where climate change and natural disasters are recurrent topics. The villagers carry out evacuation drills, discuss emergency preparations and receive first aid training. It's a chance for women to share their experiences on how to protect themselves, their families and their livelihoods during the flood season.

#### Source

Amended from: United Nations Population Fund (2009), '*Facing the Flood: Women cope with Climate Change in Viet Nam*' reported by Maria Larrinaga, with support from Oxfam Viet Nam. For the full story, visit [http://www.unfpa.org/public/media\\_resources/swp09](http://www.unfpa.org/public/media_resources/swp09)  
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## Story 2: Lars-Anders Baer: A Climate Change Story from Scandinavia

The indigenous Saamis are feeling the heat of global warming. Some 60,000 to 100,000 Saamis spread out across Finland, Norway, Sweden and Russia, making a living partly from fishing and hunting. Many of them, however, herd reindeer —the backbone of the traditional economy. Reindeer meat is prized for its flavour, tenderness and low fat content. The hides, bones and antlers are used for clothing and handicrafts.

Warmer weather has had an immediate toll on the Saamis. Lichen, a mossy fungus on rocks, abundant in these lands, is getting trapped under a layer of ice that forms as a result of rises and falls in temperature. It is the reindeer's main source of nutrition during the long winter months; however, herds are increasingly unable to reach it. 'A reindeer can normally dig through as much as one metre of snow to get to the lichen,' says Lars-Anders Baer, President of the Saami Parliament based in Kiruna, in northern Sweden. 'But now, with less snow and more ice, the plant is no longer accessible.' Feeding reindeer that cannot find enough food on their own is putting a huge financial burden on the herders. Recently, says Lars-Anders Baer, 'around 100,000 reindeer were not able to eat the lichen, so we had to give them extra food to prevent them from dying.' Despite government subsidies, the extra cost, amplified by the latest food crisis and a decline in revenues, has forced many to sell their reindeer and quit herding, which, he says, 'is essential for the survival of our culture.'

On a wider scale, pastures are starting to shrink due to the change in weather. 'As the snow melts, we can see the tree line climbing,' he says. 'This means that the ground is becoming more hospitable for agriculture and other uses, and that less pastures are available for the reindeer.' Central governments and the private sector, which had long shied away from the bitterly cold temperatures, have taken note of the available land. The land is particularly desirable since its ownership rights have not been determined yet.

'New interests are coming into our territory,' says Lars-Anders Baer. 'For example, men working in oil and gas exploration are bringing along new symptoms associated with modernization, such as alcohol consumption, prostitution and suicides. This is putting the indigenous communities under pressure. Reindeer herders are good at adapting to normal weather fluctuations,' he says. 'However, it is these secondary consequences of climate change that are troubling the Saamis. They are trying to cope with them by adopting new methods of doing business, such as changing reindeer movement patterns, introducing extra feeding and combining traditional and modern knowledge. 'The whole Swedish society is adapting to climate change, and we have to do the same,' he says. 'However, we are very concerned about possible social and cultural consequences, and will have to work hard on preserving our rights, our language and our way of life.' 'The climate and the cold weather have been our greatest defenders,' he adds. 'But now, when the climate has changed, it has opened up the area.'

### Source

Taken from: United Nations Population Fund (2009), '*Scandinavia's Indigenous Saami Way of Life Threatened by Thawing Tundra*'.

For the full story, visit: [http://www.unfpa.org/public/media\\_resources/swp09](http://www.unfpa.org/public/media_resources/swp09)

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### Story 3: Thombi Masondro: A Climate Change Story from South Africa

According to Constansia Musvoto, researcher with the South African Council for Scientific and Industrial Research, rainfall patterns in the region have notably changed since the 1960s. Musvoto says the climate changes will have a tremendous effect on agriculture and the availability of clean water in the province. 'Southern Africa will be hit heavily by climate change over the next 70 years,' she says. 'Agricultural production is projected to be halved, a development that will threaten the livelihoods of farmers in a region where 70 per cent of the population is smallholder farmers.'

Thombi Masondo, 57, takes a rest after working under the baking sun on her 10-acre farm. Her crops are dying before they have a chance to break the soil. The area, dry at the best of times, is experiencing the longest ever rainless stretch in its history. Masondo has seen weather conditions change substantially over the past 30 years, with rains often starting a month later than they used to.

The province, long vulnerable to drought, has seen worsening dry spells. It often rains continuously for almost a week, which is bad news for the crops. Rising temperatures, delayed and unreliable rainfall, soil erosion, and severe droughts are making it difficult for small-scale farmers to continue growing food such as maize and beans in this drought-prone area.

Masondo, a gray-haired mother of five, scrapes her living growing crops which she sells at the nearest market to raise money to send her children and some of her grandchildren to school. Her husband died of AIDS in 2004, and the illness has also claimed two of her daughters, leaving her to look after their three orphaned children.

Limpopo is one of the poorest provinces in South Africa with a rural population of 89 per cent with a relatively high illiteracy and unemployment rates. It is the epicentre of South Africa's hunger but the government is responding with painful slowness. People rely heavily on agriculture for household food security. Growing malnutrition has led to reports of disease-related deaths among young children weakened by hunger. Drought has also weakened the animals and many died from hypothermia during the recent rains. The three cows dozing near to Masondo are the only ones left after more than 13 of her herd died during the droughts of the past four years. This, for her, was like losing part of her body as she used these cattle to plough her land, plant her crops and ferry her products from the field to the market. The area as a whole, she says, lost 'thousands of cows.'

#### Source

Taken from: Panos London. '*Limpopo Goes Hungry as Climate Change Bites.*'

For the full story, visit: <http://panos.org.uk/features/limpopo-goes-hungry-as-climate-change-bites/>  
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## Story 4: Corey Marchbank: A Climate Change Story from Canada

Corey Marchbank, 35, lives in Miscouche, Prince Edward Island, Canada. He works as a goose hunting guide, which means that he takes goose hunters out to the field. He began hunting with his father not long after he learned to walk, and his love of the outdoors led him to become a professional guide 14 years ago. He hunts with clients from the United States and other Canadian provinces.

For decades, the grain and potato fields around his home have been the primary location for consistent, high quality goose hunting, though lately things have been changing. In recent years he has noticed a dramatic rise in temperatures, a decrease of winter snow and ice, and how these changes have been affecting the migration patterns of Canadian geese in this region.

The goose hunting season starts on the first Monday in October and ends the second Saturday in December. Usually by the season opening the weather is a bit chilly but, over the last two years, right up to November, he was still swatting mosquitoes, wearing T-shirts and sneakers — not hunting jackets as it used to be.

‘We used to get snow by 1 November, but now we’re lucky to get snow by Christmas. During the winter of 2006-07 there wasn’t more than a week of good snowmobiling weather. In years past, snowmobiling was good from Christmas through spring. And I remember when I was a kid, you’d go outside and the snow would be up to the level of the power lines and there were warnings on the radio not to let the kids out. I haven’t seen that in a long time,’ he says.

With the increase in fall temperatures, Canadian geese are migrating south much later in the year. When it eventually gets cold and they migrate through Prince Edward Island, the geese hang out in the local bays and estuaries instead of collecting spent grain and potatoes from the agricultural fields. This is happening for a couple of reasons. First, the waters have not been freezing over like they used to. Second, without the cold temperatures, the geese don’t have the same pressure to stock up on food before continuing their migration south. ‘With the hot sunny days we’ve been having, the geese tend stay out on the water and don’t come inland at all. It’s a big change,’ he says. ‘And now, some of the geese are even staying around all year. I’ve never seen geese do this. They know not to take their chances though, and if it’s mild around here, they’ll stick around and take advantage of it.’

‘Usually the first two weeks of the hunting season are the best hunting that you have the whole season. Now, most hunters are going home with nothing. During the last two years, on opening day, we haven’t shot a single goose. I have a group of four guys that come every year, and just like clock-work, they expect to get their geese. But the last two years on opening day they didn’t get any. Clients are starting to say to me, “Gee, do you remember when we used to go out and the geese were everywhere and now you can go out on opening day and not see any geese at all?” ‘

### Source

Taken from: WWF *Climate Witness: Corey Warchbank, Canada*. For the full story, visit: [http://wwf.panda.org/about\\_our\\_earth/aboutcc/problems/people\\_at\\_risk/personal\\_stories/witness\\_stories/map.cfm](http://wwf.panda.org/about_our_earth/aboutcc/problems/people_at_risk/personal_stories/witness_stories/map.cfm) © 2007WWF (panda.org). Some rights reserved. Reproduced here with permission.

## Story 5: Ben Namakin, A Climate Change Story from Kiribati and Micronesia

**Ben Namakin is originally from Kiribati. He currently lives in Pohnpei (formerly known as Ponape) in the Federated States of Micronesia (FSM) and works as an environmental educator for the Conservation Society of Pohnpei (CSP), the only local environment non-government organisation on the island.**

During Ben Namakin's childhood days in Kiribati, people never experienced severe sea flooding. There were storms, but they weren't that bad. As the sea levels continue to rise in Kiribati, several king tides have hit the island. Saltwater intrusion affects the quality of water in wells, floods taro (root vegetable) patches, gardens, and puts stress on plants and trees that are very important to the life and culture in Kiribati.

'Pandanus trees mean a lot to us,' he says. 'They are used for house construction, local medicine, food, traditional clothing, etc., but are dying from saltwater intrusion. Serious storm surges cause coastal erosion, floods grave yards, and in 2006, led to the collapse of the beautiful Dai Nippon causeway. This incident brought huge costs to the people of Kiribati. They had to build new homes with their own finance, and dig up their deceased relatives from their graves and bury them further inland.'

While studying for his High School Diploma in Pohnpei in 2001, during his free time, he would hang out with his friends on a small islet, Dekehtik, located on the barrier reef a couple of miles away from the school. It was his favourite camping, picnicking and snorkelling spot. In 2005, he found to his surprise that Dekehtik Islet had split into two. "I went to see for myself, with my own eyes, and there it was, badly destroyed by sea flooding. How sad to see this unexpected, sudden threat to the islanders and the landowners!," he says.

Visiting the community on the coast of Sokehs, Pohnpei, he learned that many villagers had built their houses on raised foundations as the seawater was flooding their homes during high tide. They also built walls in front of their houses to prevent flooding during heavy rains. The villagers he spoke to mentioned noticing these changes in the last five years but not in the past.

'The civil, economic, social and cultural rights that climate change abuses have strengthened my spirit to stand up for my nation, fight for our rights and to let many people know that we need to do something now to stop global warming,' he adds.

He participated at the Youth Summit during the United Nations Conference on Climate Change in 2005. He spoke at the conference plenary session which had more than 10,000 people deliver the youth's message on 'Our Climate, Our Challenge, Our Future'. In 2006, he participated in a Climate Change tour across the United States. Through seminars, he encouraged university students to join the climate change movement. He also worked hard to convince leaders in the USA to improve US policy on clean energy to address climate change, ratify the Kyoto Protocol, and most importantly make decisions that will not affect his people in the Pacific Islands negatively.

### Source

Taken from: WWF *Climate Witness: Ben Namakin: Kiribati and Micronesia*.

For the full story, visit: [http://www.panda.org/about\\_our\\_earth/aboutcc/problems/people\\_at\\_risk/personal\\_stories/witness\\_stories/?100800/1/](http://www.panda.org/about_our_earth/aboutcc/problems/people_at_risk/personal_stories/witness_stories/?100800/1/) © 2007 WWF (panda.org). Some rights reserved. Reproduced here with permission.

## Story 6: The Communities of the Chacaltaya Glacier: A Climate Change Story from Bolivia

On the steep slopes leading down from the Huayna Potosi and Chacaltaya mountains lies a string of tiny communities that make a meagre living by keeping llamas, sheep and chickens and by growing small crops of potatoes and oca, a perennial plant grown in the central and southern Andes. High above them, the Chacaltaya glacier that has sustained these activities is retreating at a completely unexpected pace - three times as quickly as was predicted just ten years ago - and will be gone in a generation. The glacier that once supported a ski resort is now reduced to a small chunk of snow and ice nestled just below the 18,000-foot summit. With it, a web of life that depends on the water seeping down from the glacier is changing forever.

Many of the slopes are now farmed primarily by women, some of them in their seventies, some of them girls who should be in school. Though they manage to survive off the land, there's nothing left over to sell, so many of the men have been forced to leave the mountains to take whatever work they can find in the nearby cities of La Paz or El Alto.

Village leader Felix Quispe, for example, feels deeply connected to the land his family has worked for generations. But now he spends much of his time in the city, selling toilet paper and cleaning windows. 'It is very sad,' he says, 'Many people have left and houses are abandoned. Husbands only come home maybe twice a month. It would be great to live like before and not be heartbroken every day.'

'Young people tend to leave these areas,' says Jaime Nadal, the UNFPA, United Nations Population Fund, representative in Bolivia. 'Old women are typically left in the community having to perform harder and harder tasks to keep up the household. We already see mostly old women in many of these communities.'

Cultural traditions heighten the sadness of these changes. For one thing, a culture that values a mutual sharing of men and women's roles is being disrupted by recent changes. And the people mourn the unravelling of their deep connection with Pachamama, Mother Earth. 'This is a culture that is very much attached to the land, says Jaime Nadal. 'In our culture, the person is a person in the context of the field, the sun, the earth, the water.'

The loss of the glaciers also jeopardizes water supplies for the cities of La Paz and El Alto. 'What will the world do when two million people will not have water for drinking?' asks Jose Gutierrez, a climate change expert in Bolivia. 'The world needs to know what is happening in Bolivia,' he adds. 'We are losing something that is a human right, a source of life - water for drinking, for food, for the animals, for electricity. We also need to have a future, as any other people in this world.'

### Source

Taken from: United Nations Population Fund (2009), *Melting glaciers alter a way of life: Adapting to harsh, new realities in Bolivia* reported by Trygve Olfarnes and Andi Gitow. For the full story, visit: [http://www.unfpa.org/public/media\\_resources/swp09](http://www.unfpa.org/public/media_resources/swp09)  
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## Handout 5. Sustainable Development and Climate Change Collages

### Perspective 1: Green Economy

“The proximate (first to be achieved) goal in the creation of a green economy is the notion of making the economy more ecologically efficient—meeting our economic needs without compromising our ecological integrity.”

Source: The Frederick S. Pardee Center for the Study of the Longer-Range Future at Boston University (2011). *Beyond Rio +20: Governance for a Green Economy*. p. 9.

### Perspective 2: Fairness and Justice for Future Generations

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Source: World Commission on Environment and Development (1987). *Our Common Future*.

### Perspective 3: No Unsustainable Exploitation of Global Resources

“Sustainable development shall never be attained as long as unsustainable exploitation of the earth’s resources by the North continues.” [Sustainable Development should seek] “to redress existing imbalances by ensuring equity in ...the control and exploitation of global resources.”

Source: *The Isiolo Declaration: Africa’s Perspective on Environment and Development* (n.d.).

### Perspective 4: Gender Equity and the Empowerment of Women

(1) “Gender equality and the empowerment of women [are] effective ways to combat poverty, hunger and disease and to stimulate development that is truly sustainable.”

Source: United Nations Millennium Declaration (2000).

(2) “The empowerment of women and improvement of their status are important ends in themselves and are essential for the achievement of sustainable development.”

Source: International Conference on Population and Development (1994). *Summary of the Programme of Action*.

### Perspective 5: The Need for Global Partnership

“Integration of environment and development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future. No nation can achieve this on its own; but together we can - in a global partnership for sustainable development.”

Source: United Nations Conference on Environment and Development. *Agenda 21. Preamble* (1992).

### Perspective 6: Aboriginal Perspectives

“Embedded within the Aboriginal world view is the concept of collective responsibility for tending the land and using only that which is needed for sustenance. Important, as well, is the interconnectedness and interdependence of all life forms — humankind, flora and fauna, and all that exists on the Earth. The concept of sustainability is not new to Aboriginal people; they are very aware of the growing need for all humans to show greater respect for the environment — respect for Mother Earth — if we are to continue to coexist in this world.”

Source: *Aboriginal Perspectives of Sustainable Development*, p. 1 (n.d.).

### Perspective 7: Sustainable Human Development

“Sustainable human development aims to eliminate poverty, promote human dignity and rights, and provide equitable opportunities for all through good governance, thereby promoting the realization of all human rights, economic, social, cultural, civil and political.”

Source: UNDP (1998). *Integrating human rights with sustainable human development: A UNDP policy document*.

## Website References

Web links are available for some of the above documents:

- Perspective 1:  
<http://www.bu.edu/pardee/files/2011/03/Rio20TFC-Mar2011.pdf>
- Perspective 3:  
<http://www.un-ngls.org/orf/documents/publications.en/voices.africa/number5/vfa5.04.htm>
- Perspective 4:  
(1) <http://www.un.org/millennium/declaration/ares552e.htm>  
(2) <http://www.un.org/ecosocdev/geninfo/populatin/icpd.htm#chapter4>
- Perspective 5:  
[http://www.un.org/esa/dsd/agenda21/res\\_agenda21\\_01.shtml](http://www.un.org/esa/dsd/agenda21/res_agenda21_01.shtml)
- Perspective 6:  
[http://www.edu.gov.mb.ca/k12/cur/socstud/frame\\_found\\_sr2/tns/tn-41.pdf](http://www.edu.gov.mb.ca/k12/cur/socstud/frame_found_sr2/tns/tn-41.pdf)
- Perspective 7:  
<http://mirror.undp.org/magnet/Docs/policy5.html>

## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE IN THE CLASSROOM



## Day 2 - Futures Learning

### Facilitation Guide for Classroom Activities



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## Picturing the Future

### Time Needed

- 45 minutes (10 minutes for drawing; 15 minutes for circulating; 20 minutes for discussion)

### Objectives/Explanation

- To enable students to envision the future and learn of others' visions of the future
- To practice working with some key concepts in futures learning
- To enquire into how much climate change is intruding into personal and collective images and visions of the future

### Materials Needed

- A half-sheet of plain paper for each student
- A marker, crayon or pencil for each student

### Procedure

- Ask students to sit quietly on their own, think about the future, and then draw their images and visions of the future on the half-sheet of paper. Repeat the instruction but do not elaborate further.
- Ask them to interpret the task in their own way and to represent the future only through drawings, not writing. They should not worry about the quality of their artwork!
- The drawing completed, ask students to move around the room and form pairs or small groupings, explaining their drawings and learning about the images and visions of others. They should move on to form different pairs and small groupings in the time available so they meet with a good cross-section of the class.
- The facilitator leads a class discussion on what participants found out.

### Facilitation Guidance

This is a simple activity but one that can be profoundly revealing. The explanation of the nature of the task is purposefully vague to encourage creativity and resourcefulness. The sharing process will bring students face to face with different perspectives on the future. Of critical interest will be the degree to which climate change impinges on images and visions of the future. Have participants understood how deeply climate change will affect their lives? Or, has a climate changed future still to pervade future hopes and expectations? Possible debriefing questions might include:

- Did you find things that were common to many, even all, drawings you saw?
- Did you find very different images and visions of the future? In general terms, were the images and visions optimistic or pessimistic?
- Were the images and visions of probable, feasible or preferred futures?
- Did you find a mix of images of personal futures, local futures, national or regional futures, or global futures in what people drew? Or, did some drawings limit their scope in some way?
- Did climate change figure in the drawings? How?
- If climate change did not figure in the drawings, why might that be?
- Who has a role in helping bring about positive future scenarios and in preventing negative future scenarios?

## Degrees of Danger

### Time Needed

- 80 minutes (40 minutes in groups; 40 minutes reporting back and whole group discussion)

### Objectives/Explanation

- To raise awareness of predictions for the effects of climate change in the twenty-first century in the world and regionally
- To consider what manifestations of climate change, taken separately and taken together, will mean nationally and regionally
- To take students to the threshold of considering what can be done individually and collectively to limit the effects of climate change

### Materials Needed

- A pack comprising the first document in Section A of the Regional Resource Pack, the IPCC Impact of Climate Change chart in the same section, Handout 1 and Handout 2
- Chart paper and marker for each group

### Procedure

- Begin by explaining that the class is going to look at documentation predicting what climate change will bring in the twenty-first century. Some of the documentation is from the Intergovernmental Panel on Climate Change and comes from some of the world's most respected scientists, but also included in the documentation are 'future histories' of the twenty-first century written by writers who have drawn on scientific evidence but write for a wider audience.
- Explain, too, that the different documents predict what will happen with different rises in temperature and that the view of the UN and most governments is that a 2.00 Centigrade rise in global surface temperature above pre-industrial levels is livable with. There are leading scientists, however, who think that the rise in temperature cannot be held at 2.00 rise without drastic action now.
- Have the class form groups of four around tables.
- Distribute the packs of materials.
- Have students read through all the data, discuss it, and then focus on two questions: How will what is predicted directly affect my country and region? How will what is predicted indirectly affect my country and region? Point out with regard to the second question that in an increasingly connected world a climate change impact far away can reverberate through the world system and affect the economy and society of other lands and peoples. They should consider the two questions for a 1.00, 2.00 and 3.00 rise in global surface temperature.
- Have students list their conclusions on chart paper in two columns headed Direct Effects and Indirect Effects.
- Ask each group to report back and then engage the class in discussion of what has been read and reported.

### Facilitation Guidance

This activity can leave groups with feelings of despondency, pessimism and hopelessness. It is important to give space and legitimacy to such feelings but balance them somewhat by pointing out that predictions and future histories offer powerful means of focusing the minds of people and governments and so encouraging pre-emptive action in the present. For that reason, a key debriefing question concerns how to use such negative scenarios to focus the mind and help effect change. Point out that the class will be moving on to explore ways of limiting climate change and of adapting to it in which young people can play a significant part.

An important question to ask in the debriefing concerns how different effects - whether they be direct and indirect - might interact and so become mutually amplifying.

## Climate Futures Wheel

### Time Needed

- 70 minutes (35 minutes for Stage 1; 35 minutes for Stage 2)

### Objectives/Explanation

- To consider the range of probable and possible near and mid-term consequences (and knock-on effects) arising with the onset of increasingly severe climate change
- To explore the likely interplay between the consequences and so encourage systemic thinking about climate change impacts

### Materials Needed

- Large sheet of chart paper and two markers of different colors for each group of three or four students
- A copy of the relevant regional page of Handout 1 for each group
- Pins and/or adhesive tape

### Procedure

#### Stage 1

- Invite students to form groups of three or four and distribute the chart paper and markers.
- Demonstrate the futures wheel idea on the flip chart or chalkboard (Box 1).

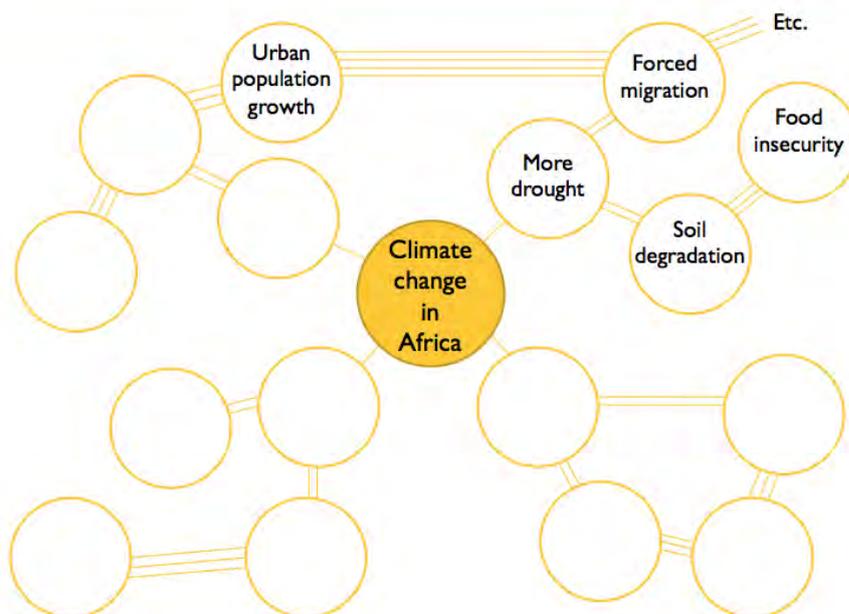
### Facilitation Guidance

The futures wheel device helps show how immediate consequences of climate change will themselves trigger a range of knock-on effects. In itself it is not much of an aid to discerning interrelationships between effects. This is why the corrective of using a second marker to identify links between consequences is employed. The linking stage of the activity will show how various combinations of consequences can exacerbate the climate change threat; also how combinations of consequences can themselves become key drivers in accelerating climate change. The facilitator might focus on the following in the debriefing discussion:

- Differences in group presentations (interpretations, emphases, omissions)
- The problematic nature of forecasting given the variables, unknowns and uncertainties of complex systems; in particular, forecasting local manifestations
- Interrelationships between consequences that students felt other groups had overlooked

### Box 1.

## Climate Futures Wheel - Example



## Day Two: Futures Learning

- Ask groups to write the words 'Climate Change in (name of place, country or region)' in the center of the sheet and to draw a circle round the words. They should use only one marker.
- Ask them to consider likely concrete effects of climate change in their place/country/region, draw single lines radiating out from the central circle, write in each of the effects, and draw a circle around each.
- Have them then consider the possible repercussions from the first set of consequences (the first-order consequences). This time they draw double lines radiating out to one or more second-order consequences arising from each first-order consequence.
- Encourage them to go on and write in and circle third-, fourth- and even fifth-order consequences.
- Ask groups to consider how different consequences might work together to amplify the consequences for human communities and the severity of climate change. The consequences should be linked by drawing a two-way arrow between the consequences concerned, with an explanation written in. For this the second marker should be used.

### Stage 2

- Have groups hang their charts on the classroom wall or pin board, and invite everyone to go read the work of other groups.
- Lead a whole group debriefing discussion.

### Variations

- Collect articles on local or regional climate change happenings and have groups stick the article in the center of the sheet.
- Have groups choose a specific local or regional climate change event and have them write it in the center circle.

Source: Sustainability Frontiers

## Climate Change Future Scenarios (2030)

### Time Needed

- 75 minutes (30 minutes in initial groups, 20 minutes in combined groups, 25 minutes in whole group discussion)

### Objectives/Explanation

- To examine a collection of climate-changed future scenarios and consider their credibility and desirability
- To reflect on what, if anything, should be done now in anticipation of the scenarios

### Materials Needed

- A cut-up set of scenarios (Handout 3) for each group of three or four students
- A sheet of chart paper, marker and paste stick per group
- A copy of Handout 4 per participant

### Procedure

- Invite students to form groups of three or four members.
- Distribute a set of scenarios to each group (which they are to place on the table upside down like a pack of cards).
- Write up the material in Box 2 on the flip chart or chalk board and ask each group to copy it onto their chart paper using all the paper space available.
- Ask members of each group to take it in turns to pick up a card and read out the future scenario on the card. [Stress that all scenarios that are suggested are seen as having their roots in climate change.] The group should discuss the scenario and try to reach agreement as to whether what is being predicted is Likely and Desirable or Likely but Undesirable or Unlikely but Desirable or Unlikely and Undesirable. They paste the scenario on the appropriate line on the chart. If group members are unable to reach agreement, they place the scenario on the Can't Agree line. They move on to the next scenario...
- When all the statements have been placed, ask each group to join with another group to explain and discuss their decisions.
- Conduct a whole group discussion.

### Facilitation Guidance

This activity works on two levels. First, it is about engaging with a range of scenarios set in a climate-changed future. Second it is about engaging with the perspectives and value positions of students as they are raised in the discussion of the scenarios.

In the whole group debriefing, the facilitator should first ask about scenarios that engendered the most debate and discussion (this will include scenarios placed in the Can't Agree scenarios). Where did the disagreement lie? What was at the root of the disagreement? Different perspective? Different values?

Students should also be asked whether they found that the scenarios fell into categories, and, if so, what the categories might be.

Finally, the class should be reminded that future scenarios are, more than anything, tools to make us think about the present and our actions in the present. If a scenario is Likely and Desirable what do we need to do now to ensure it happens? If a scenario is Likely but Undesirable what do we need to do now to help ensure it doesn't happen? If a scenario is Unlikely but Desirable what do we need to do to push it towards realization? If a scenario is Unlikely and Undesirable is there anything we should be doing or can we just let things lie? The discussion will work better if the group concretely considers one or more particular scenarios falling under each heading.

### Box 2.

LIKELY/DESIRABLE -----

LIKELY/UNDESIRABLE -----

UNLIKELY/DESIRABLE -----

UNLIKELY/UNDESIRABLE -----

CAN'T AGREE -----

## Inheritance

### Time Needed

- 40 minutes (10 for the first milling exercise; 20 in role as young people in 2050, including letter writing time; 10 reading out letters)

### Objectives/Explanation

- To introduce the ideas of intergenerational justice and accountability
- To introduce the idea of looking at 'history backwards'

### Materials Needed

- A copy, printed both sides, of the two-page Inheritance sheet (Handout 5) for each student

### Procedure

- Distribute the Inheritance sheet.
- Ask students to stand up and mill around and ask each other in what ways earlier generations have improved the quality of life of their generation and in what ways they have reduced the quality of life for their generation. Positive inheritances are listed in the left-hand column; negative inheritances in the right-hand column.
- Now ask the class to take on the role of young people living in the climate-changed world of 2050. They mill around again and (staying in role) share thoughts on how the previous two generations have, on the one hand, enhanced their life quality and, on the other, passed on a reduced inheritance. The two columns on the second side of the Inheritance chart are completed.
- Invite students to form groups of three, to sit, and (still in role) compose a 'To Whom it May Concern' letter to someone living in the 2010s. Ask them to point out in the letter what was being done and what was not being done in the 2010s to ensure an equal and just quality of life and wellbeing for their generation. Very importantly, ask them to decide to whom the letter should be addressed in the 2010s. It can go to any person, group of people (of whatever size) or organization in their country or around the world that they hold to be particularly responsible for any loss of quality of life for their generation.
- Ask each group to read out their letter and to say to whom they have addressed it and why.

### Facilitation Guidance

This can be a powerful, emotional experience, especially in the reading of the letters. It is best not to debrief the activity but merely let it stand as an experience.

At some point after the activity the notions of intergenerational accountability and justice should be elaborated.



United Nations  
Educational, Scientific and  
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## Day / Focus

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# DAY TWO HANDOUTS

## Handout 1. Climate Change Regional Impact Descriptions

### Africa

- New studies confirm that Africa is one of the most vulnerable continents to climate variability and change because of multiple stresses and low adaptive capacity. Some adaptation to current climate variability is taking place; however, this may be insufficient for future changes in climate.
- By 2020, between 75 million and 250 million people are projected to be exposed to increased water stress due to climate change. If coupled with increased demand for water, this will adversely affect livelihoods and exacerbate water-related problems.
- Agricultural production, including access to food, in many African countries and regions is projected to be severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are expected to decrease. This would further adversely affect food security and exacerbate malnutrition in the continent. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020.
- Local food supplies are projected to be negatively affected by decreasing fisheries resources in large lakes due to rising water temperatures, which may be exacerbated by continued over-fishing.
- Towards the end of the 21st century, projected sea-level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5-10% of Gross Domestic Product (GDP). Mangroves and coral reefs are projected to be further degraded, with additional consequences for fisheries and tourism.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p13. Cambridge University Press. Reproduced here with permission.

## Asia

- Climate change is projected to impinge on the sustainable development of most developing countries of Asia, as it compounds the pressures on natural resources and the environment associated with rapid urbanization, industrialization, and economic development.
- Glacier melt in the Himalayas is projected to increase flooding and rock avalanches from destabilized slopes, and to affect water resources within the next two to three decades. This will be followed by decreased river flows as the glaciers recede.
- Freshwater availability in Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease due to climate change which, along with population growth and increasing demand arising from higher standards of living, could adversely affect more than a billion people by the 2050s.
- Coastal areas, especially heavily-populated megadelta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some megadeltas, flooding from the rivers.
- It is projected that crop yields could increase up to 20% in East and South-East Asia while they could decrease up to 30% in Central and South Asia by the mid-21st century. Taken together, and considering the influence of rapid population growth and urbanization, the risk of hunger is projected to remain very high in several developing countries.
- Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and South-East Asia due to projected changes in the hydrological cycle associated with global warming. Increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p13. Cambridge University Press. Reproduced here with permission.

## Europe and North America

### Europe

- For the first time, wide-ranging impacts of changes in current climate have been documented: retreating glaciers, longer growing seasons, shift of species ranges, and health impacts due to a heat wave of unprecedented magnitude. The observed changes described above are consistent with those projected for future climate change.
- Nearly all European regions are anticipated to be negatively affected by some future impacts of climate change, and these will pose challenges to many economic sectors. climate change is expected to magnify regional differences in Europe's natural resources and assets. Negative impacts will include increased risk of inland flash floods, and more frequent coastal flooding and increased erosion (due to storminess and sea-level rise). The great majority of organisms and ecosystems will have difficulty adapting to climate change. Mountainous areas will face glacier retreat, reduced snow cover and winter tourism, and extensive species losses (in some areas up to 60% under high emission scenarios by 2080).
- In Southern Europe, climate change is projected to worsen conditions (high temperatures and drought) in a region already vulnerable to climate variability, and to reduce water availability, hydropower potential, summer tourism and, in general, crop productivity. It is also projected to increase health risks due to heat-waves, and the frequency of wildfires.
- In Central and Eastern Europe, summer precipitation is projected to decrease, causing higher water stress. Health risks due to heat waves are projected to increase. Forest productivity is expected to decline and the frequency of peatland fires to increase.
- In Northern Europe, climate change is initially projected to bring mixed effects, including some benefits such as reduced demand for heating, increased crop yields and increased forest growth. However, as climate change continues, its negative impacts (including more frequent winter floods, endangered ecosystems and increasing ground instability) are likely to outweigh its benefits.
- Adaptation to climate change is likely to benefit from experience gained in reaction to extreme climate events, specifically by implementing proactive climate change risk management adaptation plans.

### North America

- Warming in western mountains is projected to cause decreased snowpack, more winter flooding, and reduced summer flows, exacerbating competition for over-allocated water resources.
- Disturbances from pests, diseases and fire are projected to have increasing impacts on forests, with an extended period of high fire risk and large increases in area burned.
- Moderate climate change in the early decades of the century is projected to increase aggregate yields of rain-fed agriculture by 5-20%, but with important variability among regions. Major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilized water resources.
- Cities that currently experience heat waves are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts. Elderly populations are most at risk.
- Coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. Population growth and the rising value of infrastructure in coastal areas increase vulnerability to climate variability and future climate change, with losses projected to increase if the intensity of tropical storms increases. Current adaptation is uneven and readiness for increased exposure is low.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, pp. 14-15. Cambridge University Press. Reproduced here with permission.

## Small Island States

- Small islands, whether located in the tropics or higher latitudes, have characteristics which make them especially vulnerable to the effects of climate change, sea-level rise and extreme events.
- Deterioration in coastal conditions, for example through erosion of beaches and coral bleaching, is expected to affect local resources, e.g., fisheries, and reduce the value of these destinations for tourism.
- Sea-level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards, thus threatening vital infrastructure, settlements and facilities that support the livelihood of island communities.
- Climate change is projected by mid-century to reduce water resources in many small islands, for example, in the Caribbean and Pacific, to the point where they become insufficient to meet demand during low-rainfall periods.
- With higher temperatures, increased invasion by non-native species is expected to occur, particularly on mid- and high-latitude islands.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers*, p. 15. Cambridge University Press. Reproduced here with permission.

## Handout 2. Climate Change: Two Histories of the Twenty-First Century

### History 1

#### 2000-2025 The era when we 'Reap the Whirlwind'

- Period of increasingly regular and increasingly extreme weather events
- Last chance for massive sustained efforts to cut carbon emissions

#### 2025-2050 The era of 'Planetary Purgatory'

- Point of 'no return' when further warming of the planet can't be stopped
- Rising temperatures trigger release of carbon stored in tundra and forests

#### 2050-2100 The era of 'Hell and High Water'

- Massive sea level rises lead to abandoning low-lying coastal areas
- Droughts, expanding deserts, wildfires depopulate continental areas

Source: Joseph Romm, *Hell and High Water* (2007)

### History 2

#### A 1.0°C warmer world (above pre-industrial levels)

- Creeping desertification of the present North American wheat belt
- Arctic meltdown begins
- Amazon pushed to the edge
- Pacific atoll nations swamped

#### A 2.0°C warmer world

- Increasing acidity of oceans makes seas toxic to sea life
- Heat wave emergencies in Europe and other temperate areas
- Ecosystems already under pressure suffer significant species loss

#### A 3.0°C warmer world

- Amazon dies and burns
- Arctic ice almost gone
- Seawater penetrates coastal cities
- Uncontrollable wildfires in Australia and elsewhere
- Loss of glacial melt in Himalayas dries water supplies in the Indus
- Hundreds of millions of people have no choice but to migrate

Source: Mark Lynas, *Six Degrees: Our Future on a Hotter Planet* (2007)

### Handout 3. Climate Change Future Scenarios

In 2030: The pan-African grassroots 'Elephant Movement' campaigns for high-income countries to repay their 'carbon debt' to Africa. It unites the voices of low-income countries in climate change negotiations and funds lawsuits and governments.	In 2030: Food security is a worldwide concern; vegetarianism is a global moral movement.
In 2030: The number of climate refugees grows by the day and campaigners demand that developed nations make land available for settlement	In 2030: State-sponsored family planning and public health initiatives — and limits on numbers of children — are common.
In 2030: Insects, such as farmed grasshoppers, have replaced animals and fish as the main source of protein for hundreds of millions of people in Africa and Eurasia. Vegetarian diets are common — and enforced in some areas.	In 2030: The 2026 Climate Treaty makes failure to meet emissions reduction targets as serious as failure to comply with a UN Security Resolution. Countries that refuse to sign the treaty are threatened with sanctions and even military intervention.
In 2030: Low-income countries generate 40% of the world's solar energy, a huge increase since 2010.	In 2030: Regional integration of low-income countries is a common strategy to increase resilience and political power; the Pacific members of the alliance of Small Island States become a single country in 2023.
In 2030: Smallholder cooperatives have become the dominant agricultural model in low-income countries; these are linked into global supply chains and organized using collaborative online software.	In 2030: Compulsory identity cards holding information about personal resource consumption are common all over the world; companies sell services (such as 'personal carbon management') to help people avoid falling foul of strict legislation.
In 2030: Oil-importing countries have suffered hugely. Oil-exporting countries have built up huge sovereign wealth funds with massive influence over the global economy, and are starting to invest in renewable energy technologies.	In 2030: the 2028 Olympics are cancelled for the first time since World War II, because of the lack of carbon credits to fund either the building of stadiums or travel.
In 2030: New political alliances form around natural geographic boundaries such as the Niger/Volta Watershed collaboration. Regional blocs manage food, energy, biodiversity and even population.	In 2030: 'Nuclear off-shoring' is becoming common; wealthy nations build nuclear plants in low-income countries, which are run by their own military; they export the power giving the host country a share.

Source: Forum for the Future (2010). *The Future Climate for Development: Scenarios for Low-Income Countries in a Climate Changing World*. pp. 5-6.

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## Handout 4. Future Scenarios

<p><b>1. Reversal of Fortunes</b></p> <p>This is a fraught world where the urgent need to cut carbon dominates international relations. Drastic measures to decarbonizing the global economy spell crisis for many industries and no country is immune to the pain. Having rapidly developed—mostly on carbon-intensive pathways—many low-income countries of the 2010s are now middle-income. They speak a strong, united voice on the world stage, holding wealthier nations to account for the problems of climate change. These new emerging economies are the least resilient and are suffering the most, and with the world focused on cutting carbon there is little money in the pot for aid.</p>	<p><b>2. Age of Opportunity</b></p> <p>This is a world where low-income countries have received significant and effective development assistance as part of a strong climate change deal. They play a growing role in the world economy and are spearheading a low-carbon energy revolution, leapfrogging the old high-carbon technologies in pursuit of a prosperous and clean future. Cultural confidence in these countries is high: their politicians take a prominent role on the world stage, and increasingly people reject hi-carbon Western lifestyles has uncivilized. In many states power has devolved to regions and communities; in some countries this has brought positive change, but in others large areas have fallen under the control of local mafia and warlords.</p>
<p><b>3. Coping Alone</b></p> <p>This is a world in which low-income countries feel increasingly abandoned. Two decades of high oil prices and economic stagnation have driven the global community apart. Attempts to coordinate action to reduce carbon emissions have been dropped. Regional blocs now focus on their own concerns, such as food security, resource shortages and adapting to climate change. Low-income countries face all these problems with few resources and limited support from wealthy nations; some states have collapsed. New models of business and governance are starting to emerge from the shadows increasing inequality.</p>	<p><b>4. The Greater Good</b></p> <p>This is a world where people understand that economies rely fundamentally on access to natural resources. Climate change is seen as the ultimate resource crunch, but there are equal concerns or water, food and soil depletion. States manage natural resources pragmatically to give the greatest good for the greatest number and are prepared to take draconian action to protect them. Individual liberties and choice of Siefert, but most people feel that their future is at least being safeguarded. Those low-income countries with natural resources prosper; those without have little bargaining power. Tensions between rival resource blocs are intense, and sometimes spill over into violent conflict.</p>

Source: Forum for the Future (2010). *The Future Climate for Development: Scenarios for Low-Income Countries in a Climate Changing World*. pp. 5-6.

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**Handout 5. Inheritance**

Inheritance (Now)	
Positive	Negative

Inheritance (2050)	
Positive	Negative

## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# CLIMATE CHANGE

IN THE  
CLASSROOM



## Day 3 - Climate Change Mitigation and Adaptation

### Facilitation Guide for Classroom Activities



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## Climate Change Mitigation and Adaptation

### Time Needed

- 60 minutes (35 minutes working in groups; 25 minutes reporting back and whole group discussion)

### Objectives/Explanation

- To develop and refine understandings of the concepts of climate change mitigation and climate change adaptation
- To explore the overlaps and synergies between the two concepts

### Materials Needed

- A cut-up set of the Climate Change Actions statements (Handout 1) for each four participants
- A sheet of chart paper, a marker and a paste stick for each four participants

### Procedure

- Briefly introduce the concepts of climate change mitigation and climate change adaptation (Box 1) and take clarification questions.
- Divide the students into groups of 4.
- Hand out a set of statements, chart paper, a marker and a paste stick to each group.
- Ask groups to divide their chart paper into two columns one titled 'Mitigation', one 'Adaptation'.
- Ask them to discuss each statement and decide whether it is an example of climate change mitigation or adaptation, pasting it in the appropriate column and adding in a note explaining their decision.
- Where the group thinks a statement is an example of both mitigation and adaptation or if they are unable to decide or if they can't agree, ask them to paste the statement over the line between the two columns, again adding a note of explanation.
- If a group thinks an adaptation action might contribute to mitigation or vice-versa ask them to circle the statement and draw an arrow into the other column, with an explanation written along the arrow.
- Have groups take turns to report back on particular statements and their decisions, inviting other groups to agree or disagree by way of initiating a wider discussion of the statement.
- After each statement has been reviewed, broaden the discussion to consider the potential contribution of climate change mitigation and adaptation to prospects for sustainable development.

Source: Sustainability Frontiers.

### Facilitation Guidance

While questions of climate change mitigation and adaptation have been present in earlier activities, this activity introduces the concepts in a more direct, concrete and studied way, and examines their interrelationship and their potential contribution to a secure and sustainable future. In the final debriefing, the facilitator might ask the following questions:

- To what extent are mitigation and adaptation 'opposite sides of the same coin'?
- Do proposals for mitigation and adaptation seem equally achievable and realistic?
- Are they about reforming or transforming society?
- Looking at the sets of statements clustered under the 'Mitigation' and 'Adaptation' headings, what implications does each set have for the meaning of 'sustainable development'?
- How would your world look if the 'Mitigation' statements were put into effect?
- How would your world look if the 'Adaptation' statements were put into effect?

### Box 1. Mitigation and Adaptation

MITIGATION is aimed at avoiding, reducing or, at least, delaying climate change mainly by reducing greenhouse gas emissions into the atmosphere

ADAPTATION is necessary for responding to climate change that is already unavoidable because of past greenhouse gas emissions (there is considerable time lag before an emission contributes to global warming)

MITIGATION and ADAPTATION are, thus, complementary aspects of a coherent climate change strategy. Both call for lifestyle change. Both have to be factored into sustainable development plans.

## Climate Change Mitigation Continuums

### Time Needed

- 65 minutes (20 minutes in pairs; 20 minutes in sixes; 25 minutes for whole group feedback and discussion)

### Objectives/Explanation

- To understand that there are immediate or presenting driving forces behind climate change as well as more fundamental driving forces
- To recognize that mitigating climate change by addressing immediate driving forces is itself complex, costly and demanding but that mitigating climate change by addressing fundamental driving forces calls for a transformation in assumptions, expectations, lifestyles and dominant world view
- To consider individual and community change agency and advocacy in regard to mitigating fundamental climate change driving forces

### Materials Needed

- A cut-up set of twelve Climate Change Mitigation Strategies? (Handout 2) for each two participants
- A strip of paper (made by cutting chart paper lengthwise into two halves), marker and paste stick for each two participants

### Procedure

- Hand out a strip of paper and marker to each pair of students and ask them to draw a line along the length of their strip.
- Distribute a cut-up set of Climate Change Mitigation Strategies? to each pair and explain that the task is consider where they would place each strategy on a continuum.
- Allot each pair a criterion for making their decisions from those laid out in Box 2, ensuring that the set of criteria are equally used across the pairs.
- When they have reached agreement about where to position the strategies, have them stick the strategies along the line. Say that careful positioning of strategies relative to one another matters. If, as a pair, they cannot reach agreement about the positioning of any of the strategies, they should write notes on the strip explaining their disagreement(s).
- The task complete, ask each pair to get together with two other pairs ensuring that all three pairs worked with a different strategy.

### Facilitation Guidance

The Mitigation Strategies laid out on the cards pick up the points made in Box 3 (next page) concerning a potential spectrum of strategies - from those that respond to clearer and more immediate climate change driving forces, on the one hand, and those that respond to interpretations of deeper or more underlying driving forces, on the other. The range of criteria used and the device of having pairs work with different criteria are intended to elicit the problems arising from both types of strategy,

For instance, are mitigation strategies that focus on greenhouse gas emissions informed by a 'business as usual' mindset that avoids fundamental changes? In focusing on the scientific and technological is there avoidance of the ethical and justice dimensions of climate change? What kinds and level of resistance will these strategies encounter? From what source(s)? Are mitigation responses that focus on what are seen as deeper socio-economic and psychological driving forces of climate change likely to offer such a challenge to the known global fabric of society that they are out of the question? What kinds and level of resistance will they encounter? From what source(s)? Or, are there ways they could be pursued? The facilitator should draw on these questions in the closing debate and discussion

### Box 2. Climate Change Mitigation Continuums

ACCEPTABLE <---> UNACCEPTABLE

PRACTICABLE <---> NOT PRACTICABLE

DESIRABLE <---> UNDESIRABLE

REALISTIC <---> UNREALISTIC

JUST <---> UNJUST

EFFECTIVE <---> INEFFECTIVE

- Ask each pair in the group of six to explain and justify their positioning decisions to colleagues. The other two pairs should serve as ‘critical friends’.
- This done, invite the six to engage in a discussion about how and why the criteria they worked with influenced their positioning of strategies.
- In whole group session, invite groups to feed back their reflections on the activity before opening the session to general debate and discussion.

#### Extension

- Share relevant documents on climate change mitigation in Section C of the Regional Resource Pack with students and hold a class discussion on climate change mitigation.

### Box 3. A Spectrum of Mitigation Strategies

## Climate Change Mitigation (1)

- Mitigation efforts focus upon reducing greenhouse gas emissions. For instance:
  - Curtailing emissions released from burning fossil fuels by power stations, factories, buildings, motor vehicles and airplanes
  - Reducing deforestation (including burning and decomposing of wood)
  - Using alternatives to fertilizers that release greenhouse gases
  - Capturing greenhouse gases released from garbage and human waste
  - Reducing meat eating in that cattle and farm animals emit methane (the second most important greenhouse gas)

## Climate Change Mitigation (2)

- But some argue that ‘deep mitigation’ strategies are needed that address the underlying driving forces behind high levels of greenhouse gas emissions:
  - Rolling back mass consumerism, especially in high income nations
  - Moving away from a growth economy that exploits more and more natural resources
  - Prioritizing localism as an antidote to globalization and the continual movement of people and goods around the world
  - Educating for a reconnected, non-exploitative relationship with nature

## Climate Change Picture Gallery (2): Adaptation

### Time Needed

- 45 minutes (25 minutes pairs; 25 minutes whole class discussion)

### Objectives/Explanation

- To practice photograph interpretation as a means of looking at climate change adaptation
- To articulate personal responses to photographs of climate change adaptation before negotiating a joint response

### Materials Needed

- A set of 8 climate change adaptation photographs (Handout 3)

### Procedure

- Hang the photographs on the walls around the classroom.
- Ask students to form pairs and to go on a tour around the picture gallery. Their task is to discuss each photograph, what it is saying, what its implications are, and what their personal emotional response is to what they see.
- Have them on this gallery tour decide which photograph makes them feel most inspired, which most reflective, which most optimistic for the future, and which most energized to do something practical about climate change. Have them also determine which photograph they have the most questions about and what those questions are.
- Collect the photographs and bring the class together for a debriefing of the activity.

### Facilitation Guidance

It is a good idea to start by holding up the photographs one by one and asking for general impressions of each photograph. The debriefing should continue by reviewing decisions made one by one, i.e. asking for responses and facilitating debate and discussion on which photograph was most inspiring, then moving on to which photograph elicited most reflection, and so on. As with the previous Photo Gallery activity, it is likely that some photographs were chosen under more than one heading. The question should be floated as to why this might be and if there are insights as to what we most appreciate when we see people taking action for change.

The facilitator should conclude the session by asking whether the examples of adaptation reviewed have triggered any good ideas for local climate change adaptation initiatives. Students should be encouraged to share these with the community.

## Adaptation Stories

### Time Needed

- 50 minutes (10 minutes for reviewing the stories and writing responses; 10 minutes as a group of six; 10 minutes in pairs; 10 minutes as a reconvened group of six; 10 minutes of summary discussion)

### Objective/Explanation

- To identify the characteristics of effective climate change adaptation

### Materials Needed

- One set of Climate Change Adaptation Stories (Handout 4) already given to students to read for homework
- 4 slips of paper per student
- Additional sheets of paper
- Flip chart and marker

### Procedure

- Give students a short while to reacquaint themselves with the collection of Stories of Adaptation set as homework reading.
- Working quietly on their own, have them reflect on the stories and write four short paragraph responses to the stories, one response per slip of paper, each beginning 'Effective climate change adaptation is about...'
- Invite students to form groups of six and sit in a circle around a table or on the floor. Request one member of each group to collect in the 24 responses, shuffle them, and then deal them out again as in a game of cards.
- Ask everyone to look at their 'hand', discarding into a central pool any responses they wrote and any about which they have reservations. They should continue to discard into and pick up from the central pool until they are satisfied with their 'hand'. Say that the aim is for each group member to end up with a final 'hand' of up to three reactions that, to repeat, (a) they did not write themselves and (b) with which they fully agree.
- Invite groups to break into pairs, to read their chosen paragraphs to each other, and to explain why they chose them.
- Ask pairs to negotiate and write a composite one-paragraph statement beginning 'Effective climate change adaptation is about...'. Alternatively, if the pair cannot agree, they write a paragraph explaining their disagreement(s).
- Invite groups of six to regroup, share, explain and discuss their composite statements.
- Lead a short whole group discussion asking each group, one by one, to identify up to three key criteria and elements of effective climate change adaptation, contributions being written on the flip chart or chalkboard.

### Extension

- Share relevant documents on climate change adaptation in Section C, D, and E of the Regional Resource Pack with students and hold a class discussion on climate change adaptation.

### Facilitation Guidance

This activity offers a format for achieving a thorough yet time efficient sharing of reflections on climate change adaptation. Participants are asked to critically reflect on the stories and on the perspectives of colleagues on the stories, and to try to reach a joint agreed position on what makes for effective climate change adaptation. It is important that the facilitator sets a brisk business-like pace for the activity. A detailed debriefing in this case is not essential; rather let the learning that emerges 'sink in'.

## Categories of Disaster Risk Reduction

### Time Needed

- 45 minutes (30 minutes in groups; 15 minutes whole group discussion)

### Objectives/Explanation

- To introduce a range of examples of school-based/focused and community focused disaster risk reduction initiatives
- To have participants organize them according to genre of DRR strategies, genre of child/youth contributions to DRR, and modes of child/youth contribution to DRR
- To build appreciation of the overlapping nature of the different categories under each genre and of the three genre themselves

### Materials Needed

- A cut-up Set of Disaster Risk Reduction in Action descriptions (Handout 5) for each group of 3 students
- Cut-up sets of Disaster Risk Reduction Strategies labels (Handout 6), Children's Contributions to DRR labels (Handout 7) and Modes of Child and Youth DRR labels (Handout 8) for each group
- 10 lengths of thin string for each group
- Blank slips of paper

### Procedure

- Invite students to form groups of three and sit at tables or on the floor.
- Hand out a set of Disaster Risk Reduction in Action descriptions to each group and have them read them through.
- Invite them to use the blank slips available to write additional disaster risk reduction descriptions out of their own experience, especially but not exclusively ones connected to climate change.
- Then hand out the lengths of string and a set of Disaster Risk Reduction Strategies labels to each group.
- With the information in Box 3 written on the flip chart or chalkboard, ask them to form string hoops on their tabletop or on the floor and place a label in each hoop. Their task is to go through the Disaster Risk Reduction in Action descriptions once again and decide in which hoop (i.e. under which strategy category) each statement fits.
- Explain that if they feel that a description falls under more than one strategy category then they can overlap one — or more — hoops and place the description in the common space created.
- Also explain that for this task there are extra pieces of string per group. Advise students that they can use these for adding strategies of their own making (blank labels available for this purpose).

### Facilitation Guidance

This is a busy and deceptively simple activity. The use of string allows for a group to revise the placement of descriptions so as to flexibly represent their new thinking as it emerges. They will find that the overlap of two or more hoops may have a knock-on effect through the whole! In a time economic way, the activity familiarizes students with key DRR approaches and the potential for student engagement in DRR. It is important for the facilitator to be a helpful timekeeper so that approximately a third of group time is spent on each of the three sorting tasks. It is a good idea to begin the briefing with questions on what students have learned but special attention should be given to new categories (labels) they created, and why, and examples of DRR that were added to the descriptions out of their own experience.

### Box 4. Disaster Risk Reduction Strategies

- Awareness raising in the community
- Setting up early warning systems
- Putting emergency preparedness plans in place
- Developing coping mechanisms
- Building personal and community resilience
- Dissemination and advocacy (communicating and sharing good practice)

- Now, ask them to disassemble the hoops and put away the labels but retain the descriptions. Distribute the Children's Contributions to DRR labels and ask them to repeat the process using the new categories. Again, the extra pieces of string (and blank labels) are there so students can add their own categories.
- Then distribute the Modes of Child and Youth DRR labels and ask groups to repeat the process a third time with the new categories.
- Facilitate a whole group reflection on the exercise.

#### Variation

- If time presses, have half the groups attempt the Children's Contributions to DRR exercise above and half attempt Modes of Child and Youth DRR exercise, sharing learning in the debriefing.



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## Day / Focus

1. Climate change learning for sustainable development
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UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY THREE HANDOUTS

## Handout 1. Climate Change Actions?

<p><b>'Roll back malaria' campaigns</b></p> <p>As temperate zones become hotter and the malarial mosquito migrates north and south, a 'roll-back malaria' campaign is put in place to stop malaria epidemics from breaking out in countries like Argentina and New Zealand.</p>	<p><b>Coastal defences</b></p> <p>Coastal defences in New Orleans are built up so that rising sea levels coupled with storm surges – both likely effects of global warming – don't lead to a repeat of the events that occurred when Hurricane Katrina struck in 2005.</p>
<p><b>Drought-resistant seeds</b></p> <p>Scientists develop new strains of seed that will give a good crop yield even in drought conditions.</p>	<p><b>Air travel restrictions</b></p> <p>Strict limits are placed on frequency of air travel and flying is also made much more costly for the traveller.</p>
<p><b>International disaster force</b></p> <p>The United Nations sets up a specialized international disaster force that is on standby to help nations and communities overrun by climate-induced disaster.</p>	<p><b>Harnessing wave and tidal power</b></p> <p>Wave and tidal energy farms are set up along coastal areas to harness the energy of waves and tides and generate clean electricity.</p>
<p><b>Locally sourced food</b></p> <p>Growing and eating locally grown and seasonal food is encouraged in high income nations to cut down on food air-freight miles and to make people less reliant on food from other countries, the supply of which may dry up eventually as climate change intensifies.</p>	<p><b>Shrinking beef industry</b></p> <p>The tax on beef goes up and up so that beef burgers and steaks get more and more costly and the beef industry shrinks. [Beef cattle are often reared in areas of deforested areas that would have soaked up CO<sub>2</sub> and belching cattle emit a significant amount of methane (CH<sub>4</sub>), a powerful greenhouse gas, into the atmosphere.]</p>
<p><b>Capturing carbon</b></p> <p>Technologies are developed to recover carbon from the atmosphere and seal it permanently away in deep underground reservoirs.</p>	<p><b>Community classes for adaptation</b></p> <p>At local community centres, classes are held to teach community members how to protect themselves from extreme weather events.</p>
<p><b>Stricter building insulation standards</b></p> <p>To cut energy losses from buildings, new regulations are brought in that require owners to insulate their buildings to the highest standards at their own cost, thus reducing personal and national energy consumption and CO<sub>2</sub> emissions.</p>	<p><b>Emergency food stockpiling</b></p> <p>Governments build massive stockpiles of food for emergency consumption in the event that the effects of climate change – inland drought and wild fires, lowland and coastal flooding – lead to food shortages.</p>
<p><b>Flood management initiatives</b></p> <p>New flood protection and drainage systems are put in place to protect communities that have experienced flooding following heavy rainstorms.</p>	<p><b>Voluntary simplicity</b></p> <p>A 'voluntary simplicity' movement encourages people everywhere to live a more simple life with few possessions and in ways that don't exploit and destroy the environment.</p>
<p><b>Species protection</b></p> <p>Deep water-preserving ditches are created to protect rare birds from extinction. The birds feed on insects that need water for breeding - water that has started drying up in the summer heat. Their food source protected, the birds can survive in a warming climate.</p>	<p><b>Reducing car usage</b></p> <p>The decline in oil supplies and the climate threat encourage governments to use taxes and restrictions to phase-out gas-powered vehicles while offering big tax breaks to 'car-less' families and some concessions to families with electric cars.</p>
<p><b>Education for sustainable consumption</b></p> <p>Schools introduce lessons to encourage students to consume more sustainably given that the global consumer economy is seen as a major cause of climate change.</p>	<p><b>Capping carbon dioxide</b></p> <p>Over a ten-year period factories and industries are forced by law to reduce the amount of carbon dioxide released into the atmosphere by 50% with stiff penalties for failure to comply.</p>

## Handout 2. Climate Change Mitigation Strategies?

Reduce unsustainable consumption habits, replacing them with forms of <b>personal satisfaction</b> that have a smaller impact on the environment.	<b>Stop/ban the logging</b> of old-growth forest and promote widespread reforestation.
Introduce laws for high standards of <b>building insulation</b> and link new buildings to local <b>renewable energy</b> installations.	Reduce road and air travel by penalizing car ownership and air travel with <b>'fuel-guzzler' taxes</b> .
De-urbanize and return to self-sufficient, <b>sustainable rural lifestyles</b> .	Take measures to reduce or even reverse, <b>global population growth</b> .
Return to <b>local food economy</b> with consumption of locally-sourced food with low 'food mileage.'	<b>Cap manufacturing emissions</b> and otherwise 'clean up' industry.
Change to <b>climate-friendly modes of transport</b> , such as electric cars and more energy-efficient airplanes.	Move away from coal-generated energy to <b>renewable energy</b> .
Create a 'level playing field' between high income and low income countries with high income countries paying <b>climate change development reparations</b> for their historically high greenhouse gas emissions.	Reduce, halt or reverse the economic growth model in favour of a <b>'steady-state' economy</b> (replacing 'Gross National Product' with 'Gross National Happiness' as the measurement of national wellbeing).

### Handout 3. Climate Change Adaptation Photographs

Photo 1



Women cultivating community land in Senegal

Source: © UNESCO/Roger, Dominique

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Photo 2



Philippines-Iba South Central tree planting activity

Source:  Trees for the Future

Photo 3



Irrigating polders, part of the rural economy at Village de Bol, Lake Chad, Chad.

Source: © UNESCO/Ledru et Martel

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Photo 4



Farmers in Peru grow a wide variety of different potatoes to increase the biodiversity of their crops and reduce the potential impact of climate change.

Source: © Practical Action

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Photo 5



U.S. Army Sgt. Amanda Broome, Combined Joint Task Force-Horn of Africa Surgeon Cell animal care specialist, works on the construction of an Eco-Dome prototype. The Eco-Dome was engineered by the California Institute of Earth Art and Architecture to provide comfortable, economical and sustainable building solutions for impoverished and natural disaster stricken-areas. The design ensures the structure will be resistant to earthquakes, fire, flood and hurricanes.

Source:  Staff Sgt. Kathrine McDowell, US Army Africa

Photo 6



The youth group from Teoraereke planted baby mangrove plants with the President of Kiribati, Anote Tong. Planting mangroves is very important because it holds the sand together to reduce the effects of coastal erosion. It also protects homes and families.

Photo credit: © Eneri Henry

Source: UNEP/GRID-Arendal and CICERO, Many Strong Voices / Portraits of Resilience

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Photo 7



Self-reliance through simple technology in Zambia

Source: © Practical Action / Crispin Hughes

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Photo 8



Experimental corn irrigation in Senegal.

Source: © UNESCO/Roger, Dominique

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## Handout 4. Stories of Adaptation

### Story 1

#### Floating houses: Architecture of the future in especially threatened areas?

Dutch architects and planners developed concepts for ‘amphibian houses’ as a strategy for adapting to steadily rising sea levels. The planners’ idea is that houses need not be built on solid ground; they can also be built on water. The first project of this kind has been built close to the city of Maasbommel. Dura Vermeer, the largest building company in the Netherlands, built 46 houses that are anchored to the seabed and can move with the tides.

There are other concepts of water architecture to be explored, such as houses on stilts and waterproof houses. Like ‘amphibian houses’, these would be connected to the power grid and water supply. Especially since the 2005 Request for Proposals from the Ministry of Housing, Spatial Planning and the Environment (VROM), interest in floating houses and cities as a way to adapt to the impacts of climate change has greatly increased. Such houses are also being tested in other cities, such as London and Hamburg. The two cities have built an alliance with the city of Dordrecht in Holland within the framework of an Urban Flood Management (UFM) project, which is co-financed by the Dutch Living with Water Programme. A key concern of the three cities is to transfer knowledge of risk assessments and management.

Source: Taken from: Hans-Peter Meister, Inga Kroger, Martina Richwien, Wilson Rickerson, and Chad Laurent (2009). *Floating Houses and Mosquito Nets: Emerging Climate Change Strategies Around the World*, MEISTER Consultants Group, pp. 92-93.

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### Story 2

#### An Experience in Perpetual Adaptation

Namari Peuhl is a small village located in northeast Niger, a short distance from the Sahara Desert. The droughts of the 1980s profoundly disrupted the herding practices and socio-cultural values of nomadic peoples. The 1984 drought was the worst of all. Decimation of the cow and sheep herds exposed their vulnerability and sent a genuine shockwave through the Namari community. More than 90% of the herd animals died and the rest were in a critical state.

The extent of the drought phenomenon made it impossible to follow long routes. Tribal chiefs were forced to make the historic decision to remain in the lowlands, which were still humid, and transform their herding practice into an agro-pastoral system based on household vegetable and animal production. As they said: ‘If we leave the hillsides, we will lose the rest of our herds; the droughts no longer allow us to make our living from nomadic herding.’

The survival strategy was to convert to pastoral farming and the priority was food crop production. Survival came first; if possible, the herd could be rebuilt later. Staying in the lowlands made it possible to remain close to waterholes and diversify agricultural production. Market gardening was practiced in addition to rainy season farming.

Djibo Mego, the chief of the Namari and former herder, had abandoned animal husbandry after repeated droughts destroyed pasturelands and made nomadic grazing difficult. However, when many people from the village migrated, he decided to stay to support his parents. He turned to rain-fed agriculture. However, the long hungry season following the brief rainy season obliged him to rethink his plan and look at other types of crops that could be grown during the nine-month dry season. Market gardening provided him with that opportunity.

Market gardening made it possible to fully integrate with the agrarian system of the region. The herders’ villages became permanent and adapted to the socio-economic realities of the zone located in the heart of the Sahel region. The local authorities recognized and supported the integration of herding into the local land management system, and adaptation of cultural values to the new context was ensured.

## Day Three: Climate Change Mitigation and Adaptation

Many members of the community who had refused to stay, believing they could save their herds by crossing the great Sahel, returned without a single animal. Djibo took them in, helped them settle in the village, and made them welcome. But he was saddened to recall that others had left, never to be heard from again.

Today, vegetable crops combined with rain-fed crops enable the people of Namari to grow a surplus of produce, which they can sell. This spark of hope reminds the hardworking people, and Djibo Mego most of all, of some of the difficult days of their history. However, it also shows them that they are the architects of their own collective change.

Agro-pastoral practices have not affected their cultural values. In fact, the community is beginning to be called on frequently by the local authorities to mediate in conflicts between herders and farmers in other zones.

Source: This story is from *Adaptation Stories*, by Denton, F. et al. © 2010 IDRC. The collection was produced with support from Canada's International Development Research Centre and the United Kingdom's Department for International Development, through the Climate Change Adaptation in Africa programme.

### Story 3

#### Relocation and Rehabilitation: Climate Change Adaptation in Rwanda

Once home to populations of chimpanzees and golden monkeys, the sloping terrain of Rwanda's Gishwati Forest has in recent decades suffered severe environmental degradation exacerbated by devastating climatic disasters. Landslides, floods and torrential rain have claimed lives, demolished human settlements, and destroyed thousands of hectares of forest and farmland. The 1994 genocide displaced many thousands of people, which led to further land clearing and extensive degradation as desperate people were forced to settle on steeply sloping land in this densely populated country.

The UNEP/UNDP Climate Change and Development – Adapting by Reducing Vulnerability (CC DARE) programme provided Rwanda with funding to develop a Land Suitability and Land Use Plan. This helped guide the relocation of human settlements from high-risk zones, as well as the rehabilitation of vacated land, so as to reduce the vulnerability of local communities and ecosystems. Risk assessments showed that if further erosion of the Gishwati forest was to be avoided, 43 per cent of the terrain – around 2844 hectares – should be used for pasture, forest plantation and fruit trees. Of this, 1393 hectares should be preserved and invasive human activities forbidden.

CC DARE showed that small, flexible and targeted funding works. Working with the Rwandan Ministry of Environment, local government, districts and communities, and with \$150,000 in funding from the Danish Ministry of Foreign Affairs, UNEP provided timely and focused support for the planning that is vital for moving communities and rehabilitating land. The project also developed manuals that enabled a proper assessment of land use – guiding communities and authorities on carbon storage, high value crops, soil resilience, sustainable farming systems, bridging periods of food insecurity, and strategies to cope with climate variability. The programme attracted national government interest and inspired larger interventions. The relocation of communities to safer areas was implemented by local government and supported by national funds, demonstrating local fast tracking of climate change adaptation while keeping actions within national development programmes.

The updated Land Suitability and Land Use Map and Plan for Gishwati has had an enormous impact, paving the way for innovative action on climate change adaptation in Africa's most densely populated country. The initial investment has enabled the Rwandan Ministry of Agriculture to access monies for the resettlement of returnees displaced by the 1994 genocide, and for the rehabilitation of land where the risk of landslides and flooding is greatest. Rehabilitation will, in turn, enable Rwanda to play a bigger role in global carbon trading through the establishment of new carbon sinks in Gishwati. The success of the project has helped Rwanda leverage funds from other international sources, and enabled other climate change adaptation programmes in the country to make substantial savings.

There is enormous potential for the project to be replicated elsewhere in Rwanda. There are plans to share the knowledge and experience the project has generated with other central African countries to encourage the approach on a small or large scale beyond Rwanda's borders.

Source: Taken from: UNDP/UNEP. The CCDARE: Climate Change Adaptation & Development Initiative website. <http://www.ccdare.org/Countries/Rwanda/tabid/29633/Default.aspx>

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## Story 4

### Rainwater Harvesting in Schools: Demonstrating Adaptation to Climate Change in Schools in the Seychelles

The Republic of Seychelles is vulnerable to particular climate change effects and challenges which include sea level rise, increases in sea surface temperatures and changes in rainfall patterns with short periods of heavy rainfall during the rainy season and severe droughts during the dry season being a common occurrence. Traditionally, Seychelles experiences one rainy and one dry season. During the rainy season, most of the excess rainwater is lost through surface runoff as there is no elaborate rainwater-harvesting scheme. When the dry season sets in, water is scarce and is not enough to meet demand. This problem of water scarcity is made worse by the ever-increasing demand for water as a result of increased economic and social development as well as population growth.

School demand for water has been increasing steadily resulting in high water bills. This, coupled with the effects of persistent severe droughts and artificial water shortages with the government restricting water use during the dry season, made the rainwater harvesting in schools project a timely climate change adaptation initiative while demonstrating how schools facing similar challenges can adapt to climate change.

The project objectives were to:

- Harvest rain water so as to meet the needs of selected schools and to reduce the cost of water bills
- Educate school children on the impact of climate change on water resources and on methods used to adapt to climate change
- Raise awareness among the general public about climate change impacts on the Seychelles and about rainwater harvesting as a means of adapting to water problems caused by climate change

The installation of rainwater harvesting equipment, that includes water tanks and roof gutters in some cases, covered 10 schools in the Seychelles.

The project organized exhibitions for the general public and training and capacity building workshops for the school children and their teachers. Two exhibitions were organized for the general public attracting more than 3200 people. Exhibition materials were books, paintings and films on climate change and its effect on the water sector. Training and capacity building workshops involved teaching and non-teaching staff from 6-7 schools. Over 400 teachers attended the presentations on climate change and its impact on the water sector. In the participating schools, the children had the opportunity to participate in a variety of climate change activities that helped them better understand the relationship between climate change and water.

As a result of the projects' success, rainwater harvesting has now been included in the national climate change strategy and is also being incorporated into the Environment Management Plan for the Seychelles. In addition, a bill to include rainwater-harvesting systems as part of the building codes is under consideration by the Seychelles legislature. This is an indication that rainwater harvesting is a sustainable intervention against climate change to the extent that it can be incorporated into the environmental management strategies of a country. The economic implications of this project cannot go unmentioned. A direct benefit of this project

has been a saving of US\$ 250 on water bills registered by the schools. These funds can now be invested in the improvement of the schools' teaching and learning resources.

Source: Taken from: UNEP/UNDP. The CCDARE: Climate Change Adaptation & Development Initiative website. *Rainwater harvesting in schools: demonstrating adaptation to climate change in schools in the Seychelles- A Summary Report*. For the full report, visit: <http://www.ccdare.org/Outputs/Seychelles/tabid/7195/Default.aspx>

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### Story 5

#### Adaptation Technologies for Reducing Community Vulnerability

Some 80 per cent of Nepalese people follow traditional cultivation practices and depend on agriculture for their livelihoods. These practices rely on rainwater and the seasons. Many mountain dwellers have observed unusually erratic heavy monsoon rains in recent years. Farmers have noticed delays in the monsoon season, changes in rainfall intensity and duration, reduced productivity, changing vegetation composition and more soil erosion. With less rainfall, rivers and springs have dried up.

Shifting cultivation is still an important land use system for some ethnic groups in Nepal. The system involves clearing a piece of land and growing trees or crops on it until the soil loses fertility and productivity falls. The land is then left and reclaimed by natural vegetation or used for other farming practices. Shifting cultivation is at risk from flooding, soil erosion, landslides and other forms of land degradation resulting from heavy monsoon rains.

With financial support from the Hill Agriculture Research Project, LI-BIRD (the non-government institute called Local Initiatives for Biodiversity, Research and Development) designed and implemented a project to introduce hedgerows in areas where shifting cultivation occurred. The project helped some of the poorest and most vulnerable communities in Nepal, known as Chepang, to develop strategies to cope with adverse climate change impacts and improve their livelihoods by reducing their vulnerability. It demonstrates a community-based adaptation technology suitable for shifting cultivation areas on sloping land in Nepal.

Planting hedgerows in the project areas helped stabilize the soil and thus enhance food production and income. Soil quality improved markedly in project areas and many of the plots with hedgerows are being transformed into terraces. Soil erosion has decreased by 40 per cent in the past four years of the project. The technology has also reduced the workload of women who collect fodder by 30 per cent and has helped other poor and marginalized communities generate income. Such conservation farming practices are gradually replacing traditional slash and burn practices, thus reducing the burning of forested areas.

Source: Taken from: Bimal Regmi, *Community Action in Nepal*, Tiempo, Issue 68, July 2008, pp. 11-14. For the full text, visit: <http://www.tiempocyberclimate.org/portal/archive/pdf/tiempo68low.pdf>

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## Handout 5. Disaster Risk Reduction in Action

<p><b>Communicating Disaster Risk Reduction Messages, India</b></p> <p>To convey disaster risk reduction messages, school communities in Uttar Pradesh used street theatre, magic shows and puppetry. Creative and educational scripts were written in collaboration with performing artists and disaster risk reduction experts.</p>	<p><b>Participatory Vulnerability Analysis (PVA), Ghana</b></p> <p>Participatory Vulnerability Analysis conducted with local communities helped them to analyse how their behaviours could influence the likelihood of disasters, and how behaviour change could reduce the risks they face.</p>
<p><b>School Relocation, the Philippines</b></p> <p>When students in San Francisco municipality learned that their high school was going to be relocated to a landslide risk area, they debated whether and where to relocate the school. A community-wide referendum was held. Students organized a campaign and their proposal for relocating the school to a safer location won in the vote.</p>	<p><b>Community Map, Thailand</b></p> <p>As part of Disaster Risk Reduction training programme, students in Phayao province created a community map, which identified risks and safe areas. The map also identified families with children and elders in the community. They learned how to help them in case of a disaster.</p>
<p><b>Child-Led Emergency Drill, the Philippines</b></p> <p>During the Children’s Summer Camp, a student-led emergency drill was conducted using a drill scenario of a 7.5 magnitude earthquake and an incipient fire with mass casualties.</p>	<p><b>Student Risk Ambassadors, France</b></p> <p>In order to motivate students to understand and be involved in helping solve local risks (e.g. floods, industrial accidents), a programme of ‘Student Risk Ambassadors’ was launched in a local high school and was later replicated in other schools.</p>
<p><b>Developing School Protection Plans, El Salvador</b></p> <p>A pilot project called ‘Youth Participate in Disaster Prevention’ by Plan, an international NGO, aimed at helping local schools and communities reduce their vulnerability to hazards. Capacity and vulnerability assessment workshops were conducted and school risk maps and emergency kits prepared by students and parents. The schools developed School Protection Plans.</p>	<p><b>Awareness Raising through Radio, the Solomon Islands</b></p> <p>The Solomon Islands Red Cross worked with the national disaster management office to design an FM radio quiz for schools for World Disaster Reduction Day on how to reduce disaster risk and impact. It was broadcast in the afternoon when students were at home to the capital Honiara as well as further afield. Messages about climate change were integrated into the program.</p>
<p><b>Safe School Buildings, Madagascar</b></p> <p>By means of a government development fund, 2,041 cyclone-resistant school buildings in Madagascar have been constructed or retrofitted to withstand cyclone winds of up to 250 km/hour.</p>	<p><b>Early Warning, Bangladesh</b></p> <p>Bangladesh acted upon early warnings when Cyclone Sidr drew near the country in 2007. Red Crescent volunteers used megaphones to instruct people on what to do to prepare for the onslaught.</p>
<p><b>Planting Trees, Haiti</b></p> <p>Local children in Thiotte took part in a ‘Risk Reduction Day’ and planted trees in order to help reduce the risk of mud/landslides during flood incidents.</p>	<p><b>Measuring rainfall, Brazil</b></p> <p>Children are taught to measure rainfall to give an early warning of floods or landslides.</p>

<p><b>Hazard Awareness Raising in Schools, Jamaica</b>          Jamaica runs a multi-hazard awareness programme in schools and its elements include fire and earthquake drills, poster competitions and cultural competitions (e.g. song, dance, skit competitions, exhibitions and talks).</p>	<p><b>Use of Stories, Algeria</b>          In primary and secondary schools, Algerian students are taught about natural disasters through stories on earthquakes (e.g. the 2003 Boumerdes earthquake), floods and volcanoes at the rate of one lesson per school year.</p>
<p><b>School Roof Water Catchment and Storage, Sri Lanka</b>          Community participation with an NGO in Sri Lanka allowed inclusion of roof water catchment and storage in a school built to replace one destroyed by the Asian tsunami. This has improved everyday school water supply and provides an emergency water source for future disasters.</p>	

**Sources:**

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- Measuring rainfall, Brazil: Source: Save the Children (n.d.). *Reducing Risks, Saving Lives.*

**Handout 6. Disaster Risk Reduction Strategies**

Setting up early warning systems	Awareness raising in the community
Putting emergency preparedness plans in place	Developing coping mechanisms
Building personal and community resilience	Dissemination and advocacy (communicating and sharing good practice)

### Handout 7. Children's Contributions to DRR

Children as analyzers of risk and risk reduction activities	Children as constructors of social networks and capital
Children as communicators of risks and risk management options	Children as mobilizers of resources and action for community based resilience
Children as designers and implementers of DRR interventions at community level	

Source: Beck, E., Cameron, C., and Tanner, T. (2009). *Children and Disaster Risk Reduction: Taking Stock and Moving Forward: Research Report. Children in a Changing Climate*, Brighton: IDS. 36.

## Handout 8. Modes of Child and Youth DRR

<p>Creative and performance arts (including street theatre, puppetry, art displays, song and dance)</p>	<p>Using the Internet to connect with youth around the world and share ideas on disaster risk reduction</p>
<p>Using photography and video to illustrate risks</p>	<p>Writing pamphlets, notices, newspaper pieces</p>
<p>Campaigning, petitioning, writing to local and national leaders</p>	<p>Working with community-based organizations</p>
<p>Studying DRR in the school curriculum</p>	

## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

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CHANGE**  
IN THE  
CLASSROOM



## Day Four At-A-Glance

Sample Schedule (Duration)	Session	
9:00 - 9:30 (30 minutes)	Revisiting Day Three	<ul style="list-style-type: none"> <li>• PowerPoint slide 2</li> </ul>
9:30 - 9:55 (25 minutes)	Activity: 'Bouncing Back'	<ul style="list-style-type: none"> <li>• A bendy ruler or stick, a rubber band, a rubber ball, an eraser and/or other everyday objects that, if bent, pulled or squeezed out of shape, return to their original shape when released</li> <li>• Flip chart and marker</li> </ul>
9:55 - 10:45 (50 minutes)	Activity: Building a 'Culture of Safety and Resilience'	<ul style="list-style-type: none"> <li>• Two sheets of chart paper and two markers of different colours per group of four.</li> <li>• PowerPoint slides 3-9</li> </ul>
10:45 - 11:00 (15 minutes)	Break	
11:00 - 12:00 (60 minutes)	Activity: Field Trip Preparation  Alternative: Guest speakers or lecturers from the community	<ul style="list-style-type: none"> <li>• Nine slips of blank paper per participant</li> <li>• One copy of Handout 1 per participant</li> <li>• Sheets of chart paper and a marker per group of 4-5</li> <li>• PowerPoint slides 10-13</li> </ul>
12:00 - 13:00 (60 minutes)	Lunch (and travel into the local community)	
13:00 - 15:00 (A maximum of 120 minutes, including time to return to the training room)	Activity: Field Trip	<ul style="list-style-type: none"> <li>• One clipboard and paper, or notebook per participant</li> <li>• Local maps and directions (if necessary)</li> </ul>
15:00 - 16:00 (60 minutes)	Activity: Field Trip Debriefing	<ul style="list-style-type: none"> <li>• Flip chart</li> </ul>
16:00	Close	<ul style="list-style-type: none"> <li>• Participants asked to complete Handout 2</li> <li>• Remind participants to read through Day Four 'Classroom Activities' and bring any questions to the next day's workshop</li> <li>• Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Four</li> </ul>

## Day Four Facilitation Guide

This module focuses on local community and school-based climate change learning. It begins by revisiting resilience and vulnerability in greater depth, including an exploration of how schools and communities can work to build a ‘culture of safety and resilience’. Participants prepare for a field trip in the local community. The afternoon is largely dedicated to the field trip itself.

Back at the training centre, participants exchange and discuss their experiences before taking time to reflect on lessons learned about organizing and facilitating climate change-related school field trips. An alternative to the field trip activity would be to bring in guest lecturers or speakers from the community who work in climate change related activities.

[Click to consult the Summary of what is learned on Day Four](#) 

[Click to download the Powerpoint slides in pptx format for Day Four](#) 

[Click to consult the Powerpoint slides for Day Four](#) 

### 9:00-9:30 Revisiting Day Three

With slide 2 showing, facilitator leads a two-part discussion, opening each part with one of the following questions:

- As you wrote your reflections diary entry for Day Three did any issues and questions arise that you would like to raise with the group?
- Do you have any questions concerning the Classroom Activities for Day Three in your activities file?

### 9:30-9:55 Activity: ‘Bouncing Back’

#### Time Needed

- 25 minutes (15 minutes in pairs; 10 minutes brainstorming followed by brief initial input on resilience)

#### Objectives/Explanation

- To explore the qualities and capacities that make up personal resilience as a springboard for going on to consider community resilience

#### Materials Needed

- A bendy ruler or stick, a rubber band, a rubber ball, an eraser and other everyday objects that, if bent, pulled or squeezed out of shape, return to their original shape when released
- Flip chart and marker

#### Procedure

1. Use the bendy/stretchable objects brought to the session to demonstrate the capacity to ‘bounce back’ by bending and stretching them.
2. Ask participants to form pairs and move their chairs so they face each other. Ask them to sit quietly for a few moments and think about times in their life when they have ‘bounced back’ from difficult times and then reflect on the qualities they needed to show during those times.
3. Ask participants to nominate person ‘A’ and person ‘B’. Ask ‘B’ to tell ‘A’ those personal ‘bouncing back’ stories they feel comfortable sharing. ‘A’ should adopt the role of active listener. After two minutes, reverse the process so that ‘A’ tells her/his stories to ‘B’, who listens actively.
4. Then ask each pair to discuss the personal ‘bouncing back’ qualities demonstrated by their stories. Were similar capacities and characteristics shown in the stories? Or different ones in different circumstances?
5. Bring the whole group together for a brainstorming of qualities discussed, writing contributions on the flip chart. Follow this with open discussion.

#### Facilitation Guidance

This activity will help focus attention on the nature of resilience. The facilitator needs to be sensitive to the fact that the sharing of stories can be very emotional in its revelation of both strengths and vulnerabilities. For the closing whole group discussion, a critical question is how schools and teachers can help nurture and strengthen such qualities in the everyday teaching environment. Ideas can be captured on the flip chart.

**9:55-10:45 Activity: Building a ‘Culture of Safety and Resilience’**

**Time Needed**

- 50 minutes (25 minutes in groups; 25 minutes reporting back, discussion, and concluding input)

**Objectives/Explanation**

- To consider and concretize the concept of a ‘culture of safety and resilience’
- To arrive at a list of the qualities and capacities required and areas for action in building community resilience in the face of climate change
- To identify the contribution schools and other learning spaces can make to building a ‘culture of safety and resilience’
- To identify what is common in the qualities and capacities required for personal and community resilience
- To briefly consider at what level (local through national) resilience is likely to be best achieved in a climate-changed world

 Click to consult Factsheet information on coping capacity and the need to build resilience

**Materials Needed**

- Two sheets of chart paper and two markers of different colours per group of four

**Procedure**

1. Showing slide 3, speak about resilience, especially noting that resilience, the ability to ‘bounce back’, applies not just to individuals but also to societies and natural systems. For example, the redevelopment of a nation after war or the regeneration of an ecosystem after a forest fire or oil spillage. Stress, too, that climate change demands — or will in the future demand - high levels of resilience.
2. Briefly introduce the Hyogo Framework for Action (slide 4) and its Action Priority 3: ‘Use knowledge, innovation and education to build a culture of safety and resilience at all levels’. [The full text of the framework can be viewed at: <http://www.unisdr.org/we/inform/publications/19690.>]
3. Show slide 4 and invite pairs from the previous activity to join together to form a group of four to discuss the concept of ‘culture of safety’ as it applies to local community resilience to climate change. Have groups divide their first sheet of paper into five

 Click to consult slide 3-9

 Click to consult Factsheet information on building resilience through education

**Facilitation Guidance**

This activity seeks to deepen and enliven participants’ understanding of the qualities to be found in sturdy community resilience, of how those qualities can (and do) manifest themselves concretely, and of the contribution schools and learning institutions can (and do) make towards fostering a ‘culture of safety and resilience’. On the question of the contribution of schools, the facilitator might ask:

- How prepared are your schools for playing a significant role in building climate change resilience in the local community?
- What more could your schools do?
- What would need to happen for your schools to play a bigger role?
- What would be the obstacles to their playing a bigger role?
- How might those obstacles be overcome?

The facilitator might begin the concluding general reflection by asking participants whether the personal and community ‘bouncing back’ qualities and capacities revealed by the morning’s activities are similar. Are resilience qualities and capacities much the same whether the response to distress occurs in personal and local community spheres (and, indeed, at regional and national levels)?

A number of climate change experts maintain that large scale and centralized government is not the best place from which to handle the onset of multiple threats from climate change and that the local and regional levels are the most appropriate levels for developing resilience and risk reduction strategies and initiatives. This, some say, is particularly the case in that a great deal of uncertainty surrounds how climate change will manifest itself locally by locality. It is also argued that local, regional and indigenous knowledge is important for climate change defence, as is the ability to act quickly when disturbance or disaster hits. On the other hand, some argue, climate change is a new phenomenon and mundane traditional knowledge is not helpful unless combined with scientific insight (more often developed under the auspices of central government). In the latter part of the discussion, the facilitator should open up these issues and have the group briefly consider positive and negative consequences of having responses to climate change decentralized.

sections, one per dimension of resilience and write in qualities, capacities and initiatives that are needed to build a 'culture of safety and resilience' under each dimension. If group members are from the same local community, they should focus concretely on that community. If group members are from diverse communities, ideas specific to member's communities should be included.

4. Ask groups to similarly divide their second sheet of chart paper into five sections, one per dimension. On this sheet they should list contributions that their school(s) could make (or are making) to building a 'culture of safety and resilience' in pursuance of ideas noted on the their first chart.
5. Have groups report back on their ideas before engaging participants in a general reflection.
6. Conclude with an input on climate change resilience and vulnerability revisiting slides 3 and 4 but also using slides 6-9.

### 10:45-11:00 Break

### 11:00-12:00 Activity: Field Trip Preparation

**\*\* As an alternative to the field trip, one or several guest speakers or lecturers from the community could be invited to speak about their engagement in climate change activities. \*\***

#### Time Needed

- 60 minutes (25 minutes for individual and group interview question writing; 35 minutes for finalizing and sharing interviewing questions, working out interview timetables and assigning responsibilities)

#### Objectives/Explanation

- To prepare for a local field trip aimed at learning about local climate change understandings and perspectives, impacts and initiatives
- To develop interview questions to collect data on previous and current climate related challenges in the community, any existing community initiatives and resources, and current and potential future opportunities for school and school-in-community climate change initiatives
- To practice preparing for climate change-related field trips that include interviews and observation

#### Materials Needed

- Nine slips of blank paper per participant
- One copy per participant of Handout 1
- Sheets of chart paper and a marker per group of 4-5

#### Procedure

1. Introduce the idea of school climate change field trips as an effective means of alerting students to local contributions to greenhouse gas emissions, local climate change impacts, and mitigation, adaptation, risk reduction and resilience building initiatives, and as a possible precursor to school/community change partnerships.

#### Facilitation Guidance

Crucial for the success of this activity is the detailed preparation in advance of the field trip. It is vital that the facilitator should become familiar with the climate change situation in the area around where the training is taking place; i.e. any major contributions to global warming locally, any local impacts of climate change, any local climate change initiatives, any school and school-with-community initiatives. In the light of what is found, the activity may need adjusting.

The facilitator should liaise with community members, explaining the purposes of the field trip, and come up with a list of volunteers who will make themselves available for interview (individually or as part of a focus group) and/or will act as guides to participants as they visit local manifestations of the causes and effects of climate change). Locations should also be agreed and directions ascertained.

Beyond generally well-informed members of the local community, potential types of local people to approach would be:

- Climate change scientists (e.g. academics, officers from meteorological stations, agricultural/forestry/marine scientists).

[Continued, next page](#)

[Click to consult Factsheet information on local relevance of Education for Sustainable Development](#) 

[Click to consult Handout 1](#) 



2. Use slide 10 to explain to participants that the main purposes of the afternoon field visit are: to gather information on local challenges in the face of climate change; to find out about local initiatives for climate change mitigation, adaptation, risk reduction and resilience building; to collect views on potential school/ community climate change initiatives as well as data on any current initiatives.
3. Explain the key characteristics of semi-structured interviewing and offer some practical tips on conducting interviews (slides 11, 12).
4. Give nine slips of paper to each participant and ask them to write down three questions they would like to ask about each of the following areas: (1) local contributions to greenhouse gas emissions and/or local impacts and hazards arising from climate change; (2) climate change mitigation, adaptation, risk reduction and resilience building initiatives in the locality; (3) child and youth engagement with climate change in school and in the community (slide 13).
5. Have participants form groups of four or five to critically review each other's questions. Also ask them to list the genre of people they would optimally think of including in their inquiry into each of the three areas.
6. Reveal the pool of volunteer interviewees for the afternoon and details of their availability. Pin up availability sheets on which groups will sign up for a time slot with interviewees.
7. Distribute a copy of Handout 1 to each participant and ask groups to finalize their interview questions for each area by fusing their own questions with their choice of sample questions in the handout, and by shaping the questions according to whom they will be interviewing. Encourage them to also include new questions that come to mind.
8. Have all groups take turns in reporting on their plans for one area and then repeat the process for the other two areas.
9. Have groups revisit plans and finalize (1) which areas they will focus on (ask them to choose two or three areas), (2) who they will interview and when (they will have signed up on the appropriate availability sheets), (3) individual responsibilities (interviewers, interview note takers, observation note takers – if phenomena and initiatives in action are to be observed).
10. Explain that after the field trip there will be a session in which groups will report on their findings. Urge them to think through what they intend to report on ahead of the session.

- Those involved in climate change mitigation, adaptation, risk reduction and resilience building initiatives, such as: local government officers, environmental officers, members of environmental, development and sustainability non-governmental organizations, community leaders, youth leaders, religious leaders, local head teachers and school teachers, emergency officers, health workers, media representatives.
- Those with direct experience of climate change impacts, such as: older people, farmers, fishermen, women's groups, migrant minorities in the area.

If possible, a visit to an actual site contributing to greenhouse gases and/or a site affected by climate change hazards should be built into the programme with opportunities to observe and to speak with those living or working at the sites.

**12:00-13:00 Lunch**

**13:00-15:00 Activity: Field Trip**

#### Time Needed

- A maximum of 2 hours for fieldwork, including time to return to the training room

#### Objectives/Explanation

- To practice climate-change related fieldwork: interviewing and observing
- To experience some of the practicalities and logistics of organizing a climate-change related field trip

#### Facilitation Guidance

The facilitator should aim to achieve a good overview of group activities, joining different groups or planned events now and then as a silent observer.

- To learn of local experiences of, and perspectives on, climate change impacts and actual and potential climate change responses

### Materials Needed

- One clipboard and paper or notebook per participant
- Local maps and directions (if necessary)

### Procedure

1. Remind participants of the purposes of the field trip.
2. Remind them that are collecting data for a reporting back and analysis session back at the training location.
3. Initiate the session, emphasizing a punctual return to the collecting point or training location.

## 15:00-16:00 Activity: Field Trip Debriefing

### Time Needed

- 60 minutes (15 minutes for reviewing findings and observations in each of the three areas; 15 minutes' consideration of facilitating field trips)

### Objectives/Explanation

- To have groups report back, exchange and discuss their field trip findings and observations
- To reflect on lessons learned about organizing and facilitating climate-change related field trips

### Materials Needed

- Flip chart

### Procedure

1. Announce that there will be 15 minutes for reporting back on each of the field trip areas (show slide 13).
2. Start the session by asking one particular group to report back their main findings about the area under review. Break away from the reporting group now and then to ask if other groups want to add anything, qualify what has been said or have a different opinion or perspective. From time to time, switch to another group to continue the reporting back (it is not necessary for every group to assume the anchor reporting role under each area).
3. In the concluding 15 minutes, ask the whole group to discuss what useful things they have learned about organizing and conducting a climate change field trip from their school or learning institution (things to do; things not to do). Record key ideas on the flip chart.

Click to consult  
slide 13 

## 16:00 Close

- Ask participants to complete a feedback sheet for Day Four (Handout 2).
- Remind participants to read through the Classroom Activities for the day and to bring any questions to the next day's workshop.
- Remind participants to write their reflective workshop diary entry for the day and bring the diary to Day Five.

Click to consult  
Handout 2 



United Nations  
Educational, Scientific and  
Cultural Organization



## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY FOUR HANDOUTS

## Handout 1. Sample Interview Questions

### AREA 1: Local contributions to greenhouse gas emissions and/or local impacts and hazards arising from climate change

- What changes in the climate and environment have you observed in the locality?
- In your estimation how responsible is climate change for the environmental changes you have noticed?
- Is there anything in the community that you think is contributing to climate change and, if so, can you explain what you have in mind?
- What climate change hazards have occurred in the locality?
- How did they affect the community?
- What damages and losses occurred? What was the impact on peoples' lives?
- Do you think the area is vulnerable to future climate change hazard(s) and, if so, how and in what areas?
- Who are the people that are most vulnerable to climate change hazard?

Click to consult  
Factsheet  
information on  
community-  
based  
monitoring



### AREA 2: Climate change mitigation, adaptation, risk reduction and resilience building initiatives in the locality

- What is happening locally to limit the effects of climate change on the community?
- Who is involved in local climate change projects and initiatives? What do they do?
- How were the local projects and initiatives chosen? Does everybody agree with them?
- What resources and finance are there to support the projects and initiatives?
- What are the aims of local projects and initiatives? What will need to happen before they can be described as 'successful'?
- What have been the challenges, obstacles and successes so far?
- Are national and international partners involved in the initiatives?
- Are local schools involved in local actions?
- How is news about projects and initiatives spread around the community?

### AREA 3: Child and youth engagement with climate change in school and in the community

- How much are local schools and colleges involved in local climate change initiatives? In what ways are they involved?
- How do you think schools, teachers and young people might become more deeply involved?
- What could they contribute in general? What could they specifically contribute to projects you are involved with?
- What are the possibilities for new projects involving school/community partnerships? What kind of projects?
- How important is it to listen to the voice of children in discussing climate change?
- Do children and youth have a voice so far? In what arenas? Through what channels?

[↩ back to Facilitation Guide:  
Field Trip Preparation](#)

## Handout 2. UNESCO Teacher Education Course on Climate Change Education for Sustainable Development: Feedback Sheet

Workshop Day No: 1, 2, 3, 4, 5, or 6 (please circle as appropriate)

This is to help the workshop facilitator(s) know how the programme is being received. They will take account of your comments in adjusting the course or their facilitation.

1. What I liked about today's workshop

2. What I think could be improved in how the workshop is being conducted

3. What questions and concerns the day has left me with

4. My other comments

Thank you very much!

[↩ back to Facilitation Guide: Introduction](#)

[↩ back to Facilitation Guide: Close](#)

## Summary of what is learned on Day Four

### 1. Pedagogies

<b>Personal Capacities to build Community Capacities</b>	e.g.: Qualities and skills of personal resilience skills used to address culture of community resilience (Facilitation Guide: Building a Culture of Safety and Resilience pp. 4-5)
<b>Capacity Building as platform for Action</b>	e.g.: Youth take action and engage with community on nature of resilience/vulnerability (Classroom Activities & Handouts: Building a Culture of Safety & Resilience, pp. 4-5)
<b>Understanding Decision Making Processes</b>	e.g.: Students analyze effects of climate change policy decisions at different levels of 'community' (Facilitation Guide: Building a Culture of Safety & Resilience, pp. 4-5)
<b>Development of Action Competences</b>	e.g.: Practical governance training for youth on communicating climate change-related DRR message to target audience (Facilitation Guide: Building a Culture of Safety & Resilience, pp. 4-5)
<b>Initiating Social Participation</b>	e.g.: Youth interact directly with community in reflection and awareness raising on effects of climate change (Facilitation Guide: Building a Culture of Safety & Resilience, pp. 4-5)

### 2. Definitions

Resilience
Vulnerability

### 3. Interdisciplinary Knowledge Systems

Knowledge from Natural Sciences	Knowledge from Social Sciences	Knowledge from Humanities
<b>Ecology</b> <ul style="list-style-type: none"> <li>Biodiversity loss</li> <li>Redevelopment of ecosystem</li> </ul>	<b>Political Science</b> <ul style="list-style-type: none"> <li>Analyzing policy decisions at various levels of government</li> </ul>	<b>Culture</b> <ul style="list-style-type: none"> <li>Building a culture of safety and resilience</li> </ul>
<b>Earth Sciences</b> <ul style="list-style-type: none"> <li>Mapping, Physical geography</li> </ul>	<b>Anthropology/Sociology</b> <ul style="list-style-type: none"> <li>Field work, interviewing, data collection</li> </ul>	<b>Communication</b> <ul style="list-style-type: none"> <li>Best practices for mass outreach message</li> <li>Learning to draw and analyze information through interviewing</li> </ul>
<b>Climate Change</b> <ul style="list-style-type: none"> <li>Greenhouse gas emissions, global warming, local environment hazards</li> </ul>	<b>Climate Change Education</b> <ul style="list-style-type: none"> <li>Applying varying scales of governance to respond to hypothetical climate change issues of the future</li> </ul>	

### 4. International Frameworks

 Click to consult Factsheet information on educating for disaster risk reduction

MDGs	Disaster Risk Reduction (DRR)
<b>Human Rights</b> <ul style="list-style-type: none"> <li>Learners assess impact of climate change on people within local communities</li> </ul>	<b>Link DRR with Climate Change</b> <ul style="list-style-type: none"> <li>Concept of “culture of safety and resilience” concretized in the face of climate change</li> <li>Learners explore five different dimensions of resilience from unanticipated climate change events within diverse local communities</li> </ul>
<b>Innovation</b> <ul style="list-style-type: none"> <li>Students use and build knowledge to create action plans within local school networks</li> </ul>	<b>Role of youth actions on DRR</b> <ul style="list-style-type: none"> <li>Modes of child/youth contribution to DRR</li> <li>Analysis, design, implementation, communication, mobilization, construction</li> </ul>
<b>Sustainable development practices</b>	

### 5. Skills

<b>Advocacy</b>
<b>Adaptation/Risk Avoidance</b>
<b>Empowerment</b> <ul style="list-style-type: none"> <li>Opportunity to take on key role for practicing action within community</li> </ul>
<b>Envisioning</b>
<b>Planning and Strategy Development</b>
<b>Critical Perspective</b> <ul style="list-style-type: none"> <li>Building ability to listen, integrate, and synthesize varying perspectives into one soluble action plan</li> </ul>
<b>Organize and Process Information</b>

[↩ back to Facilitation Guide: Introduction](#)

# Day Four PowerPoint Slides

1

2

3

## Resilience

- The ability of an individual, a community, society or ecosystem to withstand, survive and adapt to the stress and shock waves of some dramatic, traumatic and often unanticipated event or development. The ability to rebuild is a mark of resilience.
  - Adapted from Pike, G. and Selby, D. (2011) *In the Global Classroom*

4

## Priorities for Action

- **Five Priorities for Action in the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters**
  - **Priority Action 1:** Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
  - **Priority Action 2:** Identify, assess and monitor disaster risks and enhance early warning.
  - **Priority Action 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels**
  - **Priority Action 4:** Reduce the underlying risk factors.
  - **Priority Action 5:** Strengthen disaster preparedness for effective response at all levels

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## Dimensions of Resilience

- The Five Dimensions of Resilient Well-being
  - Biological
  - Material
  - Social (including Cultural)
  - Cognitive (Knowing and Understanding)
  - Emotional
- After Williamson, J. & Robinson, M. (2006). 'Psychosocial programs or programs aimed at general well-being?'

6

## Vulnerability

- The degree to which an individual, a community, a society or ecosystem is unable to cope with the stress and shock waves of some dramatic, traumatic and often unexpected event or development.
  - Adapted from Pike, G. & Selby, D. (2011). *In the Global Classroom*

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### Climate Change Vulnerability

- The degree to which a person, community or society or ecosystem is susceptible to and unable to cope with the threats, hazards, disasters, shocks and stresses brought about by dangerous climate change.
- Features/measures of vulnerability:
  - A sense of defencelessness
  - Physical breakdown
  - Cultural collapse
  - Emotional or psychological injury or inability to cope
  - Breakdown of social structures and social and environmental processes
  - Inability to adapt
  - Aggression and conflict

■ Adapted from Pike, G. & Selby, D. (2011). *In the Global Classroom*

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### Climate Change Resilience

- The ability of a person, community or society or ecosystem to survive the threats, hazards, disasters, shocks and stresses brought about by climate change, and to rebuild itself in the aftermath.
- Features/measures of resilience:
  - Emotional, psychological and cultural sturdiness
  - The ability to remain positive and hopeful
  - The ability to adapt and transform
  - The rate and sturdiness of return to a stable condition.

■ Adapted from Pike, G. & Selby, D. (2011). *In the Global Classroom*

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### Resilience vs. Vulnerability

- The degree of resilience and vulnerability will depend upon the nature and size of the climate threat and the extent to which individuals, communities and societies have considered the future and, especially, readied themselves to handle shock and uncertainty.

■ Adapted from Pike, G. & Selby, D. (2011). *In the Global Classroom*

10

### Field Trip: Purposes

- To gather information on local challenges in the face of climate change
- To find out about local initiatives for climate change mitigation, adaptation, risk reduction and resilience building
- To collect views on potential school/community climate change initiatives as well as data on any current initiatives.

[↩ back to Facilitation Guide: Building a Culture of Safety and Resilience](#)

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### Semi-Structured Interviews

- Have a structure of main questions but it is the job of the interviewer to listen closely to what is said and ask follow-up questions
- Use open-ended questions – questions starting with ‘Who’, ‘What’, ‘Why’, ‘Which’, ‘When’ ... that are not answered with a simple ‘Yes’ or ‘No’
- Do not have a fixed wording or order of questions (the interviewer should remain flexible and go with the flow of the interview)
- Avoid ‘leading questions’, i.e. questions encouraging a particular answer
- Can be with one person or with a group of people (a ‘focus group’)

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### Conducting the Interview

- Explain the purpose of the interview before you interview someone
- Listen closely to what people say
- Make it as much like a conversation as possible
- Ask follow-up or probing questions (e.g. ‘Can you tell me more about that?’ or ‘Then what happened?’ or ‘Any other thoughts on that?’)
- Adjust the order of questions so that the next question seems to flow naturally from what the person being interviewed has just said

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## Areas of Interview Questioning

- AREA 1: Local contributions to greenhouse gas emissions and/or local impacts and hazards arising from climate change
- AREA 2: Climate change mitigation, adaptation, risk reduction and resilience building initiatives in the locality
- AREA 3: Child and youth engagement with climate change in school and in the community

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Field Trip Preparation](#)

[↩ back to Facilitation Guide:  
Field Trip Debriefing](#)

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## End of Day 4 – See you tomorrow

Please don't forget to:

- Fill out and submit your feedback form
- Read through *Classroom Activities* for the day and bring any questions to tomorrow's workshop
- Write your reflective workshop diary entry for the day and bring the diary to Day 5

[↩ back to Facilitation Guide: Introduction](#)



# Get the Facts:

## CLIMATE CHANGE IN THE COMMUNITY

Poverty - Why are the world's poorest the most vulnerable?

### Different capacities to cope

The capacity of a country or region to successfully cope with climate change is highly dependent on its level of economic and human development. Disparities in development worldwide mean that countries are affected unequally by climate change impacts. According to the Fourth Assessment Report of the IPCC (2007), developing countries are expected to suffer most from the negative impacts of climate change. Asia, Africa and many Small Island Developing States would be more vulnerable due to projected changes in annual average river runoff and water availability, decreases in crop productivity in dry and tropical regions, exposure of coastal areas to cyclones, storm surges, erosion, coastal subsidence and sea level rise (see 'The Case...' text box). Hence, the countries with the fewest resources are likely to bear the greatest burden of climate change in terms of loss of life and their related impacts on investment and the economy. Often, extreme weather events set back the development process for decades.

Even though developing countries are predicted to face the most severe impacts of climate change, they are less prepared and thus less able to confront the challenges than developed countries. For example, climate change-related weather disasters (e.g. floods, cyclones) are likely to cause substantial loss of life in developing countries, in particular amongst the most vulnerable populations who often dwell in precarious geographic areas and in sub-standard dwellings. The institutional capacity to successfully deal with such weather events is comparatively low. Indeed, over 96% of disaster-related deaths in recent years have taken place in developing countries.<sup>1</sup>

Developing countries are less prepared to cope with sea level rise, water shortages, increased extreme events, or the negative effects on agriculture resulting from climate change. All of these impacts put increased pressure on the capacities of the governments of those countries.

<sup>1</sup> Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation, African Development Bank, Asian Development Bank, DfID (United Kingdom), Directorate-General for Development (European Commission), Federal Ministry for Economic Cooperation and Development (Germany), Ministry of Foreign Affairs Development Cooperation (The Netherlands), OECD, UNDP, UNEP, The World Bank, 2003. <http://siteresources.worldbank.org/INTCC/817372-1115381292846/20480623/PovertyAndClimateChangeReportPart12003.pdf>

### The need for building resilience

Strengthening the adaptive capacity of governments, communities and households to climate change impacts is vital to decreasing the impact on vulnerable populations and increasing their resilience. A poverty-reduction strategy should increase the resilience of livelihoods, assets, and infrastructure. However, such a strategy should incorporate existing knowledge and coping strategies of vulnerable populations and should be designed with the targeted communities' participation, allowing them to have access to climate information. Social inequities can affect such access and hinder the adoption of an appropriate adaptation strategy.

Mitigation efforts can also increase the resilience and capacity of communities to adapt to changes in local climate conditions. Reducing both loss of natural habitat and deforestation can have significant biodiversity, soil and water conservation benefits, and can be implemented in a socially and economically sustainable manner. For example, forestation and sustainable bioenergy plantations can restore degraded land, manage water runoff, retain soil carbon and benefit rural economies<sup>2</sup> thus improving their ability to adapt to adverse impacts of climate change.

### The way forward for policy: Address poverty; build resilience

In general, the impacts and responses to climate change should be evaluated and integrated into poverty reduction strategy papers and conflict reduction strategies. Policy-makers need to recognise that sustainable adaptation measures must be context specific, and that policy responses need to integrate the participation of local stakeholders and use community-focused approaches. Development policies addressing the potential migratory impacts of climate change should stress coping capacities, adaptation and sustainability. Development and poverty reduction programmes and projects should incorporate resilience elements in its strategies<sup>3</sup>.

[↪ back to Facilitation Guide: Building a Culture of Safety and Resilience](#)

<sup>2</sup> Intergovernmental Panel on Climate Change (2007). Climate Change 2007: Synthesis Report. Geneva, Switzerland.

<sup>3</sup> Forced Migration Online. Environmentally displaced people: understanding the linkages between environmental change, livelihoods and forced migration. [http://repository.forcedmigration.org/show\\_metadata.jsp?pid=fmo:4960](http://repository.forcedmigration.org/show_metadata.jsp?pid=fmo:4960)



## Building community resilience through education

Education is also an instrument for preventing disasters from happening. Many hazards only become disasters due to human behaviour or as a result of a lack of preparedness. What people **know** has therefore often been demonstrated to be more important than what people **have** when it comes to avoiding or limiting the harmful consequences of hazards.

Ensuring quality education before, during, and after disasters can help build individual and community resilience to future climate change-induced disasters. It can reduce vulnerabilities to hazards by equipping learners and their communities with life-saving knowledge and helping them to develop positive coping mechanisms. Education can be instrumental in building local capacity to cope after disasters and in helping learners and the community to return to a normal life.

Education plays a significant role in increasing long-term behaviour changes and promoting participation among the general public. As such, it contributes to enhancing bottom-up solutions to a global problem that cannot be addressed by 'elites'. As an example, children often learn about natural risks at school and then pass this information onto their parents. This is typically the case in developing countries – when such programmes exist, but also occurs in developed states.<sup>4</sup> Adults, once informed, are more able to participate in civil society and to influence decision-making in areas that affect them, particularly at the local level.

Many other ethical discussions and principles<sup>5</sup> in relation to climate change can be approached by formal or informal education, with potentially strong outcomes in terms of giving rise to critical reflection. Viewing climate change in ethical terms underlines the point that everyone's behaviour counts and contributes, even indirectly, to influencing the trends of environmental and social systems. By thinking about and acting on our responsibilities, we share benefits within and

<sup>4</sup> Education also contributes in developing countries to saving lives by simply teaching children and women to swim or perform certain emergency procedures in the event of floods or other natural disasters.

<sup>5</sup> For exploratory purposes, other important principles in relation to climate change can be quoted here: the principle of equitable access to medical, scientific and technological developments with the sharing of knowledge and benefits; the principle of safeguarding and promoting the interests of the present and the future generations; the polluter pays principle; the precautionary principle.

### School System Disaster Response

The response of school systems in providing educational services to displaced families from New Orleans and other coastal cities when hurricanes Katrina and Rita hit the Gulf Coast of the United States in 2005 provides an example of accommodating children affected by an extreme weather event. Schools and school districts expedited enrolments to assure children did not remain out of school for an extended period of time. The US Congress approved funding for schools, which were educating displaced students. In some cases families returned to their hometowns when schools reopened; in other cases the families stayed permanently in their new communities and schools were able to deal with the fluctuation of enrolments.

among societies, but also between humans and plants, animals, ecosystems and the entire 'biotic community'.<sup>6</sup>

### Reorienting existing education programmes to address sustainability

Curricular revisions, not only in science and mathematics education, but also in the social sciences and humanities are needed to educate the younger generation about climate change, and to stimulate the problem-solving and critical thinking skills needed to generate solutions at the local and global levels. For some geographic regions, re-orienting education will go deeper. In the case of climate-induced migration, new skills may be necessary to live with members of other ethnic groups and/or cope with a changing physical environment. These need to be incorporated into the curriculum.

Education can play an important role in facilitating adaptation to the challenges posed by climate change. It can help reduce the vulnerability of communities and improve their capacity to adapt to changes in their social, economic and ecological environment, and an uncertain future. Most importantly, it helps individuals to make informed decisions on how to adapt their lives and livelihoods to the effects of climate change and reduce risk and vulnerability.

**Indigenous and local knowledge** is a key resource for communities in understanding the environment, and assessing and adapting

<sup>6</sup> According to A. Leopold, (an American ecologist), 'a thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise', *A Sand Country Almanac* (1949).

# Get the Facts:

## CLIMATE CHANGE IN THE COMMUNITY

to climate change impacts. It should be strengthened and integrated into education programmes. Building on students' knowledge of local communities and their culture and value systems is essential. This makes climate change education more authentic and relevant to specific situations, and helps to find local, realistic and affordable solutions for adaptation.

### Education for climate change adaptation in the community

Education for adaptation is not an easy task. The future of vulnerable communities in

#### Community-based Monitoring

Community-based monitoring (CBM) is a complex research field that is becoming an essential and often required component in academic research and natural resource management (Fleener et al., 2004; Huntington, 2008). It is often used as a validation of results produced by conventional research methods. CBM enables researchers to reach beyond traditional data collection strategies by using the best available knowledge, be it academic, indigenous or local.

The Circumpolar Biodiversity Monitoring Program commissioned the development of a Community-Based Monitoring Handbook (Gofman and Grant Friedman, 2010). The handbook enhances the role of community-based observations in the current and emerging Arctic research projects and recommendations can also be applied to broader monitoring efforts and in non-Arctic regions. The Handbook reviews several ongoing community monitoring programmes, and is written for a diverse audience that includes scientists, students, Arctic community residents and government officials.

Projects reviewed include:

- Arctic Borderlands Ecological Knowledge Co-op (<http://taiga.net/coop/>)
- Community Moose Monitoring Project and Community Ecological Monitoring Project, ECORA (Integrated Ecosystem Approach to Conserve Biodiversity and Minimize Habitat Fragmentation in the Russian Arctic, <http://www.grida.no/ecora/>)
- Marine Rangers Project in Australia ([www.atns.net.au/agreement.asp?EntityID=4923](http://www.atns.net.au/agreement.asp?EntityID=4923))

[↩ back to Handout 1](#)

coastal areas, deserts or mountains is already uncertain in the short term. Education for adaptation therefore has to prepare for futures characterized by uncertainty. Adaptation to climate change requires individuals to be aware of potential changes in the climate and to understand the implications on their lives. It requires them to assess the risks such changes hold for their future, and to take informed decisions on how to adapt their livelihoods and homes.

Quality education that equips individuals with critical thinking and problem-solving skills improves the adaptation capacities of affected communities. Education programmes that explicitly prepare for disaster, and promote indigenous knowledge, sustainable lifestyles and sustainable development will further enhance these capacities.

Education for adaptation plays a key role in enhancing the resilience of communities, in particular, in **rural areas** where livelihoods are dependent on the weather. Education programmes can help to raise awareness of changing farming requirements and incorporate climate information into the decision-making of rural communities. In agriculture, for instance, adaptation options for education may explore opportunities of reducing dependency on rain-fed agriculture, adopting drought resistant and early maturing varieties, as well as better use and management of rain water through rainwater harvesting. These may require the use of action enquiry strategies in teaching and learning.

[↩ back to Facilitation Guide: Building a Culture of Safety and Resilience](#)

### Educating for disaster risk reduction

Governments must commit to teacher training and curricula development to support large-scale teaching on DRR. Disaster prevention and preparedness need to be incorporated throughout formal curricula and through co-curricular and informal means. Students can be taught about disasters and their impacts on people's lives as part of the science and life-skills curricula. While classes should familiarize students with local hazards and what to do in an emergency, a multi-hazard approach should be adopted to instruct learners about the variety



of hazards that exist. Policy-makers can engage teachers and students in adapting, developing and testing high-quality interactive materials and strategies to teach DRR, while teachers should be trained in how to create safe learning environments that promote the protection and well-being of learners.

[↪ back to Summary of what is learned on Day 4](#)

### Locally relevant, culturally appropriate: Education for sustainable development

The ESD framework and pedagogies provide an educational framework for many environmental, social, economic, ethical and political issues and are thus ideal for addressing the wide variety of impacts related to climate change.

ESD can be implemented in myriad ways such that the resulting ESD programme is locally

relevant and culturally appropriate, reflecting the unique environmental, social and economic conditions of each locality. Furthermore, ESD increases civil capacity by enhancing and improving the workforce, social tolerance, environmental stewardship, participation in community-based decision-making, and quality of life. These features enable climate change education to acquire a wider and deeper meaning and applicability through close association with ESD (see 'Education for...' text box).

[↪ back to Facilitation Guide: Field Trip Preparation](#)

#### Education for Sustainable Development:

- is based on the principles and values that underlie sustainable development;
- deals with the balanced well-being in all three realms of sustainability — environment, society and economy;
- promotes life-long learning;
- is locally relevant and culturally appropriate;
- is based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences;
- engages formal, non-formal and informal education;
- accommodates the evolving nature of the concept of sustainability;
- addresses content, taking into account context, global issues and local priorities;
- builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable workforce and quality of life;
- is interdisciplinary. No one discipline can claim ESD for its own, but all disciplines can contribute to ESD;
- uses a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills.



# Get the Facts:

## CLIMATE CHANGE IN THE COMMUNITY

Climate change impacts on communities worldwide

### Intergovernmental Panel on Climate Change (IPCC) Information on Current Knowledge about Future Impacts

#### Freshwater resources and their management

By mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water-stressed areas. In some places and in particular seasons, changes differ from these annual figures.]

Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.

In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.

Adaptation procedures and risk management practices for the water sector are being developed in some countries and regions that have recognised projected hydrological changes with related uncertainties.

#### Ecosystems

The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).

Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.

The progressive acidification of oceans due to increasing atmospheric carbon dioxide levels increases the potential for the skeletons of coldwater coral reefs to dissolve, perhaps already within a few decades. The impacts will be greatest at high latitudes..

#### Food, Fibre and forest products

Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3°C depending on the crop, and then decrease beyond that in some regions.

At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase the risk of hunger.

Globally, the potential for food production is projected to increase with increases in local average temperature over a range of 1-3°C, but above this it is projected to decrease.

Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes.

Adaptations such as altered cultivars and planting times allow low- and mid- to high-latitude cereal yields to be maintained at or above baseline yields for modest warming.

Globally, commercial timber productivity rises modestly with climate change in the short- to medium-term, with large regional variability around the global trend.

Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.

#### Costal systems and low lying areas

Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be



exacerbated by increasing human-induced pressures on coastal areas.

Corals are vulnerable to thermal stress and have low adaptive capacity. Increases in sea surface temperature of about 1-3°C are projected to result in more frequent coral bleaching events and widespread mortality, unless there is thermal adaptation or acclimatisation by corals.

Coastal wetlands including salt marshes and mangroves are projected to be negatively affected by sea-level rise especially where they are constrained on their landward side, or starved of sediment.

Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.

Adaptation for coasts will be more challenging in developing countries than in developed countries, due to constraints on adaptive capacity.

### Industry, settlement and society

Costs and benefits of climate change for industry, settlement and society will vary widely by location and scale. In the aggregate, however, net effects will tend to be more negative the larger the change in climate.

The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring.

Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies.

Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

### Health

Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity, through:

- increases in malnutrition and consequent disorders, with implications for child growth and development;
- increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts;
- the increased burden of diarrhoeal disease;
- the increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and,
- the altered spatial distribution of some infectious disease vectors.
- Climate change is expected to have some mixed effects, such as a decrease or increase in the range and transmission potential of malaria in Africa.

Studies in temperate areas have shown that climate change is projected to bring some benefits, such as fewer deaths from cold exposure. Overall it is expected that these benefits will be outweighed by the negative health effects of rising temperatures worldwide, especially in developing countries.

The balance of positive and negative health impacts will vary from one location to another, and will alter over time as temperatures continue to rise. Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives and infrastructure and economic development.

Source: Excerpts from *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers, pp. 11-13. Cambridge University Press.

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## Day / Focus

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2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

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**CLIMATE  
CHANGE**  
IN THE  
CLASSROOM



## Day 5 - A Global Focus on Climate Change

### Facilitation Guide for Classroom Activities

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## Global and Regional Trends

### Time Needed

- 90 minutes (45 minutes analyzing data and preparing a presentation; 45 minutes presentations followed by whole group discussion)

### Objectives/Explanation

- To interpret data on global and regional climate change
- To determine key issues and action/policy directions in the light of the interpretation

### Materials Needed

- Packs comprising copies of a selection of global and regional climate change data available in Sections A and B of the Regional Resource Pack per group of four students

### Procedure

- Have students form groups of four per desk/table.
- Distribute one pack per group.
- Explain that the task of each group is to read through the data, discuss what each piece of information is saying and what its implications are and then to determine what main conclusions can be drawn from the data set taken as a whole.
- Explain, too, that each group is going to be asked to present their findings at an imaginary Regional Climate Conference that you will chair. Each presentation (of maximum four minutes) should have two sections: (1) Climate Change: What the Region Needs To Do; (2) Climate Change: What the Region Needs to Say to the World. All group members should contribute to the presentation.
- Have groups present, inviting up to three questions to each group.
- Conclude with a whole group discussion of what has emerged from the exercise.

### Facilitation Guidance

If students are not familiar with interpreting data, it will be helpful to begin the activity by looking at one or two examples from the pack and conduct an interpretation as a class.

If students have Internet availability, they can be encouraged to seek out and draw on more data and display their findings during their presentation.

## Climate Change Cartoons

### Time Needed

- 60 minutes (30 minutes in groups; 15 minutes reporting back; 15 minutes discussion)

### Objectives/Explanation

- To employ cartoons to explore perceptions on climate change and climate justice issues
- To practice media analysis
- To look at the place of cartoons in fostering the attitudes and dispositions for promoting social change and justice

### Materials Needed

- One lettered set (A-J) of up to ten photocopied climate change cartoons per group of three or four students (Handout 1)

### Procedure

- Distribute sets of cartoons and ask groups to spread them out on the table or floor.
- Ask individuals to quietly peruse the cartoons and to rank them intuitively in terms of their immediate impact, jotting down their chosen order and writing a brief note about what they think each cartoon is trying to say.
- Have individuals share their rankings and explanations with group members, the aim being to understand each other's perspectives and thinking rather than look for consensus.
- List a range of specific criteria — such as 'shocking', 'disturbing', 'sad', 'perceptive', 'thought provoking', 'funny', 'puzzling'. Give each group one of the criteria to work with and ask groups to rank the cartoons according to that criterion, [For instance, one group will rank the ten cartoons from 'most shocking' to 'least shocking'.]
- Have groups report back on their ranking, and the thinking behind their ranking, before engaging students in a discussion of issues that have surfaced.

### Variations/Extensions

- Have students write captions or alternative captions for the cartoons.
- Have students adapt the cartoon as a brief puppet play or as street theatre for the community.
- Have students, working individually or in pairs, prepare their own climate change cartoons and mount a classroom or school display. Have them repeat the main activity with their own cartoons.
- Give students a brief verbal description of a cartoon and read the caption (if any). Have them sketch it themselves and then compare their own version with the original.

### Facilitation Guidance

Cartoons can convey ideas and perspectives in direct, humorous, effective and very simple ways. As such, they provide a fascinating springboard for consideration of climate change and sustainability issues as well as media perceptions and judgments on those issues.

Members of each group should be encouraged to share their initial responses to the cartoons before going on to report on their ranking of them according to the criterion they were given. Questions to put in the closing discussion include:

- What other criteria would it have been interesting to use for the activity?
- How do the cartoons achieve their effect?
- What insights do the cartoons offer on global climate change issues and, specifically, issues of climate change injustice?
- Who might most applaud each of the cartoons and who might feel most disturbed and challenged by its message?
- Which cartoon would you most like to send to world leaders to think about?
- The teacher should point out at some stage in the debriefing that humor has, historically, been a very powerful tool in action for social change and justice, and not least by loosening up seemingly intractable positions against change.

## Climate Change and the Millennium Development Goals

### Time Needed

- 55 minutes (10 minutes introduction and initial brainstorming; 25 minutes group exchanges; 20 minutes whole group discussion and input)

### Objectives/ Explanation

- To examine implications of climate change for UN Millennium Development Goals (MDGs)
- To explore interconnections between Millennium Goals in regard to climate change challenges
- To recognize interdependent relationship between global development efforts

### Materials Needed

- One cut-up set of the UN Millennium Development Goals cards (Handout 2)
- Chart paper, markers and a paste stick per group of two or three students
- One copy per student of Handout 3, Impacts of Climate Change on the Millennium Development Goals

### Procedure

- Explain that there are a number of studies acknowledging that climate change is hampering efforts to deliver the UN Millennium Development Goals and that there is even evidence that climate change is putting progress towards achieving the goals into reverse. Use the information in Boxes 1 and 2 in introducing the activity.
- Ask students to form teams of two or three and give each team one UN Millennium

### Facilitator Guidance

This is a simple but effective means of examining the implications, actual or potential, of climate change for global development efforts and of exploring the reverberations of impacts across all eight MDGs.

Students can be invited, as in the above procedure, to discuss climate change implications at different levels: global, regional, national, and local. Alternatively, the facilitator can ask teams to focus on just one of those levels.

In the debriefing, it is probably best to take each MDG in turn. The one or more teams that have considered a particular MDG can be asked to share their ideas on actual or likely impacts of climate change on the realization of the Goal. The discussion can then widen to have other teams report on how they think the effects of climate change on the MDG in question is likely to reverberate on and influence progress towards the MDG they have considered. The discussion then moves on to the next MDG using the same procedure. With each MDG, it is important to enquire about any 'None' returns. Are there, indeed, no repercussions or can participants come up with ideas?

### Box 1. UN Millennium Development Goals (MDGs) – International Development Goals for 2015

- MDG 1: Eradicate extreme poverty and hunger
- MDG 2: Achieve universal primary education
- MDG 3: Promote gender equality and empower women
- MDG 4: Reduce child mortality
- MDG 5: Improve maternal health
- MDG 6: Combat HIV/AIDS, Malaria and other diseases
- MDG 7: Ensure environmental sustainability
- MDG 8: Develop a global partnership for development

### Box 2.

'Climate change is hampering efforts to deliver the MDG promise. Looking to the future, the danger is that it will stall and then reverse progress built-up over generations not just in cutting extreme poverty, but in health, nutrition, education and other areas.'

Source: UNDP (2007). Human Development Report 2007/8.

## Day Five: A Global Focus on Climate Change

Development Goals card. Ask them to paste it in the middle of their chart paper and brainstorm and write down global, regional and local impacts of climate change on the achievement of the given MDG.

- The brainstorming completed, ask each team to join with another team that has investigated a different MDG. Have the teams give each other summary explanations of their work and take questions.
- Then ask the combined team to consider how the climate change impacts on each MDG may in turn have repercussions for the realization of the other MDG.
- Have the members of the original two teams note down agreed repercussions from the other MDG on their chart paper. Have them note down 'None' if no repercussions are identified.
- Invite each original small team to find to another team working on a different MDG and repeat the same procedure. Repeat the procedure a third time if there is sufficient time available.
- Bring the whole group together for a sharing and discussion of the insights emerging from the activity. At an appropriate point in the debriefing, perhaps after the discussion of 'None' returns is completed (see below), distribute Handout 3 and have the group review potential impacts of climate change they identified and those they overlooked.

## Rights and Climate Change

### Time Needed

- 50 minutes (25 minutes in groups, 25 minutes in whole class session)

### Objectives/Explanation

- To explore case studies of the impacts of climate change on people's lives through a human rights lens
- To learn that a climate changing world puts human rights at threat
- To think about climate change actions to protect rights

### Materials Needed

- One or more stories of the effects of climate change on people's lives. Stories to use include: Day 1 Classroom Activity Handout 4; Regional Resource Pack section C
- One copy per group of four of the simplified version of the United Nations Universal Declaration on Human Rights (Handout 4)
- One copy of the Rights and Climate Change sheet per student (Handout 5)

### Procedure

- Have student form groups of four.
- Give the same climate change story or a different story to each group.
- Ask groups to read their story before going on to complete the four columns of the Rights and Climate Change sheet referring to their copy of the UN Declaration.
- Bring the class together. If groups have worked with different stories, have each group offer a summary of their story. If all have read the same story go straight into the next stage of the activity.
- Conduct a class debriefing, working through the Rights and Climate Change sheet column by column.

### Variation

- If the facilitator has access to stories of the impacts of climate change on children, the same process can be followed but using one of the simplified versions available of the Convention of the Rights of the Child, 1989.

### Facilitation Guidance

The activity familiarizes students with the rights laid down in two key international documents and has them look at climate change impacts in terms of rights denials.

If more than one story is used, it is important to enquire whether there is a similar pattern in the rights being denied across the stories. It is also important to have students reflect on the predicament of people where more than one human right is under assault simultaneously. Finally, it is important to ask whether the erosion or denial of some rights because of climate change will lead to a creeping erosion of the enjoyment of other rights listed in the two international documents.

## How Far Do Our Freedoms Go in Securing the Future?

### Time Needed

- 30 minutes (12 minutes reflecting and circulating; 18 minutes whole group discussion)

### Objectives/Explanation

- To consider the question of what constitutes and what does not constitute legitimate action and activism when the sustainability and wellbeing of humanity and the planet are held to be in danger

### Materials Needed

- Five trays of badges (20 per tray for a group of 30) indicating five positions on a continuum of opinion ranging from strong agreement to strong disagreement (see Box 4)

### Procedure

- Explain Box 3 on the 2008 Kingsnorth trial in Kent, United Kingdom, in which six environmental activists halted the operation of a coal-fired power station in a protest about climate change. The jury found the activists not guilty on the grounds that their breaking the law was justified because their actions were to prevent greater damage in the future.
- Ask students to reflect on the result of the trial for two minutes and its implications for climate change activism.
- The two minutes over, invite students to go to the trays of badges and choose and wear the badge that most faithfully represents their own response to outcome.
- Have students wearing the same badge meet together for two minutes (in pairs or threes) to discuss why they chose the badge. Then have them move on to discuss the statement for two minutes with someone wearing a badge one position removed from their own. Then have them move on to discuss the statement for two minutes with someone wearing a badge two or more positions removed. Finally, ask them to meet up again with the person(s) they first talked with to have them review what they have heard and learned and the degree to which the arguments advanced have caused them to think again.

#### Box 4.

- I Strongly Disagree
- I Disagree
- I'm Neutral
- I Agree
- I Strongly Agree

### Facilitation Guidance

It is important to encourage students to engage in positive, constructive discussion and active listening rather than just join in dug-in argument. A somewhat different approach is to invite students to change badges between statements if the discussions have caused them to rethink their position.

Helpful lead questions for the debriefing include:

- Can we think of times when people have taken action for change that was considered unlawful but has contributed to justice and wellbeing?
- What were the principal arguments advanced for and against the statement?
- How would your thinking change should climate change increase in its severity?
- Where does loyalty most lie in deciding what action, if any, to take to combat climate change? My region? National interest? National law? The earth? Present generations? Future generations?
- Can these loyalties be combined? How?

### Box 3. The Kingsnorth Trial, Kent, United Kingdom, September 2008

- Six Greenpeace activists halted the operation of the Kingsnorth coal-fired power station. Their protest was against plans to build an even bigger coal-fired power station next door
- They were interrupted and arrested before they could finish painting their message asking the government to scrap the plans on the power station chimney
- They were charged with criminal damage and faced possible jail sentences
- The Greenpeace defense was that the action, even if illegal, was justified in that they were trying to prevent future damage to the world through climate change.
- The jury found the defendants innocent in the light of this defense but said their verdict did not set a precedent.



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Educational, Scientific and  
Cultural Organization



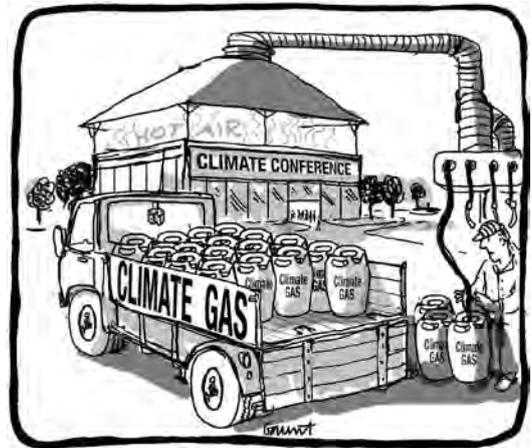
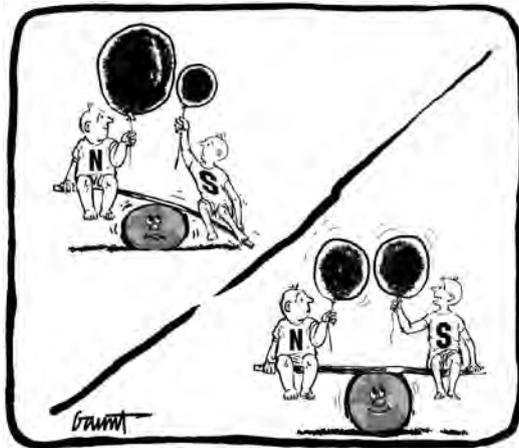
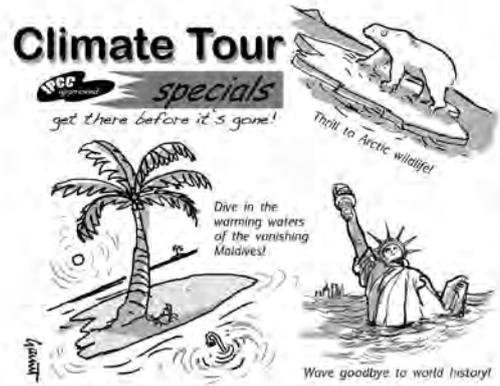
## Day / Focus

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# DAY FIVE HANDOUTS

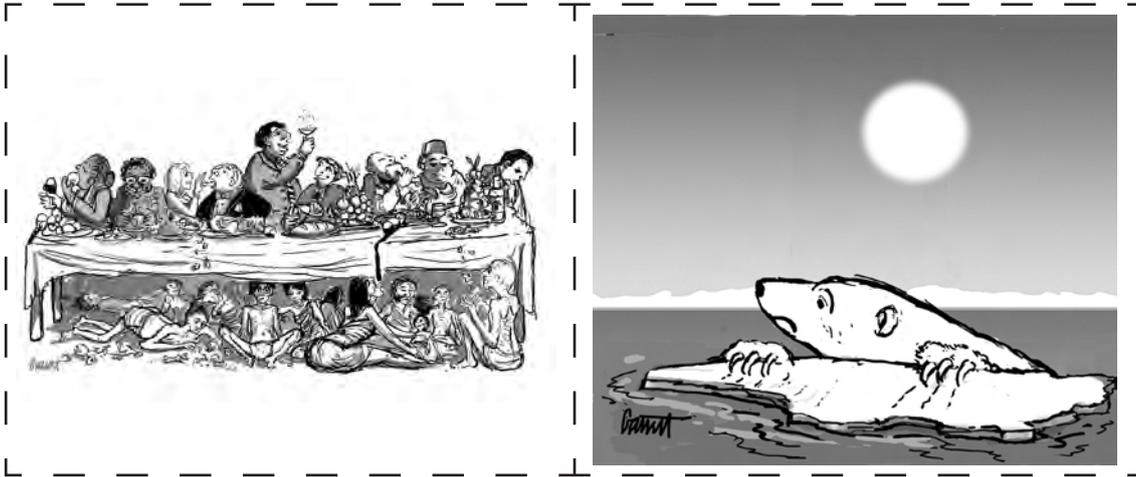
## Handout 1. Climate Change Cartoons



### Executive Des.Res.

(ARCHITECT-DESIGNER) FOR GLOBAL WARMING





Credit: Lawrence Moore. Reproduced here with permission.

### Handout 2: Millennium Development Goals Cards

MDG 1. Eradicate extreme poverty and hunger	MDG 2. Achieve universal primary education
MDG 3. Promote gender equality and empower women	MDG 4. Reduce child mortality
MDG 5. Improve maternal health	MDG 6. Combat HIV/AIDS, Malaria and other diseases
MDG 7. Ensure environmental sustainability	MDG 8. Develop a global partnership for development

### Handout 3: Impacts of Climate Change on the Millennium Development Goals

Millennium Development Goal	Potential Impacts of Climate change
<b>Goal 1</b> Eradicate extreme poverty and hunger	<ul style="list-style-type: none"> <li>• Damage to livelihood assets, including homes, water supply, health, and infrastructure, can undermine peoples' ability to earn a living;</li> <li>• Reduction of crop yields affects food security;</li> <li>• Changes in natural systems and resources, infrastructure and labour productivity may reduce income opportunities and affect economic growth;</li> <li>• Social tensions over resource use can lead to conflict, destabilizing lives and livelihoods and forcing communities to migrate.</li> </ul>
<b>Goal 2</b> Achieve universal primary education	<ul style="list-style-type: none"> <li>• Loss of livelihood assets and natural disasters reduce opportunities for full time education, more children (especially girls) are likely to be taken out of school to help fetch water, earn an income or care for ill family members;</li> <li>• Malnourishment and illness reduces school attendance and the ability of children to learn when they are in class;</li> <li>• Displacement and migration can reduce access to education.</li> </ul>
<b>Goal 3</b> Promote gender equality and empower women	<ul style="list-style-type: none"> <li>• Exacerbation of gender inequality as women depend more on the natural environment for their livelihoods, including agricultural production. This may lead to increasingly poor health and less time to engage in decision-making and earning additional income;</li> <li>• Women and girls are typically the ones to care for the home and fetch water, fodder, firewood, and often food. During times of climate stress, they must cope with fewer resources and a greater workload;</li> <li>• Female headed households with few assets are particularly affected by climate related disasters.</li> </ul>
<b>Goal 4</b> Reduce child mortality  <b>Goal 5</b> Improve Maternal Health	<ul style="list-style-type: none"> <li>• Deaths and illness due to heat-waves, floods, droughts and hurricanes;</li> <li>• Children and pregnant women are particularly susceptible to vector-borne diseases (e.g. malaria and dengue fever) and water-borne diseases (e.g. cholera and dysentery) which may increase and/or spread to new areas — e.g. anaemia resulting from malaria is currently responsible for one quarter of maternal mortality;</li> <li>• Reduction in the quality and quantity of drinking water exacerbates malnutrition especially among children;</li> <li>• Natural disasters affect food security leading to increased malnutrition and famine, particularly in sub-Saharan Africa.</li> </ul>
<b>Goal 6</b> Combat HIV/AIDS, malaria and other diseases	<ul style="list-style-type: none"> <li>• Water stress and warmer conditions encourage disease;</li> <li>• Households affected by AIDS have lower livelihood assets, and malnutrition accelerates the negative effects of the disease.</li> </ul>

<b>Goal 7</b> <b>Ensure environmental Sustainability</b>	<ul style="list-style-type: none"><li>• Alterations and possible irreversible damage in the quality and productivity of ecosystems and natural resources;</li><li>• Decrease in biodiversity and worsening of existing environmental degradation;</li><li>• Alterations in ecosystem-human interfaces and interactions lead to loss of biodiversity and loss of basic support systems for the livelihood of many people, particularly in Africa.</li></ul>
<b>Goal 8</b> <b>Develop a global partnership for development</b>	<ul style="list-style-type: none"><li>• Climate change is a global issue and a global challenge: responses require global cooperation, especially to help developing countries adapt to the adverse effects of climate change;</li><li>• International relations may be strained by climate impacts.</li></ul>

Source: Excerpt from: UNFCCC (2007). *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries*. Reproduced here with permission.

## Handout 4: Universal Declaration of Human Rights (Simplified Version)

<p><b>Article 1. Equality of all people</b> All people are born free and equal in dignity and rights. They should behave towards each other in a spirit of community and solidarity.</p>	<p><b>Article 2. Right of all to fair and equal treatment</b> You should have all the rights and freedoms listed in this Declaration, no matter where you are from, what colour you are, what sex you are, what language you speak, what religion you practice, what views you hold or how rich or poor you are. Nor does it matter what country you live in.</p>
<p><b>Article 3. Right to life</b> You have the right to life, and to live in liberty and security.</p>	<p><b>Article 4. Right to freedom from slavery</b> No one has the right to make you a slave and you cannot make anyone your slave.</p>
<p><b>Article 5. Right to freedom from torture</b> No one has the right to torture you, or to treat or punish you in a cruel way, and you cannot torture anyone.</p>	<p><b>Article 6. Right to be regarded as a person</b> Wherever you are, the law must recognize you as a person with rights.</p>
<p><b>Article 7. Right to equality before the law</b> The law is the same for everyone, and it should be applied in the same way for everyone. Laws must never treat people differently.</p>	<p><b>Article 8. Right to legal protection</b> You have the right to legal remedy when your rights are violated.</p>
<p><b>Article 9. Right to freedom</b> No one has the right to put you in prison or keep you there, or send you away from your country unjustly or without reason.</p>	<p><b>Article 10. Right to a fair trial (1)</b> If you bring a case to law or are charged and must go on trial, this should be conducted fairly and publicly. The people who try your case should not let themselves be influenced by others.</p>
<p><b>Article 11. Right to a fair trial (2)</b> If charged with an offense, you should be considered innocent until it can be proved that you are guilty, and you have the right to defend yourself against any charge at a public trial. You should not be punished for something you did before a new law was made.</p>	<p><b>Article 12. Right to privacy</b> You have the right to protection from interference with your privacy, family, home and correspondence. You have the right to have your honour and reputation protected in law.</p>
<p><b>Article 13. Right to freedom of movement</b> You have the right to come and go as you wish in your country. You have the right to leave your country and return to it if you wish.</p>	<p><b>Article 14. Right to political asylum</b> If someone persecutes you, you have the right to go to another country and ask it to protect you. You lose this right if you have committed a crime or acted contrary to the principles of the United Nations.</p>

**Article 15. Right to nationality**

You have the right to a nationality and no one can deprive you of that nationality, without a good reason. You have the right to change your nationality if you wish.

**Article 16. Right to marry and have a family**

You have the right to marry and have a family when you are an adult. There should be nothing to stop you marrying someone from a different race, country or religion from yourself. Man and women have equal rights in marriage. No one can force you to marry. The government of your country should protect your family.

**Article 17. Right to own property**

You have the right to own property on your own or in association with others. No one can take your property away from you without reason.

**Article 18. Right to freedom of belief**

You have the right to freedom of thought, conscience and religion, the right to change your religion or beliefs and the right to practice your religion and beliefs if you wish, either alone or with other people.

**Article 19. Right to freedom of opinion and expression**

You have the right to freedom of opinion and expression, freedom to hold opinions without interference, and the right to receive and transmit information and ideas from or to other people, no matter where they live, through any media.

**Article 20. Right to freedom of assembly**

You have the right to organize or take part in meetings or work together in a peaceful way, but no one can force you to belong to a group.

**Article 21. Right to political activity**

You have the right to take an active part in your country's affairs by belonging to the government or by voting for politicians of your choice. You have the right to work in local government. The government shall be elected freely by all people. Election shall be held regularly and everyone's vote is equal.

**Article 22. Right to social security**

You have the right to social security and are entitled through national effort and international cooperation to the fulfilment of economic, social and cultural rights necessary for your dignity and free development.

**Article 23. Right to work**

You have the right to work, to choose your work freely, to just and favourable conditions of work, and to receive payment for to allow you and your family to live decently. Everyone should receive the same pay for doing the same work. You have the right to claim unemployment benefit or social security if necessary. You have the right to join a trade union to protect your interests.

**Article 24. Right to leisure**

You have the right to rest and leisure, to work reasonable hours and to take periodic paid holidays.

<p><b>Article 25. Right to a decent standard of living</b></p> <p>You have the right to a decent standard of living to ensure the health and wellbeing of your family (including food, clothing, housing, medical care and necessary social services); also the right to security in unemployment, sickness, disability, widowhood, old age or other lack of livelihood brought about by circumstances beyond your control. Mothers and children deserve special care.</p>	<p><b>Article 26. Right to education</b></p> <p>You have the right to learn. Primary education should be compulsory and free. You should be able to learn a profession or continue your studies as far as you are able. At school you should be taught to develop your talents and to get along with other people, whatever their religion, their race or their nationality. Education should help the United Nations bring about and keep peace in the world. Your parents have the right to choose what kind of school you will go to.</p>
<p><b>Article 27. Right to culture and copyright</b></p> <p>You have the right to join in the cultural life of your community and to share in the better life that scientific progress makes possible. Anything you invent, write or produce should be protected and you should be able to benefit from it.</p>	<p><b>Article 28. Right to a social and international order</b></p> <p>Everyone is entitled to a social and international order that will help them achieve the rights in this Universal Declaration.</p>
<p><b>Article 29. Duties to community and respect of rights</b></p> <p>You have duties towards the community that makes your full development possible. Your rights and freedoms shall be limited only so far as necessary to protect the rights and freedoms of others.</p>	<p><b>Article 30. Protection of this Declaration</b></p> <p>No government, organization or person may destroy the rights and freedoms set out in this Declaration.</p>

Source: Adapted from: Pike, G. & Selby, D. (1988). *Human Rights: An Activity File*.

## Handout 5. Rights and Climate Change

Rights denied in the story	How is each right is denied
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
Local climate change adaptations to protect the right	
What could be done in the future to prevent further denial of rights	

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IN THE  
CLASSROOM



## Day 6 - Towards Empowerment and Action

### Facilitation Guide for Classroom Activities



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## Climate Change Despair and Empowerment Sequence

### Time Needed

- 60 minutes

### Objectives/Explanation

- To work primarily at an affective level by looking at personal responses to climate change
- To engage with feelings of despair, hopelessness and powerlessness in the face of climate change and work on translating those feelings into feelings of purposefulness and commitment to transformative action

### Materials Needed

- Three cards and a sheet of drawing paper per student
- Sufficient blank 'commitment' cards
- Flip chart and marker or chalkboard and chalk

### Procedure

- Have students sit in a large circle.
- **Stage 1: Feeling Powerful.**  
Ask students to think about times when they have had to do something really difficult or scary but where they came out feeling really powerful. Give them a few minutes for reflection before asking them to pick up a card and draw images that capture the experience and feelings of those times. Have students share and explain their images round the circle. Then have them store their card for future reference.
- **Stage 2: Thinking the Unthinkable.**  
Ask students to each pick up a card and write down three sentences, each sentence starting with one of the following:
  - 'The thing that worries me most about the changing climate is...'
  - 'The thing I prefer not to think about happening with climate change is...'
  - 'What scares me most about a climate-changed world is...'
- Give three to four minutes for writing (avoid giving examples and encourage students to honestly write what they wish). Collect the cards in, shuffle them and hand them out again. Have students read out the card they have received. Accept all sentences without comment.
- **Stage 3: Climate Change Nightmares.**  
Ask students to silently run a film in their heads about dangerous climate change inspired by the recall of a bad dream, something they have actually experienced, or something they have read in a newspaper, magazine or book or seen in a film. After a few minutes ask them to draw a picture on paper, not to be shown to anyone, of their feelings.
- **Stage 4: Something You Love.**  
Ask students to again close their eyes and think deeply about something they most value about life or the world and what they would do to protect it. After a few minutes, ask volunteers to share and describe what they thought of.

### Facilitation Guidance

This activity is designed to take students through a sequence of powerful emotional jolts before demonstrating the potential within them for social action in difficult times. First, they recall feelings and moments of power (Stage 1) before encountering climate change dystopias in the face of which they may very well feel an acute sense of powerlessness (Stages 2, 3). The orientation then swings (Stages 4, 5) to focusing upon what they most value in life and to considering hopeful futures (something that is likely to be made more intense by just having considered what they love). The focus then turns (Stage 6) to considering individual action to limit the causes and impacts of climate change that is then bolstered by considering the power students have been able to find in themselves in earlier frightening circumstances (Stage 7).

In the concluding comment (Stage 8), the facilitator should explain that the sequence of activities is intended to address the fear and sense of despair and hopelessness that many people feel in the face of climate change, whether that is because of the potential destruction of the environment they know, the loss of livelihood, the destruction of their culture and lifestyle, the failure of those holding power to respond effectively, or just the sheer magnitude and seeming intractability of the threat. Such exercises as this are important in combating despair, helplessness and cynicism in young people as a necessary precursor to fostering in them the commitment to engage in climate change action.

## Day Six: Towards Empowerment and Action

- **Stage 5: A Hopeful Future.**  
On a new card, have students write three sentences beginning:
  - ‘I really could help my community face up to climate change by...’
  - ‘I could show climate change leadership if I...’
  - ‘To help transform things, a good way forward for me would be to...’
- Once more collect in the cards, shuffle them and hand them out again. Have students read out the card they have received. All sentences once again accepted without comment.
- **Stage 6: The Big and Little Things We Could Do.**  
Having heard the individual contributions, have the group pool ideas for the big things and little things they could personally do to help combat climate change as students as well as members of a community. Big things are more public and noticed and are likely to involve others; little things are more private and unnoticed such as a small change in personal habits. Note down ideas on the flip chart or chalkboard.
- **Stage 7: Revisiting Feeling Powerful.**  
Ask participants to look back again at their images of themselves being powerful (Stage 1). Invite them to quietly reflect on how those feelings of power might be drawn upon in helping combat climate change and, in particular, in acting on the big and little things pooled during Stage 6. Then go round the circle asking students to share their reflections one by one. Finally, place blank ‘commitment to action’ cards in the centre of the circle and in a few minutes of quiet invite participants to write their own commitment cards, sharing them informally with colleagues as the activity ends if they wish.
- **Stage 8: Concluding Comment.**  
Close the activity sequence with a concluding comment (see Facilitation Guidance).

Source: Sustainability Frontiers

## Confronting Climate Change Denial: Snappy Dramas

### Time Needed

- 45 minutes (5 minutes introduction; 30-35 minutes for snappy dramas; 5-10 minutes for debriefing)

### Objectives/Explanation

- To explore climate change denial and cognitive dissonance as it applies to climate change
- To role play ways that denial and cognitive dissonance can be addressed and to practice the skills involved

### Materials Needed

- A cut-up set of the Snappy Drama Cards (Handout 1) per group of four

### Procedure

- Have class members sit in a circle and quietly think about times when they have worried about something but put it 'to the back of their minds' or otherwise tried to forget about it or reduce its significance; things like going out to have fun the evening before a big exam when as they play they feel uncomfortable not to be studying, or going through the motions with a boyfriend or girlfriend when they no longer feel good about the relationship but aren't prepared to face up to the fact by telling them, or behaving in one way when part of them is telling them they should be behaving in another but not confronting the problem. Go around the circle asking them to recount examples they are prepared to share and the feelings they had. The teacher introduces the idea of denial; that in big things and small things people use mind devices to evade reality and to protect themselves from facing up to things. The class is asked if they can identify in their examples different forms of denial dynamic and give each form a descriptor.
- Go further into the concepts of climate change denial and introduce the idea of cognitive dissonance using the definitions in Box 1.
- Have students form groups of four.
- Introduce the idea of 'snappy dramas', i.e. short dramas, to be quickly prepared and then to be immediately performed in response to stimulus material.
- Explain that you are going to give out a succession of cards, each one offering an example of climate change denial or cognitive dissonance. Hand out the first card. Tell group members that they are to decide on roles and prepare a quick one-minute drama in which some in the group (action takers on climate change) try to confront the denial and/or

### Facilitation Guidance

Before the session the facilitator should decide which of the cards available are to be used and in what order, making up their own out of local knowledge of they wish.

In the short debriefing, the facilitator should ask students to pinpoint the different strategies that those who assumed the role of action takers on climate change employed in attempting to break through the denial and to surface the cognitive dissonance they encountered. What approaches do students think are likely to be most effective in fostering awareness, openness and deep self-reflection leading to concerned engagement with climate change?

### Box 1. Climate Change Denial and Cognitive Dissonance

Climate change denial is the term used to describe how individuals and institutions downplay or ignore the extent of climate change, its significance, and its origins in human behavior. Denial happens on defense of financial interests, but also to protect individuals from facing the prospect of a climate-changed future and the changes they would need to make in their behaviors and lifestyles. It is especially prevalent amongst the populations of high-income countries.

Cognitive dissonance, a term used in social psychology, describes an uncomfortable feeling arising from holding two contradictory ideas and/or behaving in two contradictory ways at the same time. It also describes when we know - but won't acknowledge - that what we are saying or how we are behaving is contradicted by evidence and we continue to resist amending what we say or what we do.

Source: Sustainability Frontiers (2011).

## Day Six: Towards Empowerment and Action

tease out the cognitive dissonance of other individuals in the group. Give four minutes of preparation time. Then chose three groups to perform their drama. The performances complete, hand out the second card, repeating the process four or five times in all (with three performances to conclude each section bringing in all groups).

- After the four or five rounds of snappy drama, facilitate a brief reflection on the skills and strategies that have been demonstrated (amidst the humor) in confronting denial and teasing out cognitive dissonance.

## Climate Change Action

### Time Needed

- 80 minutes (15 minutes groups of three; 15 minutes combined groups; 15 minutes whole group discussion; 15 minutes groups of three; 20 minutes whole group discussion)

### Objectives/Explanation

- To consider the acceptability and effectiveness of various forms of social action in response to climate change
- To consider the degree of participation that different forms of youth social action involve
- To introduce students to the concept of 'involvement literacy'

### Materials Needed

- A cut-up set of Climate Change Actions? (Handout 2) statements per group of three students
- A sheet of chart paper and a marker per group

### Procedure

- Have students form groups of three.
- Distribute the sets of statements, chart paper and markers.
- On the top half of their chart paper have groups copy the diagrams in Box 2a / 2b.
- Give half the groups the criteria Acceptable/Unacceptable and the other half the criteria Effective/Ineffective.
- Have students quietly read the twelve action statements and decide where they stand in terms of the criteria they are working with.
- Then have groups negotiate a placing of each statement along a continuum between their two criteria. So, for instance the statement describing an action felt to the most unacceptable goes closest to the (-) sign and the statement describing an action that is felt to be most acceptable goes closest to the (+) sign. Statements describing actions considered falling somewhere in between are placed at an agreed point along the continuum.
- The placing complete, have each student draw and initial where they would draw the line between what they think are acceptable and unacceptable (or effective and ineffective) actions.

### Facilitation Guidance

This activity is designed to alert students to the need to make mature and informed choices about their involvement in climate change social action, and other action for social change. 'Involvement literacy' is not just about developing and practicing the skills for change agency and advocacy but also about mature and considered reflection on the effectiveness, ethics, pitfalls and implications of the social change initiative that is being proposed.

The first half of the activity looks at the effectiveness and ethics of various forms of action while the second half asks students to consider the nature of their proposed participation. Is a more or less decorative and tokenistic function being offered them? Or are they being engaged in a truly participative way with space to contribute ideas and initiate? Are their school and community giving them a genuinely initiating role in combating climate change?

It is important to ask questions that cut across the different strands of the activity. What if an action is considered very effective but is deemed unacceptable? How far should young people go in supporting effective action if they are relegated to a tokenistic or decorative role? Should they have a genuine say in local climate change adaptation and mitigation initiatives or should they support them uncomplainingly?

If students have undertaken community actions as a result of activities earlier in this pack, they should be asked where they would place them on the ladder of participation. The higher up the ladder the more participative has student engagement been!

#### Box 2a. Where to draw the line?

unacceptable                      acceptable  
 (-) ————— (+)



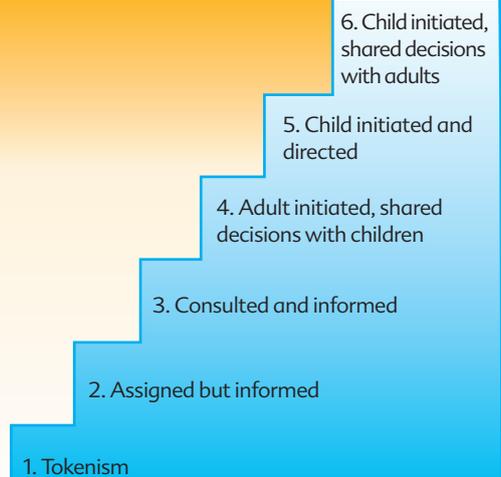
#### Box 2b. Where to draw the line?

ineffective                      effective  
 (-) ————— (+)



- Then have each group join with another that has used different criteria so each can share and explain their decisions.
- Hold a whole class discussion to air issues raised and insights gained.
- Have groups of three re-form. Now ask them to draw a ladder of participation (see Box 3) on the second half of their sheet of paper. Explain what each rung on the ladder means (Box 4).
- Ask groups to decide on which rung of the ladder each action statement should be placed.
- Have groups report back and have the class review what has been learnt. During the review introduce the idea of 'involvement literacy' (see below).

### Box 3. Ladder of Participation



After Hart, R.A. (1992) *Children's Participation: From Tokenism to Citizenship*. Florence: UNICEF International Child Development Centre

### Box 4. Ladder of Participation - Explanation of Terms Used

#### Tokenism:

- Young people participate but with little understanding and little or no choice about what they say and no chance to contribute their own opinions or consult.

#### Assigned but informed:

- Young people volunteer after initiative explained to them; they know who has made the decisions and why; they are given a particular role that is important.

#### Consulted and informed:

- Adult determined initiatives but over which young people are consulted.

#### Adult-initiated; shared decision making:

- Adult-determined initiatives in which young people have a say from the outset

#### Child initiated and directed:

- Initiatives thought up and executed entirely by young people.

#### Child initiated but involving adults:

- Initiatives thought up by young people who then involve concerned adults

[After Hart, R.A. (1992) *Children's Participation: From Tokenism to Citizenship*. Florence: UNICEF International Child Development Centre]

## Alternative Pathways

### Time Needed

- 40 minutes (25 minutes in groups; 15 minutes reporting back)

### Objectives/Explanation

- To practice and reflect on planning and implementing a local community change initiative towards climate change mitigation, adaptation or risk reduction

### Materials Needed

- A sheet of chart paper and marker per three or four students

### Procedure

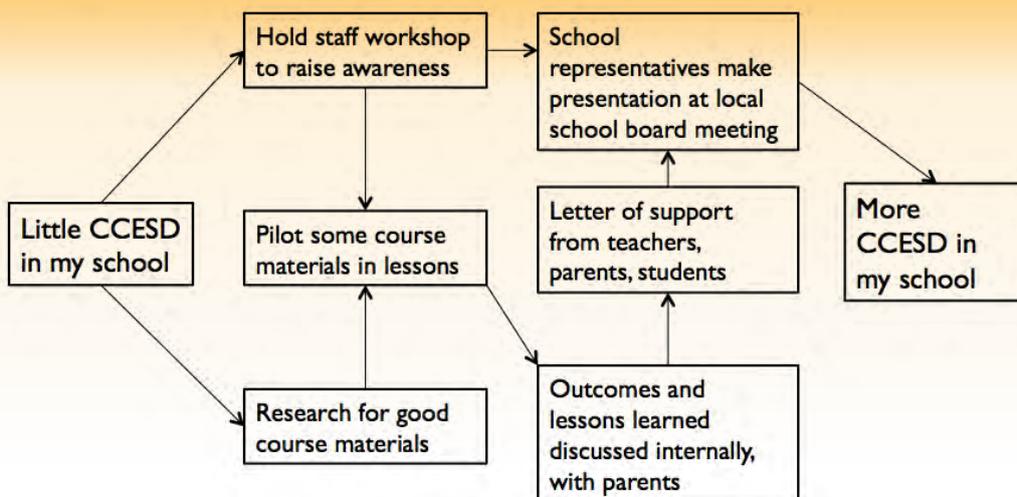
- Have students form groups of three or four.
- Distribute a sheet of chart paper and a marker to each group.
- Using the example in Box 6, explain the Alternative Pathways process. Students should write down a present climate change issue (a problem concerning mitigation, an adaptation need or a need to reduce risk) in their community on one side of their sheet and the desired outcome on the opposite side. Alternative means of circumventing or overcoming the problem and arriving at the desired outcome are discussed and written in. Steps along the alternative pathways are linked with arrows.
- Ask each group to report back, encouraging critical feedback from others, before having the whole class reflect on lessons learned about planning and effecting climate-related action in the community.

### Facilitation Guidance

In encouraging feedback on reports and facilitating the whole group discussion, it is important to raise questions concerning the realism and practicability of the plans. Were they in some ways naïve? Were they overly idealistic? Were important considerations overlooked? In what ways could the plans be made more workable? It is also worth discussing with the class the usefulness and feasibility of goal-oriented planning of this nature. What are the limitations of such approaches? Are they nonetheless useful tools for locating constraints and critical decision points ('forks in the path') in seeking to achieve a desired goal?

### Box 5. A Sample Process for the Alternate Pathways Activity

#### A sample process:



## Holding a Climate Change Students' Hearing

### Time Needed

- Occasional periods of time over several weeks

### Objectives/Explanation

- To give local voice to students on their hopes, fears, visions and demands on climate change
- To give practice in climate change community action
- To (re)focus school and community attention on climate change as a potential precursor to further community action

### Materials Needed

- A postcard per school student
- Sufficient printed copies of the Students' Appeal

### Procedure

- Ensure that, as a result of their previous learning or through a specially held assembly, all the students of the school are informed to some degree about climate change, its causes, impacts and actions to be taken to mitigate or adapt to its effects.
- Introduce to them to the idea of Children's Hearings and Children's Appeals (Box 6).
- Have the students elect a student committee to organize a Climate Change Students' Hearing (two representatives per grade level; in the case of mixed-gender schools, a female and male representative per grade level).
- Invite all students to prepare a postcard expressing in words and pictures their hopes, fears, questions, visions and/or demands concerning climate change, and submit it to the organizing committee.
- Support the committee as they organize and synthesize the cards and prepare a two-page Students' Appeal summarizing their thoughts and feelings. During the process, advise them how to maintain the interest and involvement of the whole student body through issuing news announcements, circulating an occasional newsheet, or holding consultations on draft ideas being considered for inclusion in the Appeal.

### Facilitation Guidance

This is a demanding but potentially hugely enriching process that gives students the opportunity to speak their minds on climate change to local decision makers and opinion formers. Involvement in such a process, even if it leads to no immediate solid changes, can build in students the conviction that their collective actions can make a difference.

The role of the facilitator is to support, offer counsel and guide. The more things that can be left to students to do, the more sense of empowerment they will have.

The process can make a key contribution to building school and community alertness to climate change, perhaps even through the local media.

### Box 6. Children's Hearings and Children's Appeals

The idea originated at a meeting of the World Commission on Environment and Development in Bergen, Norway, in May 1990. Following the meeting, ten Norwegian children were given the opportunity to put their hopes, fears, visions and demands for the future to their country's leaders at a Children's Hearing. The Hearing, which received widespread media attention, was the culmination of a process that started with schools being asked to invite students to send postcards conveying their thoughts and feelings about the state of the world to an editing group. The group sorted some 6000 postcards under different headings and drew up a Children's Appeal reflecting and summarizing the opinions of children and using their own words. At the Hearing, ten selected children put questions based on the postcards to a panel of national figures, including the then Prime Minister of Norway, Gro Harlem Brundtland. The Norwegian Children's Ombudsman chaired the Hearing and ensured the questions were answered without evasion. After the Hearing, the Appeal was presented and distributed. Since then, Children's Hearings have been held at school, local, regional, national and global levels.

- Have the committee (supported by invited teachers and community members) arrange a date and location for a Students' Hearing. Have them invite local politicians, local religious leaders, local media representatives and other decision makers and opinion formers to join a panel of 6-8 members to answer questions on climate change causes, impacts and responses put by student representatives.
- Also have the committee invite applications from students who would like to represent the student body by putting questions to local leaders. The applicants should make a case for their being chosen for the student panel. Then have the committee choose some 10-12 students to sit on the panel (those chosen should represent the student body in terms of age, gender and ethnicity and should have demonstrated an active concern about climate change through their postcards and contribution to school and community life).
- Ask the committee and student panelists to draw up the questions to be put to the panel of leaders. Have the student panelists practice putting initial questions and follow-up questions.
- Have the committee publicize the Hearing (invitations to all students and community members). Have the committee invite along local media.
- Before the event, set up a display of student postcards for viewing.
- Have the committee approach and invite a sympathetic local figure to chair the event and ensure that the questions put by students are addressed clearly and without evasion (the chair should have time to talk to the student panel ahead of the Hearing).
- Have the chair invite contributions from children in the audience at appropriate moments (but not from adults as their role, on this occasion, is to listen).
- At the end of the questioning period, the Students' Appeal should be read out and copies circulated. Ensure the chair asks each member of the panel of leaders to make a concluding statement of commitment.
- Invite media to interview student panelists and members of the student committee, to interview members of the panel of leaders and members of the audience, and to take photographs of the postcard exhibition.

### Extensions

- Form an electronic partnership with a school in another part of the country or another country (a partnership between a school in the developed world and developing world can be particularly effective) to share the process at its several key stages. Share respective Appeals.
- Make the process an annual event with subsequent events including a review of, and holding to account for, what has happened in the preceding year.
- Link to the event some student musical or dramatic performance relating to climate change.



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## Day / Focus

1. Climate change learning for sustainable development
2. The Future
3. Adaptation & Mitigation
4. Local Focus
5. Global Focus
6. Empowerment & Action

UNESCO COURSE FOR SECONDARY TEACHERS ON CCESD

# DAY SIX HANDOUTS

## Handout 1. Snappy Drama Cards

### Small window of opportunity...

The newspaper front page had a shocking piece about the melting of the Arctic ice, the sinking of island nations, and the spread of deserts. 'We have only a small window of opportunity to stop climate change before it is too late,' the editorial proclaimed. On page 8 the newspaper was advertising its special world travel offers to see places soon to disappear with climate change. On page 11 was a whole-page advertisement by a car manufacturer for a Sports Utility Vehicle [SUV]. The editor has agreed to meet with meet some concerned readers who have complained...

**Roles:** the editor; the newspaper sales manager; two concerned members of the public

### Too big to handle...

The couple watched the program on climate change. It really worried them. 'Ah well,' the man said, 'we've had these sorts of problems before, and somebody will come up with something. Leave it to the experts.' 'Yes,' the woman said, 'there's not much we can do anyway. It's too big for us to handle'. There was somebody at the door. It was their nephew and niece. 'Hi,' the young couple said, 'we've just come from our CCESD class. Did you watch that climate change program?' ...

**Roles:** the man, the woman; the two young people

### Biggest university...

'We have become the leading North American university in championing environmental protection and education,' the university press release announced. 'We are proud that forty of our academics representing several faculties are attending the upcoming world conference on climate change in (place of choice)'. While attending the conference held at the city's biggest hotel, two of the much-travelled academics meet two local climate change activists in a local café.

**Roles:** the two academics; the two local activists

### The biggest denial...

'The biggest climate change denial is the failure of the wealthy nations to tell people that climate change is already having devastating effects for people in the developing world with 300,000 dead each year and the lives of 325 million seriously affected.' The visiting scholar from (continent of choice) watched the impact of what she had said on the students. One asked: 'Why have our parents and teachers never told us this? What should we do?'

**Roles:** the visiting scholar, three students

### Nothing more we can do...

The three teachers came back from a six-day CCESD training program. They were keen to help take the school in new directions. They went to see the principal. 'Yes, climate change is a huge, huge problem,' the principal said, 'but we have a recycling program already, there is the annual environmental day field trip, and the mechanics of climate change are explained in the science class.' Without upsetting the parents and dropping bits of the curriculum, 'There is nothing more we can do.' The three teachers...

**Roles:** the principal; the three teachers

## Handout 2: Climate Change Actions: Acceptable? Effective? or Neither?

<p><b>Shale Oil</b></p> <p>Young people block the entrance to a shale oil extraction plant and paint slogans on the walls because the plant is a major greenhouse gas producer.</p>	<p><b>Family Change</b></p> <p>A teenager gets her parents and sisters to cut down on what they buy and consume for the good of the planet.</p>
<p><b>Social Media</b></p> <p>Young people of the developing world use social media campaigns to make young people in economically rich countries aware of how their nations are responsible for most greenhouse gas emissions for which they should pay compensation.</p>	<p><b>Demonstration</b></p> <p>Young people are invited to join and help organize a demonstration and march that closes the city centre to protest against the failure of a recent international climate change conference.</p>
<p><b>Tree Planting</b></p> <p>Supervised by adults, young people plant trees on slopes above their village to stop mud landslides caused by occasional freak weather conditions.</p>	<p><b>Letters</b></p> <p>A school course on climate change ends with the teacher and students deciding to write letters to politicians and media expressing their concerns about climate change and demanding more action.</p>
<p><b>Boycott</b></p> <p>Inspired by a local speaker, young people join a campaign of posters, meetings and picketing shops to encourage people to boycott meat in that the beef industry is a major cause of global warming.</p>	<p><b>World Conference</b></p> <p>A small party of local young people from a developing world country is invited to travel to a major international climate change conference to speak about the problem as they see it; there is a photo opportunity for the party to stand with world leaders.</p>
<p><b>Sit Down Protest</b></p> <p>To help stop the cutting down of rainforests, young people are put on the front line of a non-governmental organizations' sit down protest to stop logging trucks getting into the forests when a television crew visits.</p>	<p><b>Picketing</b></p> <p>Holding placards and engaging those who pass by, students mount their own weeklong vigil outside the offices of a big business corporation that has a bad environmental record and that is using its wealth to weaken international efforts to limit climate change.</p>
<p><b>Risk Reduction Campaign</b></p> <p>Local environmentalists involve young people in helping with an awareness- raising campaign on the need to prevent flooding because local leaders seem blind to the danger.</p>	<p><b>Save Water</b></p> <p>Young people use their muscle and energy to help an international non-governmental organization erect water-saving tanks in various places across the community.</p>

This week: CCESD Course!

Day / Topic

1. Climate change learning for sustainable development
2. A Futures Learning Approach
3. Adaptation & #
4. A Local Focus
5. A Global Focus
6. Empowerment & Action

## CLIMATE CHANGE IN THE CLASSROOM

UNESCO COURSE FOR SECONDARY TEACHERS ON  
CLIMATE CHANGE EDUCATION FOR SUSTAINABLE DEVELOPMENT

### More information

For more information on UNESCO's work on climate change, please visit our website:  
<http://www.unesco.org/en/climatechange>



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