UNEP

Climate Change, its Consequences on Employment and Trade Union Action

A Training Manual for Workers and Trade Unions

Sustainlabour

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Global Warming, Greenland. A stream of melt water cascading off the vast Arctic ice sheet which covers Greenland.

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CLIMATE CHANGE, ITS CONSEQUENCES ON EMPLOYMENT AND TRADE UNION ACTION

A training manual for workers and trade unions

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BACKGROUND

The Training Manual on "Climate Change, its Consequences on Employment and Trade Union Action" is developed under the framework of the project "Strengthening trade union participation in international environmental processes", jointly implemented by the United Nations Environment programme (UNEP), the International Labour Foundation for Sustainable Development (Sustainlabour), in collaboration with the International Trade Union Confederation (ITUC), and its affiliates, the International Labour Organization (ILO), the World Health Organization (WHO) and the Government of Spain.

The overall objective of the project is to improve engagement of workers and trade unions in the development and implementation of environmental policy, as recommended by the Trade Union Assembly on Labour and the Environment at its first meeting in January 2006. The main purpose of the training component of the project is to address a clear gap and lack of knowledge of the environmental issues at stake regionally and globally in the trade union movement. The training component of the project focuses on two topics:

a. **Climate change**, its consequences on employment and trade union action, and the need for alternative methods of production and just transition;

b. **Sound and sustainable management of chemicals** and how to integrate just employment into environmental policy design.

Manual objective

The purpose of this Manual is to enhance understanding of climate change and related mitigation and adaptation issues and their consequences on employment.

Trade Unions are uniquely placed to sensitize workers about the impact of climate change on employment patterns, to promote and demand that both public and private sectors develop programmes on climate change mitigation and adaptation, as well as to train workers to contribute and verify that these measures are adequately implemented.

In this regard, access to information and training are necessary to improve working conditions. The purpose of this Manual is to provide workers and trade unions with general information and guidance on how to deal with climate change.

Manual format and content

The Manual is designed in modular format and may be used integrally or partially in modules, depending on the purpose and duration of the training. The content is designed to be applicable at different spatial levels – from the national, sub-regional, regional, and global level. Modules can be studied not necessarily in a chronological order. It contains several case studies to illustrate the theoretical aspects of the manual.

The expected length of the training period is three days, however the Manual is designed in such a way that trainers may add or leave out sections for a specific training session to shorten or lengthen the suggested training.

The Manual targets mainly workers and trade unions, both from developing countries and countries with economies in transition from Africa, Asia and the Pacific, and Latin America and the Caribbean. The Manual is elaborated for women and men, workers, who are in industry, agriculture, government and other public or private sectors, to enable them carefully consider the potential risks and opportunities of climate change as regards employment, and take appropriate actions at the local, national or international levels.

The Manual targets experienced or inexperienced workers and trade unions in climate change issues. It attempts to combine different types and levels of information to suit the needs and interests of all; though, it targets mainly an inexperienced audience.

The first module provides a broad overview of the causes and consequences of climate change globally. It is a general introduction to key concepts such as adaptation and mitigation. It also gives a broad overview of the economics and the international governance of climate change.

The second module analyses in depth the potential consequences of climate change, and mitigation and adaptation measures on employment.

The last module explores the way trade unions can contribute to climate change action from the international to the workplace level. The objective is to introduce briefly the main mechanisms in place, but particularly to underline the importance of civil society's participation, namely workers and trade unions.

Course evaluation

At the end of the training, an evaluation is requested from the trainees. The evaluation allows trainees to highlight points that will assist trainers to improve their delivery of the course, and to facilitate the review and revision of the Manual over time.

NOTES:

INTRODUCTION

The training manual is developed in the framework of the project titled "Strengthening trade union participation in international environmental processes", jointly implemented by the United Nations Environment Programme (UNEP), the International Labour Foundation for Sustainable Development (Sustainlabour), and in collaboration with the International Trade Union Confederation (ITUC), and its affiliates, the International Labour Organization (ILO), the World Health Organization (WHO) and the Government of Spain.

The overall objective of the project is to improve workers and trade union engagement in the development and implementation of environmental policy, as recommended by the Trade Union Assembly on Labour and the Environment (15-17 January 2006) at its first meeting.

The Trade Union Assembly on Labour and the Environment (Nairobi, Kenya, 15-17 January 2006)

The trade union participation was organized into two levels:

- Through five work groups: 1) climate change and energy policies; 2) chemical risk: dangerous substances in the workplace; 3) trade union activities for equitable, sustainable access to resources and services, access to water; 4) corporate social responsibility and accountability; 5) occupational health, environmental and public health: the campaigns to fight asbestos and HIV/AIDS. The written reports of the work groups were used to produce a manual of contributions: the Assembly work manual.
- Approximately twenty "case studies" were compiled, in which specific experiences were described.

The Trade Union Assemby brought together over 150 trade union representatives from developing and developed countries, along with environmental and sustainable development experts and representatives of Governments and the United Nations.

- It confirmed that the three relevant United Nations bodies (UNEP, ILO, WHO) were committed to supporting trade union engagement on sustainable development;
- It confirmed that unions were engaged in practical steps through their activities to advance sustainable development and that they were are committed to extending that work as a priority;

The Assembly agreed:

- To strengthen the link between poverty reduction, environmental protection and decent work. Decent and secure jobs are essential for people to have a sustainable livelihood. Creating decent and secure jobs is only possible, however, if environmental sustainability is attained: hence the need to embrace the poverty reduction and sustainable development goals contained in the Millennium Declaration and Johannesburg Plan of Implementation through the promotion of decent employment and environmental responsibility. This must also include the mainstreaming of gender issues;

- To integrate the environmental and social dimensions of sustainable development with rights-based approach. Fundamental rights of workers such as freedom of association and collective bargaining must be respected if workers and their unions are to be able to engage in strategies for sustainable development. Moreover, human rights must include the universal, equitable, egalitarian and environmentally sound access to basic resources such as water and energy;
- To take urgent action on climate change in support of the United Nations Framework Convention on Climate Change and its Kyoto Protocol; to develop new and additional agreements for both developed and developing countries, taking account of common but differentiated responsibilities; to anticipate and minimize the negative effects and maximize the positive effects on employment of mitigation; and to ensure the participation of trade unions in decision-making on climate change strategies.

More information is available at:
http://www.unep.org/labour_environment/PDFs/TUALEfinalresolution-ENG.pdf

The Training Manual on Climate Change for Workers and Trade Unions

Trade Unions are uniquely placed to sensitize workers about the impact of climate change and climate change policies on the world of work and production, as well as to train workers to assist and reinforce climate-friendly policies at all their levels of influence.

Climate change is the main environmental problem facing humanity. It is the cause of the multiplication of extreme weather events, such as draught, floods, heat and cold waves. Its consequences are aggravated desertification and erosion processes as well as irreversible changes in ecosystems and the loss of biodiversity.

Climate change and subsequent changes in the environment will affect all aspects of our lives: food and water supplies, the patterns and influence zones of diseases, and also the way we produce and consume, as far as these are at the origin of climate change. It will certainly also have effects on employment which we will analyze in the second module of this training manual.

Thus trade unions and workers need to understand the causes of these disruptions, in order to ensure a better participation in the discussions and propose measures that strengthen the fight against climate change by multiplying positive changes and avoiding the suffering inflected by negative changes.

NOTES:

MODULE 1:

INTRODUCTION TO CLIMATE CHANGE

Coal mine and wind turbines, India
©Shinde / UNEP / Still Pictures

Module objectives:

The module aims at:

- Providing basic information about climate change, its natural and human causes, and consequences;
- Introducing the concepts of climate change mitigation and adaptation;
- Providing an estimate of the costs of climate change and of actions to tackle it;
- Describing international mechanisms that address the climate change challenge.

Learning outcomes:

At the end of the session, the trainee will be familiar with:

- The link between greenhouse gas emissions from human activities and climate change;
- The existing and medium/long term impacts of climate change on different regions and sectors, and related costs;
- The different options available to tackle climate change and related cost.
- The objectives and mechanisms of the United Nations Framework Convention on Climate Change and the Kyoto Protocol.

Introduction to Module 1

Climate change is the main environmental problem facing humanity. It is the cause of the multiplication of extreme weather events, such as draught, floods, heat and cold waves. Its consequences are aggravated desertification and erosion processes as well as irreversible changes in ecosystems and loss of biodiversity.

Climate change and subsequent changes in the environment will, of course, affect all aspects of our lives: food and water supplies, the patterns and influence zones of diseases, and also the way we produce and consume. It will certainly also have effects on employment.

Thus trade unions and workers need to understand the causes of these disruptions, in order to ensure a better participation in the discussions and propose measures that strengthen the fight against climate change. This would be possible by multiplying positive changes and avoiding the suffering inflicted by negative changes.

This first module comprises five units:

In the **first unit** we will see that changes in the climate are natural. However, human activity has modified the patterns of this natural climate change and today we risk a global catastrophe with grave environmental, social and economic consequences.

In the **second unit**, we will see how growth has damaged the natural climate equilibrium and present available options for each economic sector to reduce its impact.

In the **third unit**, we will deal with the need of our societies to adapt to climate change, and to protect the most vulnerable from suffering the worst consequences of this problem. We also make a special mention of the link between development conditions and ability to adapt to climate change.

Unit four is about costs. First we will study the cost of fighting climate change and reducing our emissions of Greenhouse Gases (GHG) to prevent a temperature rise of at least 2-3° C. Next we will see that the cost of inaction could have a much larger impact on our lives and thus be far more costly.

In the **fifth and last unit**, we will see what steps have been taken by the international community to combat climate change and we will explain why collective action is urgently needed at the international, national, sectoral and community level to counteract climate change.

Unit 1: CLIMATE CHANGE AND ITS CONSEQUENCES

Key ideas

→ Changes in climate are natural.
→ However, human activity has modified climate change patterns.
→ As a consequence, today we risk a global catastrophe with environmental, social and economic impacts.

WHY IS THE CLIMATE CHANGING?

"Climate" refers to the average weather experienced over a long period, typically 30 years. This includes temperature, wind and rainfall patterns. The Earth's climate is not static, and has changed many times in response to a variety of natural causes.

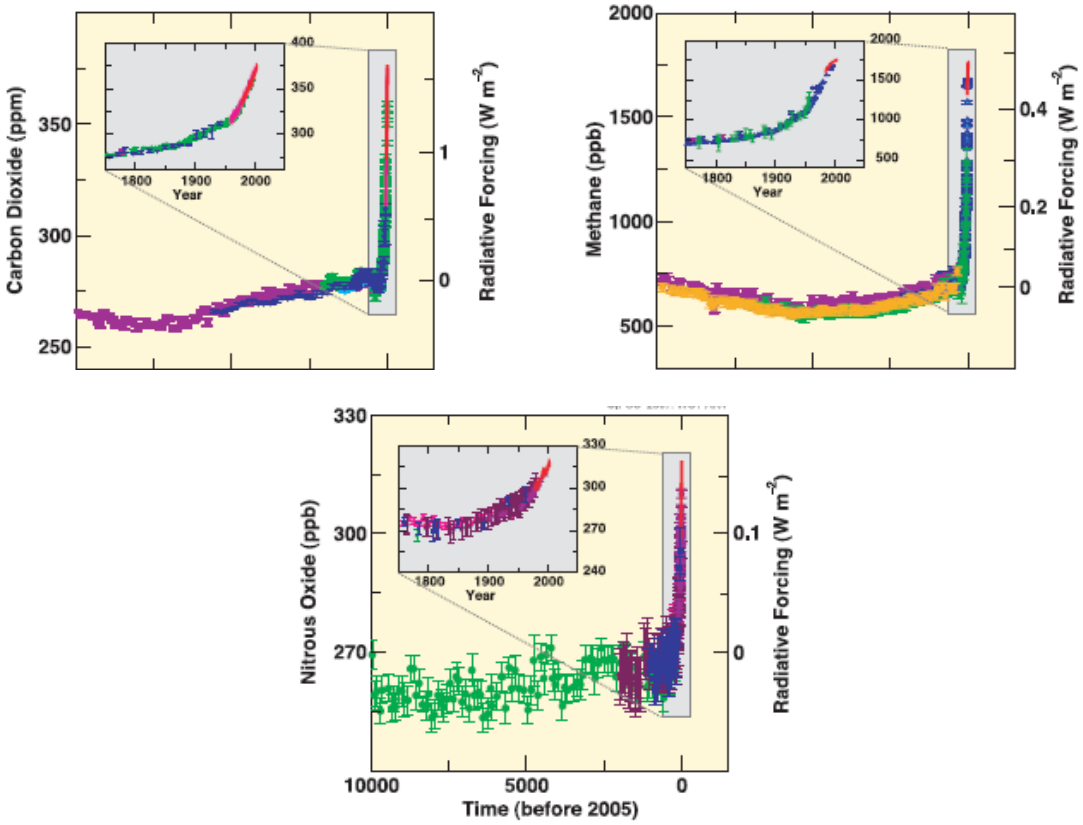
The term "climate change" usually refers to changes that have been observed since the early 1900s. These changes in global climate are likely to be due to a combination of both natural and human causes:

- **Natural causes**
  The Earth's climate varies naturally as a result of interactions between the ocean and the atmosphere, changes in the Earth's orbit, fluctuations in energy received from the sun, and volcanic eruptions.
- **Human causes**
  The main human influence on global climate is likely to be emissions of **greenhouse gases** (GHG) such as carbon dioxide (CO_2) and methane (CH_4).

"Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture".[1]

1 IPCC (2007). "Fourth Assessment Report. Working group I report." p2, "Summary for Policy Makers". The Intergovernmental Panel on Climate Change (IPCC) is composed of scientists from all over the world. The IPCC analyses in an exhaustive, objective, open and transparent manner, scientific, technical and socio-economical information on climate change risks, adaptation and mitigation. More than 2500 scientists participated in the elaboration of their last report, the Fourth Assessment Review, November 2007. For more information about the IPCC, please consult Unit 5 of this Module or IPCC website: www.ipcc.ch

Box 1.1. Evolution of atmospheric concentrations of carbon dioxide, methane and nitrous oxide



"Atmospheric concentrations of carbon dioxide, methane and nitrous oxide over the last 10,000 years (large panels) and since 1750 (inset panels). Measurements are shown from ice cores (symbols with different colours for different studies) and atmospheric samples (red lines). The corresponding radiative forcings are shown on the right hand axes of the large panels."

Source: IPCC (2007). "Fourth Assessment Review. Summary for Policy Makers"

Box 1.2. The Intergovernmental Panel on Climate Change (IPCC)

Climate change is a very complex issue: policymakers need an objective source of information about the causes of climate change, its potential environmental and socio-economic consequences, and the adaptation and mitigation options to respond to it. This is why the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988.

The IPCC is a scientific body: the information it provides with its reports is based on scientific evidence and reflects existing viewpoints within the scientific community. The comprehensiveness of the scientific content is achieved through contributions from experts in all regions of the world and all relevant disciplines including, where appropriately documented, industry literature and traditional practices, and a two-stage review process by experts and governments.

Because of its intergovernmental nature, the IPCC is able to provide scientific, technical and socio-economic information in a policy-relevant, yet politically neutral, way to decision makers. When governments accept the IPCC reports and approve their Summary for Policymakers, they acknowledge the legitimacy of their scientific content.

The IPCC delivers its reports at regular intervals. As soon as they are published, these reports immediately become standard works of reference, widely used by policymakers, experts and students. The findings of the first IPCC Assessment Report of 1990 played a decisive role in leading to the United Nations Framework Convention on Climate Change (UNFCCC), which was opened for signature in the Rio de Janeiro Summit in 1992 and entered into force in 1994. It provides the overall policy framework for addressing the climate change issue. The IPCC Second Assessment Report of 1995 provided key input for the negotiations of the Kyoto Protocol in 1997. The Third Assessment Report of 2001 as well as Special and Methodology Reports provided further information relevant for the development of the UNFCCC and the Kyoto Protocol. The IPCC continues to be a major source of information for the negotiations under the UNFCCC.

Source: IPCC, www.ipcc.ch

HOW AND WHY CONCENTRATIONS OF THESE GASES ARE RISING IN THE ATMOSPHERE?

The rise in GHG concentrations in the atmosphere is a direct consequence of our productive, economic and social model, based since the XIX century on an unsustainable increase in the use of energy, 85% of which comes from fossil sources (coal, oil and gas).

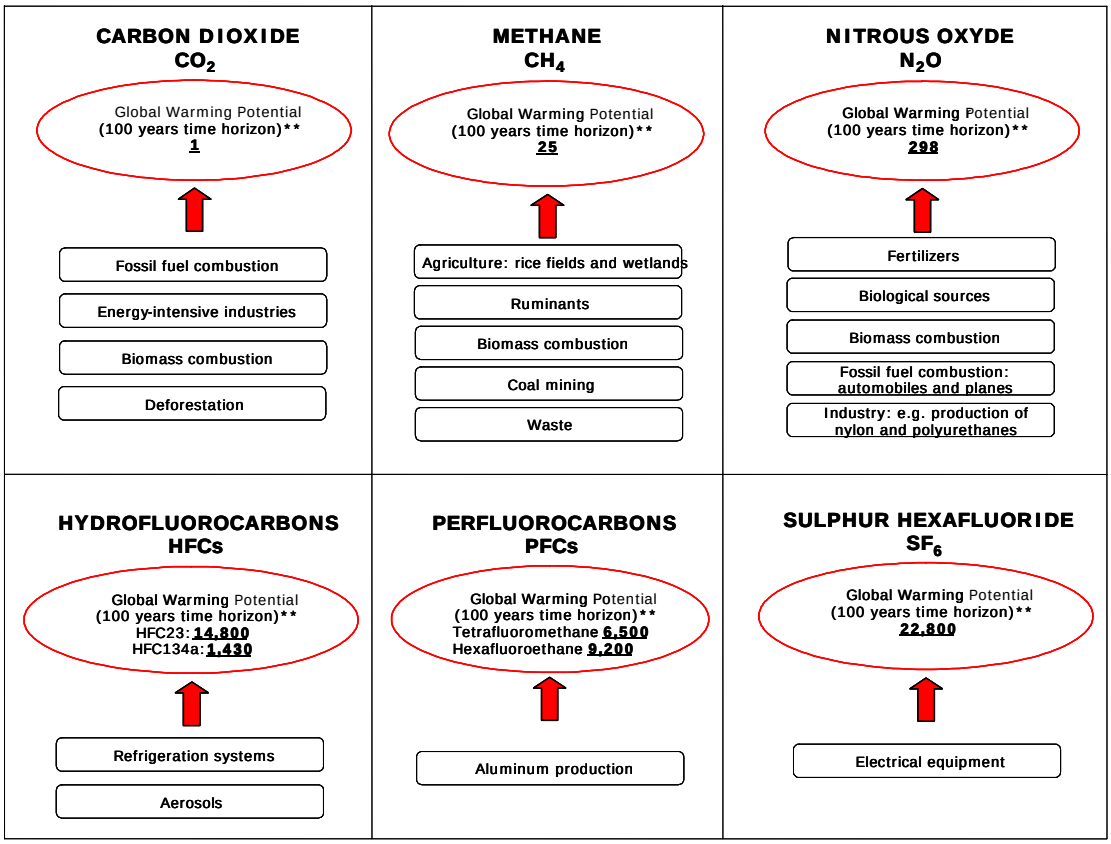
Rise in Greenhouse Gas concentrations ⇨ Rise in temperatures

Only human activity can explain the rise in temperatures in the second part of the XX century. The linear warming trend over the last 50 years (0.13°C per decade) is nearly twice that for the last 100 years.[2] This means the average speed with which temperatures have increased in the last fifty years has doubled over the whole century. **Eleven of the last twelve years** (1995–2006) **rank among the twelve warmest since 1850**.

2 IPCC (2007). "Fourth Assessment Report. Working group I report."

Almost every sector in which we work, or which provide us goods or services emits greenhouse gases. Industry, transport, electricity generation, heating, some agricultural practices, as well as industrial and domestic cooling and heating systems are examples of human activities that contribute to GHG emissions. Due to the seriousness of climate change impacts, these sectors are likely to face great transformations in the coming years, if we want climate change to be kept at a safe level.

Box 1.3. Greenhouse gases*: sources and relative global warming potential (GWP)

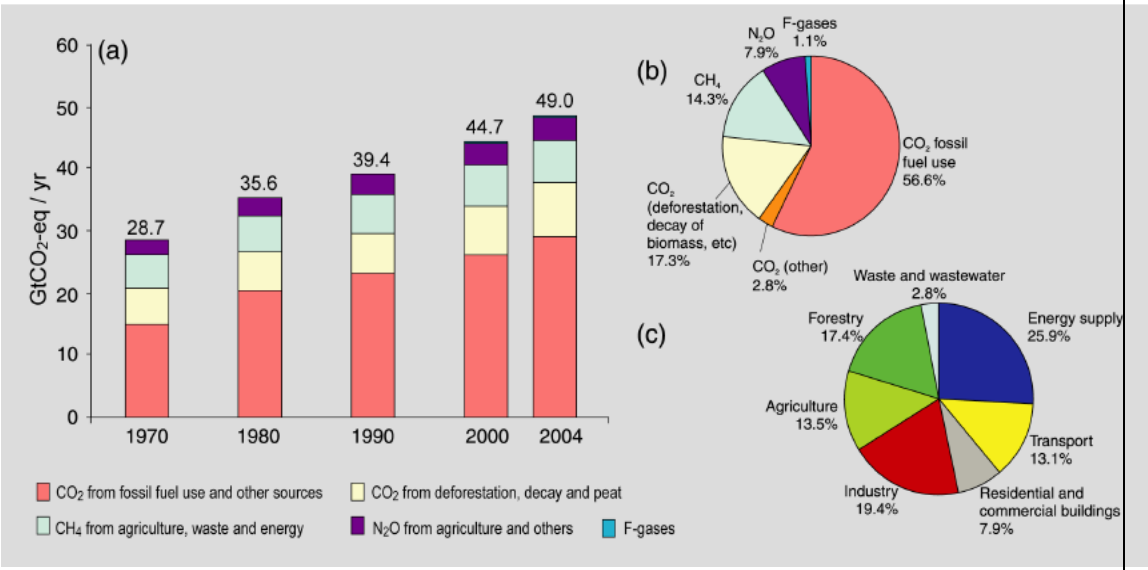


** Ranked according to their contributions in global warming*

****Global warming potential (GWP)** is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming. It is a relative scale which compares the gas in question to that of the same mass of carbon dioxide (CO_2, whose GWP is by definition 1).*

Source: IPCC (2007). "Fourth Assessment Report."

Box 1.4. Global anthropogenic GHG emissions



(a) Global annual emissions of anthropogenic GHGs from 1970 to 2004 (Includes only CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 whose emissions are covered by the UNFCCC. These GHGs are weighted by their 100-year Global Warming Potentials, using values consistent with reporting under the UNFCCC.) (b) Share of different anthropogenic GHGs in total emissions in 2004 in terms of CO_2-eq. (c) Share of different sectors in total anthropogenic GHG emissions in 2004 in terms of CO_2-eq. (Forestry includes deforestation)

Source: IPCC (2007). "Fourth Assessment Report", "Synthesis report", Summary for Policy Makers"

CONSEQUENCES OF CLIMATE CHANGE

Greenhouse gases remain in the atmosphere for some time. Long-lived greenhouse gases (LLGHGs) - for example, CO_2, methane (CH_4) and nitrous oxide (N_2O) - are chemically stable and persist in the atmosphere over time scales ranging from a decade to centuries or longer. Thus, their emissions have a long-term influence on climate.

This means that even if we were to stop emitting these gases today, the Earth would take more than a hundred years to stabilize its GHG atmospheric concentrations, which would keep temperature growing for 200 more years.

Climate varies naturally and the average temperature at the Earth's surface normally varies between 5-6°C every 100,000 years. Within these long periods of time, living beings have time to adapt to changes in temperature. Mankind however is inducing drastic changes in the climate in a very short period of time. This means that all species have to adapt to these changes very quickly, which is not possible in many cases.

Rises in temperatures are one of the multiple consequences of climate change. Rises in the level of the oceans, changes in wind patterns and a multiplication of extreme weather events are other examples. Fragile and vulnerable species are already suffering from consequences of these changes, and will in the future face the worst part.

Human beings will also have to adapt to new climatic conditions. Yet, the indirect consequences of climate change will possibly be even harder to assume (changes in agriculture, water availability, etc).

HOW WILL CHANGES IN THE CLIMATE AFFECT THE ENVIRONMENT?

The 2007 IPCC report concluded that "o*bservational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases."*[3]

Climate change is affecting negatively the number and size of glacial lakes, producing changes in Arctic and Antarctic ecosystems. These include sea-ice biomes and predators high in the food chain.

Its effects are also visible on hydrology, such as warming of lakes and rivers, and on terrestrial biological systems, such as earlier timing of spring events –leaf unfolding, bird migration, egg-laying[4]. Other changes in marine and freshwater systems are also associated with rising temperatures, such as changes in salinity, oxygen levels, etc. These include changes in algal, plankton and fish abundance in high-latitude oceans, and changes and earlier migration of fish in rivers.

Human environments and activities are affected by natural environments. Then changes such as those mentioned above will certainly affect mankind. Actually, climate change effects on human beings and their productive activities are already visibible.

WHAT ABOUT US?

Human beings will suffer directly from the effects of climate change as the environments in which they live are altered. For example, more than half of the world's population now lives within 60 km away from the sea and, since rising sea levels increase the risk of coastal flooding, many of these populations may be displaced or have to migrate in the coming years. Among the most vulnerable regions to coastal flooding are the Nile delta in Egypt, the Ganges-Brahmaputra delta in Bangladesh, and almost all small islands.

Rising temperatures and variable precipitation are likely to decrease the production of food in many of the poorest regions, increasing risks of malnutrition and hunger.

We know also that climate change significantly increased the likelihood of episodes such as the European summer heatwave of 2003.

Additionally, a greater variability in precipitation patterns is likely to compromise the supply of freshwater and increase the risk of water-borne diseases.

3 IPCC (2007). "Fourth Assessment Report. Working group II report."

4 IPCC (2007). "Fourth Assessment Report. Working group II report."

Changes in climate are also likely to lengthen the transmission seasons of important diseases such as malaria and dengue (called vector-borne diseases), and to alter their geographic range, potentially bringing them to regions which lack either population immunity or a strong public health infrastructure to counteract their spread. In a first assessment in 2000, the WHO considered changes in climate were responsible for 2.4% diarrhea cases in the world, 6% of malaria cases in middle income countries and 7% of dengue cases in industrialized countries.

WHICH PRODUCTIVE SECTORS ARE LIKELY TO BE AFFECTED FIRST?

Recent studies have helped us to better understand the consequences of climate change for different productive sectors. We now know that each productive sphere will be affected, though in different ways. Thus, the consequences for workers will vary greatly from one sector to another.

The last IPCC report states that the "*costs and benefits of climate change for industry, settlements 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*".[5]

All economic sectors will be affected by climate change. However, we can identify sectors that will be impacted in the very short run (or are already affected by early consequences of climate change). Studies such as the IPCC affirm that the most vulnerable industries and settlements will be:

- **Industries and settlements in coastal and river flood plains**. The coastal population could grow from 1.2 billion people (in 1990) to between 1.8 billion and 5.2 billion people by the 2080s. Industrializing economies create good part of their wealth in capitals, most of them based near the coast. The capacity of these workplaces to recover from extreme weather events is extremely weak, lacking even insurances to re-buy equipment or improve damaged infrastructure, as for example harbors or core telecommunications.

- **Industries and settlements prone to extreme weather events** (especially those where rapid urbanization is occurring). Impoverished regions in developing countries, for example, are expected to suffer from the very beginning from climate change. Economic activities in slums, most of it informal, will be hardly hit by extreme weather events.

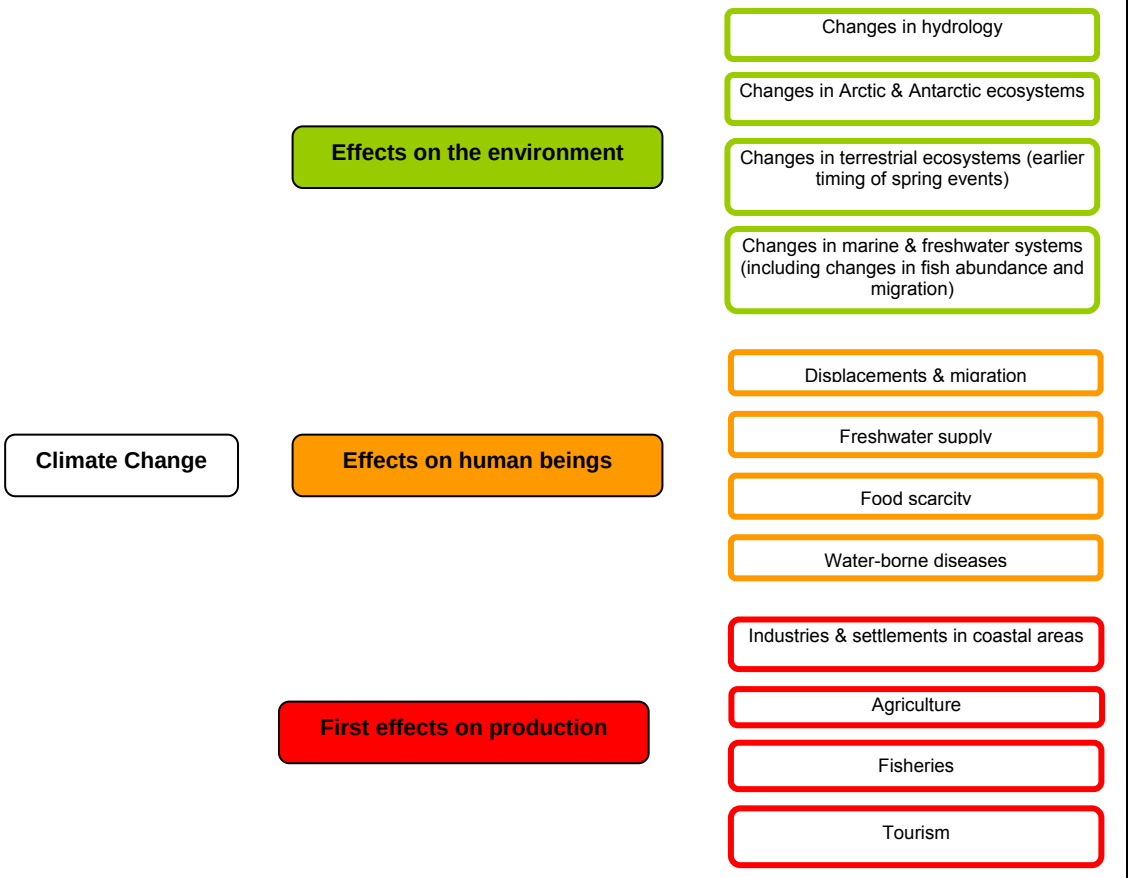
- **Economies closely linked with climate-sensitive resources** (i.e. agriculture, fisheries, tourism) are also at risk:

  Agriculture, for example, will suffer from changes in the availability of fresh water resources. Run-off is likely to increase in wet tropical areas and decrease further more in dry regions, many of which are already suffering from water stress. Crop productivity at lower latitudes is projected to decrease even with small local temperature increases (1°-2°C) and will also be negatively affected by a greater frequency of droughts and floods.

5 IPCC (2007). "Fourth Assessment Report (AR4)."

- **Fisheries and aquaculture** are projected to be adversely affected, as regional changes in the distribution and production of particular fish species are expected due to continued warming.
  Climate change will impact **tourism** in many ways. Tourism not only contributes to climate change, it is affected by it as well. Raising sea levels and temperatures will threaten coastal, island destinations and marine sites. Natural disasters will harm infrastructure, natural and cultural heritage in host communities. Diminishing snow conditions will have an impact on mountain and winter sport tourism.

Box 1.5. Effects of Climate Change on the environment, human beings and production



Source: IPCC, 2007

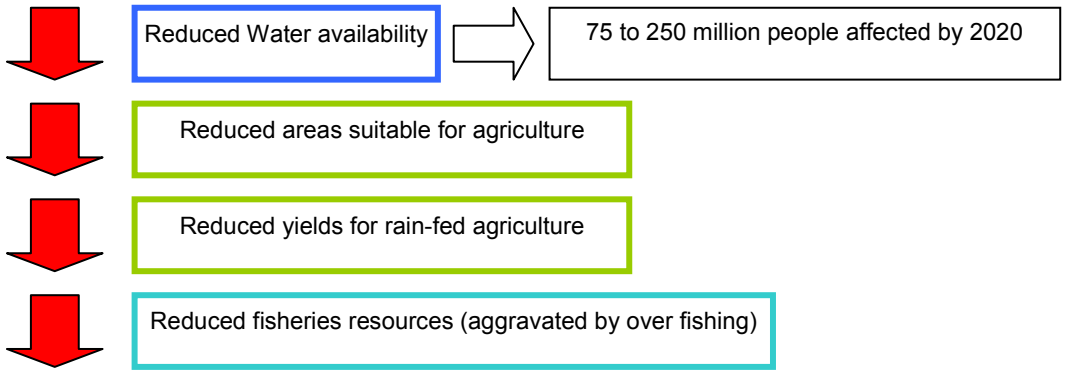
All economic sectors will be impacted in the medium to long term. Loses in infrastructure will affect the whole economic activity. Emerging and developing economies, highly dependant on exportations of raw material will suffer from scarce good crops and the difficulty to transport them through damaged infrastructure. Consequences for support services companies like financial services and banks will also be important. This example shows the tight links of climate change with the complete national and global economy.

WHAT IS GOING TO HAPPEN IN MY REGION?

IPCC says

In Africa, climate change is likely to increase water stress for 75 to 250 million people by 2020. It will also affect agricultural production, including access to food. The size of areas suitable for agriculture, the length of growing season and yield potential are expected to decrease. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020. Food supply is also going to be affected by decreasing fisheries resources in large lakes due to rising water temperatures, which may be exacerbated by continued over-fishing. Mangroves and coral-reefs are projected to be further degraded, with additional consequences for fisheries and tourism. The cost of adapting to climate change could amount to at least 5-10% of Gross Domestic Product (GDP).

Box 1.6. Consequences of Climate Change in Africa

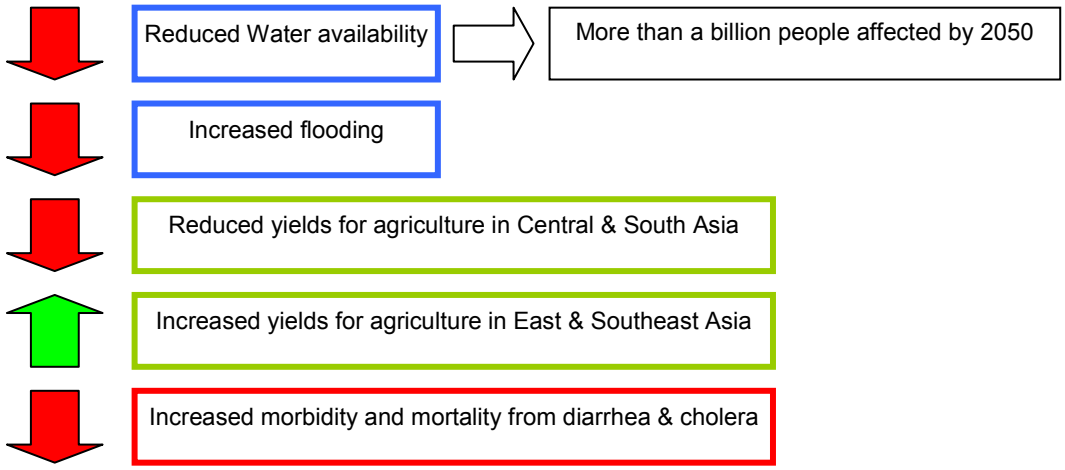


Source: IPCC, 2007

IPCC says

In Asia, glacier melt in the Himalayas is projected to increase flooding and rock avalanches, and to affect water resources within two to three decades. Climate change will also decrease freshwater availability in large river basins. This, along with population growth and increasing demand from higher standards of living, could adversely affect more than a billion people by 2050. Coastal areas, especially heavily-populated mega-delta regions, will be at the greatest risks due to increased flooding from the sea and the rivers. It is projected that crop yields could increase up to 20% in East and Southeast Asia while they could decrease up to 30% in Central and South Asia by the mid-21st century. Endemic morbidity and mortality due to diarrhea are projected to rise. Increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia.

Box 1.7. Consequences of Climate Change in Asia

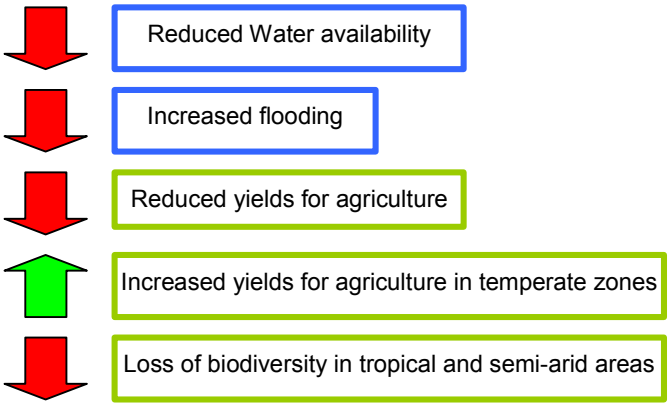


Source: IPCC, 2007

IPCC says

In Latin America, savanna will gradually replace tropical forest in eastern Amazonia by 2050, as a consequence of increases in temperature and decreases in soil water. Arid-land vegetation will tend to replace semi-arid vegetation. There is a risk of significant biodiversity loss in many tropical areas. In drier areas, climate change is expected to lead to salinisation and desertification of agricultural land. Productivity of some important crops is projected to decrease and livestock productivity to decline, with adverse consequences on food security. In temperate zones, soybean yields are projected to increase. Sea level rise is likely to increase the risk of flooding in low-lying areas. Increases in sea surface temperature are projected to adversely affect Mesoamerican coral reefs and cause shifts in the location of south-east Pacific fish stocks. Changes in precipitation patterns and the disappearance of glaciers are going to affect water availability for human consumption, agriculture and energy generation.

Box 1.8. Consequences of Climate Change in Latin America



Source: IPCC, 2007

Unit 2: MITIGATION

Key ideas

→ A mitigation policy is any policy that aims to reduce GHG emissions.
→ Historically, GHG emissions have been linked to economic growth, through the rise in fossil energy demand.
→ Technologies and process-related options are available to reduce GHG from all sectors (energy production and use, industry, transport, agriculture, land use and forestry, and waste management)

MITIGATION = REDUCING GHG EMISSIONS

GHG emissions caused by human activities enhance climate change. If we want to reduce future impacts of this change it is necessary to stabilize GHG emissions as soon as possible. Unfortunately, GHG emissions are growing everywhere. This unit first examines the complexity of separating economic growth from GHG emissions and, second, the urgency of putting in place measures to reduce emissions in order to keep temperature increases within a safe range. Policies that aim to reduce emissions are called "**mitigation policies**".

ECONOMIC GROWTH AND GHG EMISSIONS: AN UNSUSTAINABLE DUO

From observations going back to 1850 we can conclude that concentrations of greenhouse gases in the atmosphere have grown alongside trends in economic development. This is one of the observations supporting the claim that many industrialized countries have developed their economies in unsustainable ways. Energy production and consumption account for 65% of global emissions. In the case of North America and Europe, energy production is responsible for 70% of all CO_2 emissions since 1850, while developing countries account for less than one quarter of cumulative emissions.[6]

WHY IS ECONOMIC GROWTH LINKED TO GREENHOUSE GAS EMISSIONS?

As we have seen in the first unit, CO_2 emissions (the main gas responsible for human-caused climate change) originate from all kinds of combustion. We also know that the burning of fossil fuels is the main source of energy in our societies (up to 85%). The availability of energy to power machines, fuel transport and provide electricity was key in helping our traditional economies grow and improve our livelihood.

6 Stern, N. (2006). "Stern Review on the economics of climate change"

Climate change is thus the unintentional and dangerous consequence of economic growth, increasing energy needs, and the combustion of fossil fuels. This link is explored in the 2006 Stern Review on the economics of climate change, which explains how increases in the Gross Domestic Product tend to increase global emissions. Another study on the United States estimated that, over the long term, a 1% rise in GDP per head leads to a 0.9% increase in emissions per head[7]. The table below outlines the GDP per head for different countries and groupings associated with CO_2 emissions.

Box 1.9. CO_2 emissions & Gross Domestic Product per head in selected countries and regions

CO_2 emissions & Gross Domestic Product per head in selected countries 2002

Country / Grouping	CO_2 per head (tCO_2)	GDP per head ($ppp2000)
USA	20.4	34,430
Japan	9.8	26,021
UK	9.6	27,176
India	1.1	2,555

CO_2 emissions & Gross Domestic Product per head in 2002 in selected regional groupings

Country / Grouping	CO_2 per head (tCO_2)	GDP per head ($ppp2000)
EU	9.4	23,577
OECD	11.7	24,351
Former USSR countries	7.7	7,123
Developing Countries and Emerging economies	2.2	3,870
World	4.0	7,649

Source: WRI, 2006

The tables show that CO_2 emissions per head are higher in developed countries and much lower in developing countries – although developing countries are in trend of closing this gap, because of their faster collective growth and their increasing share of more energy-intensive industries, needed to produce an increasing amount of goods, mostly consumed in developed countries.

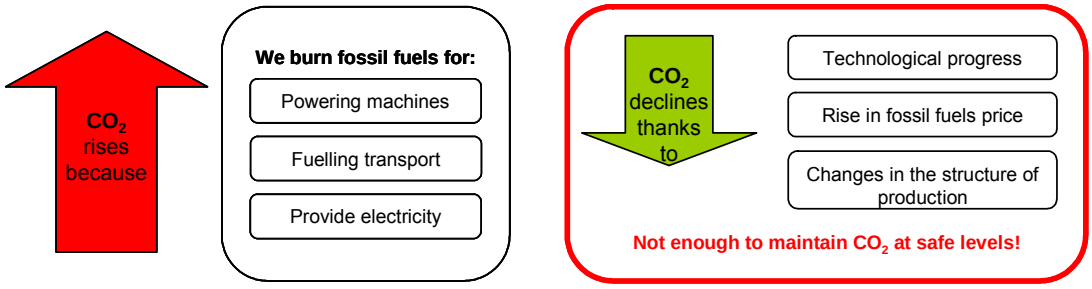
[7] Huntington, H.G. (2005). "US carbon emissions, technological progress and economic growth since 1870".,*International Journal of Global Energy Issues*. Mentioned in Stern (2006)

While the amount of carbon dioxide in the atmosphere has risen, some factorshave helped to slow this growth:

- Technological progress;
- The change in prices of different types of energy;
- The structure of production, which has reduced the carbon intensity of energy (i.e. the amount of CO_2 released in the atmosphere for each unit of energy used) and the energy intensity of outputs (the amount of energy used for each unit of product).

In the recent past, growth in income per head has been accompanied by an increase in global emissions of GHG, while reductions in global carbon and energy intensity have tended to reduce them. The extent of these reductions, however, is definitively not sufficient to stabilize GHG concentrations levels.

Box 1.10. Production factors that favour a rise or decrease in CO_2 emissions



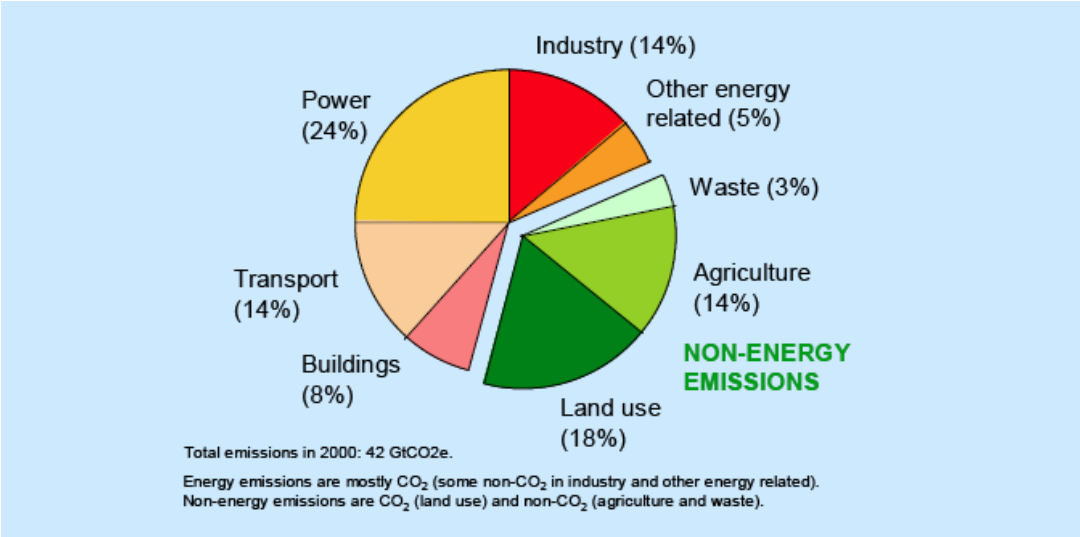
Source: Sustainlabour, 2008

In order to guarantee decent living conditions for everyone as well as the survival of human beings on this planet, we need to separate ("decouple") economic growth from GHG emissions and work towards reducing our emissions. What are the options for mitigation policies?

MITIGATION POLICIES: THE ART OF DECOUPLING ECONOMIC GROWTH AND EMISSIONS

Greenhouse gas emissions come from different sources. Thus, to reduce their quantities, each of these sources must somehow be modified. What is the distribution of GHG emissions by type of source?

Box 1.11. GHG emissions in 2000, by source



Source: WRI, 2006

The pie-chart above shows that energy-related sources are the main contributors of GHG emissions with 65% of all GHG, while non-energy ones contribute 35%. While energy-related sources emit mainly CO_2, non-energy emissions are more methane intensive.

WHAT DOES MITIGATION MEAN IN EACH SECTOR? WHAT KIND OF POLICIES CAN HELP REDUCE EMISSIONS?

Energy supply

Measures taken in the energy supply sector affect industries such as power and heat production and distribution directly. Changes in energy supply also affect other sectors (i.e. energy-intensive industries). Thus, some companies will confront more or less difficult challenges depending on their primary source of energy. This highlights the need for assessing clearly the potential social impacts of these measures, i.e. on employment, local development, etc.

Box 1.12. Examples of policy measures given general policy objectives and options to reduce GHG emissions from the energy-supply sector

Policy options / Policy objectives	Economic instruments	Regulatory instruments	Policy processes		
			Voluntary agreements	Dissemination of information and strategic planning	Technological RD&D and deployment
Energy efficiency	• Higher energy taxes • Lower energy subsidies • Power plant GHG taxes • Fiscal incentives • Tradable emissions permits	• Power plant minimum efficient standards • Best available technologies prescriptions	• Voluntary commitments to improve power plant efficiency	• Information and education campaigns.	• Cleaner power generation from fossil fuels
Energy source switching	• GHG taxes • Tradable emissions permits • Fiscal incentives	• Power plant fuel portfolio standards	• Voluntary commitments to fuel portfolio changes	• Information and education campaigns.	• Increased power generation from renewable, nuclear, and hydrogen as an energy carrier
Renewable energy	• Capital grants • Feed-in tariffs • Quota obligation and permit trading • GHG taxes • radable emissions permits	• Targets • Supportive transmission tariffs and transmission access	• Voluntary agreements to install renewable energy capacity	• Information and education campaigns • Green electricity validation	• Increased power generation from renewable energy sources
Carbon capture and storage	• GHG taxes • Tradable emissions permits	• Emissions restrictions for major point source emitters	• Voluntary agreements to develop and deploy CCS	• Information campaigns	• Chemical and biological sequestration • Sequestration in underground geological formations

Source: IPCC (2007). "Fourth Assessment Report. Working group III report. Mitigation of climate change."

What can be done to reduce these emissions?

- Improve energy supply and distribution efficiency (i.e. minimizing losses in transmission);
- Switching fuels taking into consideration emissions and costs (coal combustion emits 974 kg of CO_2/MWh, gas emits almost half as much as coal - 469 kg of CO_2/MWh);
- Expand renewable heat and power capacities, such as hydropower, solar, wind, geothermal and bioenergy.

The IPCC experts consider that other technologies, not yet in the market, could also enhance mitigation in the energy supply sector:

- carbon capture and storage from biomass and coal-fired electricity generating facilities;
- advanced nuclear power;
- advanced renewable energy, including tidal and waves energy, concentrating solar and solar PV.[8]

8 IPCC (2007). "Fourth Assessment Report. Working group III report."

Governments have chosen different means for achieving these reductions. Some use regulatory policies (for example, they may choose to buy renewable energy at a higher price than fossil energy), while others mix regulation with the market (for example, they can define emissions reduction targets for a group of companies and set a virtual market where companies can sell their excess emissions credits to companies that are not achieving their emissions reduction commitments).

There is also another set of policies aimed at reducing the energy intensity of the economy. They encourage companies and families to use energy more efficiently and invest in energy efficiency products that lower energy bills, reduce the need for new electrical generation capacity and consequently reduce greenhouse gases.

Energy efficiency programmes include:

- Public information campaigns;
- Energy audits of industrial and commercial facilities;
- Rebates for energy-saving technologies, among others.

Transport

Transport accounts for 14% of global emissions. Policies to reduce the impact of transport activity are slowly being adopted, and sometimes have more to do with local air pollution concerns than with climate change.

What can be done to reduce these emissions?

- Encourage shifts from road to rail transport and from private to public transport systems;
- Promote more fuel efficient vehicles, hybrid vehicles (which use electricity rather than fuel) and cleaner diesel vehicles;
- Further develop agrofuels, above all second generation ones;
- Encourage non-motorized transport, such as cycling and walking;
- Adapt land-use and transport planning to carbon constraints.

We think it is necessary to explain what agrofuels are, as they are proposed as a new instrument for reducing CO_2 from transport. Agrofuels are liquid or gas transportation fuels derived from biological ressources (plants, crops, etc.). The two main agrofuels, bioethanol and biodiesel, are made from crops such as cereals, soybean, rape seed oil, sugar cane and palm oil. They could be used in cars without undertaking engine transformations, up to certain shares. Combustion of agrofuels is considered “carbon neutral” as it releases the same amount of CO_2 that the plant helps reduce during its growth. This is the main reason for which they have been promoted. However, it is necessary to take into account the so-called “life cycle” of the agrofuel, which includes the total amount of energy that has been used for its production (including indirect fossil energy inputs in the form of pesticides and fertilizers used to grow the plants). In several cases, the amount of energy required (and thus the amount of CO_2 released in the atmosphere) has proven to be higher than the amount of CO_2 that can be saved from using agrofuels. Thus, their production can be another source of greenhouse gases rather than a solution for reducing them.

It is important also to differentiate “first generation” agrofuels from “second generation” ones. First generations are mainly the ones listed above. Second generation agrofuels are still under development, and are made from materials that do not compete with food production, such as leaves, tree bark, straw or woodchips. In the longer term, many envisage second-generation biofuels being made from materials that are not dependent on arable land, such as algal materials growing in water. Second generation agrofuels could have a more favourable CO_2 balance.

Buildings

8% of GHG emissions come from buildings. Adapting old buildings and constructing new climate-friendly ones is at the core of policies trying to reduce this kind of emissions.

Some examples of policies in this sector are:

- Efficient lighting and daylighting;
- More efficient electrical appliances and heating and cooling devices;
- Improved cook stoves;
- Improved insulation;
- Passive and active solar design for heating and cooling;
- Alternative refrigeration fluids, recovery and recycle of fluorinated gases.

Bills and performance rules are typically the most frequent regulations chosen by Governments to achieve changes in this sector.

Industry

Industry accounts for 14% of GHG emissions. As their emissions can easily be measured in each installation (unlike with transport or agriculture), a lot of effort has been directed at this sector.

What can be done to reduce these emissions?

- More efficient end-use electrical equipment;
- Heat and power recovery;
- Material recycling and substitution;
- Control of non-CO_2 emissions;
- A wide array of process-specific technologies.

Governments have started to implement these measures. In some developed countries these have been accompanied by tighter regulations. Industries however do not appear to be adapting their technology quickly enough, mainly because of the high investment costs this requires. This anticipates a problem for emerging economies, many of which are working with old and carbon intensive technologies and have reduced possibilities of capital investment because of economical constraints.

Agriculture

Agriculture is an important contributor to GHG emissions, but differs in the type of gases it releases into the atmosphere. Methane (CH_4) is the main gas emitted by this sector, and measures to reduce its emissions are currently not being promoted enough. Another difference is the regional distribution of these emissions. While emissions coming from industry, energy production or transport are still primarily emitted by the developed countries, emissions from agriculture (and those of forestry, as we will see below) are mainly originated in developing countries.

What can be done to reduce these emissions?

- Improve crop and grazing land management to increase soil carbon storage;
- Restore cultivated peaty soils and degraded lands;
- Reduce use of fossil-based fertilizers and pesticides;
- Improve rice cultivation techniques, and livestock and manure management;
- Improve energy efficiency;
- Improve crops yields.

Land Use and Forestry (LULUCF)

18% of emissions come from land use, land use changes and forestry, collectively referred to with the acronym LULUCF. These include deforestation processes, as well as desertification. Indeed, one of the consequences of deforestation is that the carbon originally held in the forests is released to the atmosphere, either immediately when the trees are burned, or more slowly as unburned organic matter decays.

Most of the carbon is released into the atmosphere as carbon dioxide (CO_2), but small amounts of methane (CH_4) and carbon monoxide (CO) may also be released with decomposition or burning. Reforestation reverses these fluxes of carbon. While forests are regrowing, they withdraw carbon from the atmosphere and accumulate it again in trees and soil. Although deforestation, itself, may not release significant quantities of methane or nitrous oxide (N_2O), these gases are often released as a consequence of using the cleared land for cattle or other ruminant livestock, paddy rice, or other crops, especially those fertilized with nitrogen.

What can be done to reduce these emissions?

- Afforest (create a forest) and reforest (plant forests where they have been converted to other use);
- Improve forest management;
- Reduce deforestation;
- Improve harvested wood product management;
- Use forestry products for bioenergy to replace fossil fuel use.

Waste

Waste management generates carbon dioxide and methane. The way in which these wastes are disposed of and treated has a direct influence on the emissions of these greenhouse gases. Waste incineration generates CO_2 and nitrous oxide, while land filling waste generates methane. Whatever waste management option is chosen it should be accompanied by a set of measures to avoid these emissions as well as other environmental problems (for example, carcinogenic substances produced during incineration, soil pollution, pest and diseases coming from land filling, etc.).

What can be done to reduce these emissions?

- Recycle and reduce waste;
- Compost organic waste;
- Control waste water treatment;
- Recover methane from landfills;
- Recover energy from waste incineration.

Unit 3: ADAPTATION

Key ideas

→ Adaptation is the complementary way of responding to the challenge posed by climate change.

→ It implies important investments in the most vulnerable sectors (water, health, agriculture, etc.) to avoid or reduce the impacts of climate change.

→ Without public policies, the most vulnerable groups (ie. the poorest citizens) and at the international level, the poorest and most vulnerable countries will suffer most from their inability to adapt as their capacity to invest in climate-proof technologies is limited.

ADAPTATION = COPING WITH CLIMATE CHANGE

Adaptation to climate change is the adjustment of natural or human systems in response to actual or expected changes in the climate, with the aim of allowing them to benefit from potential opportunities while minimizing threats.

The objective of adaptation policies is to reduce vulnerability to climate change. However, adaptation alone will not work; it has to go together with strong mitigation policies. These make adaptation possible and affordable, since the cost of adaptation rises as the magnitude and speed of climate change increase. In the case of natural environments the speed with which species and ecosystems can migrate or adjust is limited. For human beings, the capacity to adapt is limited by the survival of the living environment (i.e. if sea level rises, some countries will become uninhabitable).

On the one hand, adaptation strategies consist of building the capacity of people to adapt (understanding impacts, raising awareness to enable proper decision making, promoting sound long-term investments). On the other hand, adaptation means taking actions to reduce vulnerability (investing in infrastructure against climate risks, changing crops, etc.). From a trade union's perspective, this means first, understanding the impacts of climate change in a specific sector, in the workplace and for workers' families, then, exploring measures that could reduce these impacts.

Adaptation will, in most cases, provide local benefits. For this reason, it could be expected that individuals, households and businesses would spontaneously take actions in response to actual or expected benefits and threats, even without the active intervention of policy. For example, a company may set a "heat wave plan" for its workers and install cooling systems, anticipating hotter summers, or a family may undertake changes in their rooftop to render it cyclone-proof.

The capacity to adapt however is related to income and capabilities. While everybody will experience the same negative climate impacts, the most vulnerable will experience them the most. Poor people often lack the resources and information which might allow them to anticipate the effects of climate change. Therefore, in order to guarantee fairness and equity, governments need to undertake adaptation strategies that focus on empowering these populations, i.e. providing tools (financial resources, information, etc.) that enable them to adapt to climate change. Some governments in most vulnerable countries began with adaptation planning, but are facing lack of resources to tackle huge challenges posed by climate change dynamics.

Governments have a very important role to play in making adaptation happen, starting from now by providing public responses and investments, as well as policy guidelines, and economic and institutional support to the private sector and civil society.
Some aspects of adaptation, such as major infrastructure decisions, will require greater foresight and planning at the local level. Others, such as knowledge sharing and technology development, will be of global benefit.

The various adaptation strategies also differ greatly from one another. Some will concentrate on the short term, for example, by increasing resilience to extreme weather events. Other adaptation policies will focus on the medium and long-term evolution of our climate, and seek to adapt the overall socio-economic model on which each society is based (including shifts in economic sectors, massive investments in infrastructure and education, etc.).

ADAPTATION: IT'S ABOUT DEVELOPMENT!

Nations differ both in their contribution to climate change and in their vulnerability to its impacts. Ironically, many of the countries least responsible for the growing accumulation of greenhouse gases in the Earth's atmosphere, particularly in the developing world, are likely to be among the most heavily impacted by climate change.

There are physical and socio-economical reasons why developing countries and the poorest people are the most vulnerable.

First, the majority of developing countries are in tropical and sub-tropical regions, areas predicted to be seriously affected by the impacts of climate change: Africa, Asia, Latin America and the Small Island States have all been identified as regions of concern.

Secondly, developing countries are often less able to cope with adverse climate impacts because:

- **Poverty exacerbates, and is exacerbated by the impacts of environmental change**: between 1990 and 1998, 97% of all natural disaster-related deaths (90% of them weather-related) occurred in developing countries.
- **Livelihoods are highly dependent on climate-sensitive resources**: agriculture in Sub-Saharan Africa, of which up to 90% is rain-fed, accounts for 70% of regional employment and 35% of gross national product.
- **The poorest inhabitants of developing countries already struggle to cope with current extreme weather events and climate variability**. The greater frequency and severity of climate shocks is repeatedly eroding their coping capacity.

Box 1.13. Climate Change impacts in developing countries

Environmental Impacts	Socio-economic resources and sectors affected
• Changes in rainfall patterns • Increased frequency and severity of floods, droughts, storms & heat waves • Changes in growing seasons and regions • Changes in water quality and quantity • Sea level rise • Glacial melt	• Water resources • Agriculture and forestry • Food Security • Human Health • Infrastructure (e.g. transport) • Settlements: displacement of inhabitants and loss of livelihood • Coastal management • Industry and energy • Disaster response and recovery

Source: IPPC (2007). "Fourth Assessment Report. Working group II report."

Climate Change will thus exacerbate vulnerability of those who are already socially and economically vulnerable. It is necessary therefore to mainstream equity and solidarity issues, as well as development needs on adaptation strategies.

MEANS OF ADAPTING TO CLIMATE CHANGE

There is a wide array of adaptation options available for the most vulnerable sectors. However, adaptation is not occurring at the level required to reduce vulnerability to future climate change.

These potential options could be purely technological (i.e. sea defenses), behavioural (changes in food and recreational choices), managerial (changes in farm practices), and institutional (urban planning regulations).

What can be done to help the most vulnerable sectors adapt to climate change?

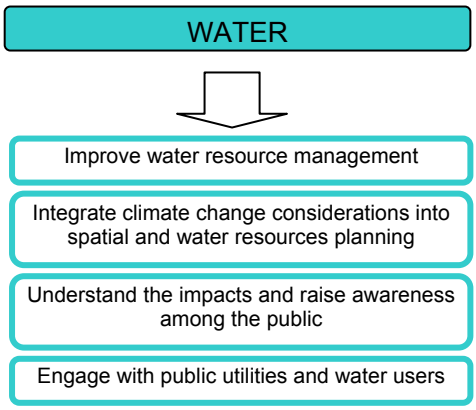
Water

Freshwater availability will be seriously compromised in mid-latitudes and semi-arid latitudes, and hundred of millions people will be exposed to increased water stress (IPCC, 2007). These elements highlight the need to act in the essential sector of water management.

High investment costs as well as the need to ensure water access to all, regardless of their financial resources, makes the water sector in developing countries particularly inadequate for privately-managed adaptation. The costs for adapting water systems to climate change need to be covered through public funding, which in many countries, are rather limited. This creates one of the main barriers to adaptation for developing countries: hardly any private or public funding has gone towards the sectors which will suffer most from climate change.

How can water management adapt?

- Improve water resources management, including flood risk and drought control.
- Integrate climate change considerations into spatial and water resources planning.
- Improve understanding on impacts and raise awareness, including by engaging with water utilities and water users.
- Integrate water resources management with other national policies and sectors, especially land-use, urban planning, energy and tourism.
- Enhance flood plain areas of rivers and designate certain rural areas especially for storage of freshwater surpluses, or establish underground rainwater harvesting.



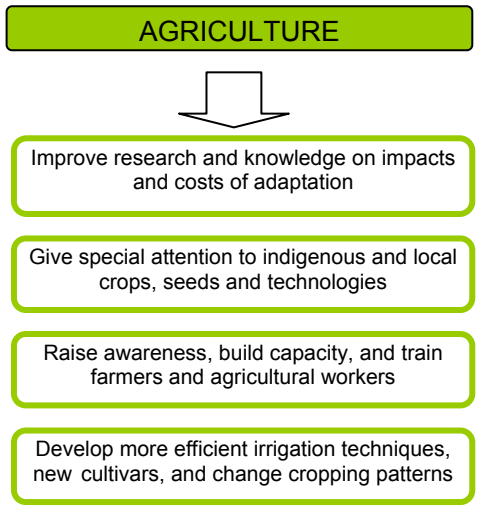
Agriculture

Adaptation needs and measures for agriculture in developed and developing countries differ clearly. While in developed countries agriculture accounts for around 8% of overall employment, in regions such as Sub-Saharan Africa, it accounts for 70% of regional employment and 35% of gross national product. It is thus logic to see a more important focus on adapting agriculture in developing economies, rather than in developed ones.

How can agriculture adapt?

- Improve research and knowledge on the impacts (i.e. in food security) and costs of adaptation options, giving special attention to indigenous and local crops, seeds and technologies rather than to new crop varieties and technologies.
- Raise awareness and improve capacity building in the sector, including training farmers.
- Develop more efficient irrigation techniques, new cultivars, change cropping patterns.

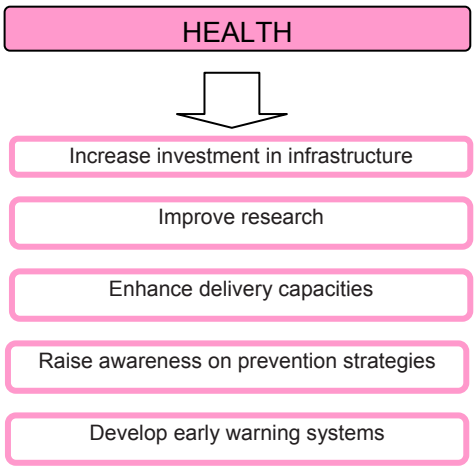
Given the special relation of agriculture to flood and drought risk management, biodiversity and market changes, a cross-sectoral approach is particularly important for agriculture.



But as with the water sector, there are many barriers preventing the adaptation of this sector. These barriers include lack of coordination among the large number of institutions that deal with agriculture, and lack of long-term planning. In developing countries, poverty – and the associated lack of adequate credit facilities – is the critical barrier: the benefits of certain actions (improved irrigation or mulching for example) may be clear to farmers, but lack of financial resources for investment hampers their implementation.

Health

Climate change will have effects on human health and health services. The burden of malnutrition, diarrhoeal, cardio-respiratory, and infectious diseases is likely to increase. Heat waves, floods and droughts, and changes in the distribution of vector-borne diseases may cause many deaths.

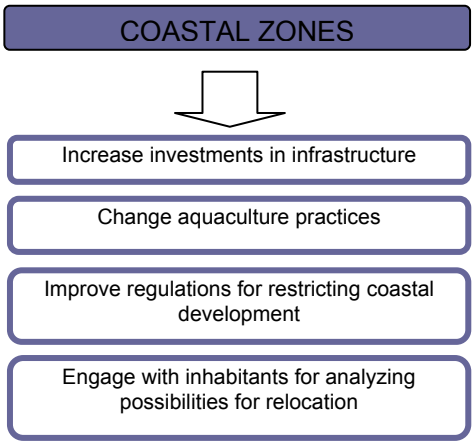


In order to reduce vulnerability to the health effects of climate change it is indispensable to reinforce health services globally through increased investment in health infrastructure, improved research, enhancement of delivery capacities, awareness raising on prevention strategies, development of early warning systems, etc.

Capacity constraints in public health services constitute a significant barrier in developing countries. These include, for example, inadequate provisions of drinking water in saline affected regions, lack of funding and consistent underinvestment in the sector due to exhausted public funds and low direct returns for private investors.

Coastal zones

Coastal zones risk increased damage from floods and storms and experts affirm that if the global average temperature goes up by 3º C, about 30% of global coastal wetlands will be lost and millions of people could experience coastal flooding each year.[9]



9 IPCC (2007). "Fourth Assessment Report. Working group III report."

Adaptation measures in coastal zones often involve investments in infrastructure (reinforcement of beach dune belts, construction of land drainage systems), but also changes in current practices (such as regular dumping of dredged sediments from harbour aquatories) and changes in regulations (for example, managing land use in areas prone to coastal flooding risk or setting back lines to restrict coastal development).

Examples of obstacles preventing the advance of adaptation measures in coastal zones are the large investments required, increased competition for public funds, and the continuous pressure to promote real estate and economic development in coastal areas.

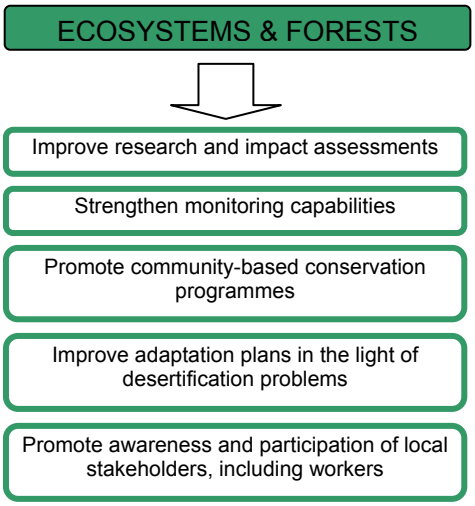
Ecosystems and forests

A 2ºC rise in temperature will entail an increased risk of extinction for 30% of species and the bleaching of practically all coral.

The adaptation of natural ecosystems is very closely related to other strategies such as mangrove conservation and forest management.

<u>How can natural ecosystems adapt?</u>

- Efforts should be focused on research and impact assessment, strengthening monitoring capabilities and community-based conservation programmes.
- Draw up adaptation plans and practices specifically focused on desertification, alpine environments, and protected areas need to be improved.
- Promote awareness in society and involve people in the assessments of the vulnerability of ecosystems and dependent industries or communities, and in the formulation and implementation of specific adaptation strategies.



Unit 4: ECONOMICS OF CLIMATE CHANGE

Key ideas

→ The fight against climate change has a cost, at least 1% GDP by 2030[10].

→ If we do not act, then the impacts on our lives will be much greater and, in consequence, the costs will be much higher (5-10% loss in GDP).

There are two response "options" to climate change:

1. The first one is to **take action**. This means to invest in climate-friendly technologies, to change behaviours in order to reduce our climate footprint, and to prepare our societies for the unavoidable impacts of climate change.

2. The second option is not to take action and remain in the so-called **"business as usual scenario"**. This means to maintain (or increase further) our current volumes of energy consumption and production, as well as the types of sources for this energy, and let individuals adapt to abrupt weather and environmental changes by themselves.

Both response options have a cost – financial, social and human. This unit will address the cost of action and inaction and will show that **costs of inaction will be far more important than those of early coordinated and responsible action**.

In our daily lives, the "Economy" is frequently referred to as the basis for making political decisions which affect our jobs and livelihoods. Usually it is used in the monetary sense, leaving aside its social implications. As political decisions are often based on economic rationale, researchers have begun to analyze the consequences of climate change with economic tools. This had the merit of raising the importance of climate change in the political agenda. However, there is an urgent need to improve this economic information, widening its scope with social data. In this chapter we will sum up available information on economic costs of climate change and its consequences.

[10] Stern, N. (2006). "Stern Review on the economics of climate change."

TAKING ACTION HAS A COST…

We are still unsure of the real costs of responsible policies aimed at reducing the effects of climate change. Nevertheless, studies are now beginning to assess some of the financial requirements needed to keep GHG emissions concentrations at safe levels.

A recent study[11] determined that the additional estimated investment and financial flows needed in 2030 is large in absolute terms, but small in relation to estimated GDP (0.3 to 0.5%) and global investment (1.1 to 1.7%) in 2030.

- **Mitigation measures** needed to return global GHG emissions to current levels by 2030 require additional investment and financial flows between **USD 200-210 billion in 2030**.

- Additional investment and financial flows for **adaptation** needed by 2030 amount to **several tens of billions of USD.**

Box 1.14. How much will actions aimed at combating climate change cost?

Additional investment and financial flows in 2030

Mitigation

Sectors	Global (billion USD)
Agriculture	35
Building	51
Energy RD&D	35-45
Energy Supply Infrastructure	(-) 67
Forestry	21
Industry	36
Transport	88
Waste	0.9

Global: 200–210 billion USD (0.92% of projected global investment and 0.26%of global GDP in 2030)

Developing countries: 76-77 billion USD (0.86% of projected global investment and 0.29% of GDP in 2030)

Adaptation in some selected sectors

Sector	Global (billion USD)	Share of developing countries
Agriculture, forestry and fisheries	14	50%
Coastal zone	11	40%
Human health	5	100%
Infrastructure	8-130	25%
Water supply	11	80%

Global: Overall needs identified in this study correspond to 0.2–0.8% of global investment flows or 0.06-0.21 % of projected GDP in 2030.

Developing countries: 28 to 67 billion USD in 2030.

Amounts are large in absolute terms, but small relative to GDP and investment

Source: UNFCCC. Smith, Joel (2007). "Preliminary Estimates of additional investment and financial flows needed for adaptation in 2030."

[11] UNFCCC. Smith, Joel (2007). "Preliminary Estimates of additional investment and financial flows needed for adaptation in 2030." Estimates from this report should be treated as indicative, due to a number of gaps in the information (i.e. Limited availability of data for regional disaggregation, the need for increased electricity access in developing countries is not taken into account, among others).

Even if these figures focus only on investment needs and do not include the costs that will be covered by individuals (such as the renewal of electric appliances, or the insulation of houses), they help us identify the cost of sectoral investments which are necessary to both mitigate and adapt to climate change. However, we should take them as indicative.

First let us examine the mitigation side, which is made up of all the policies aimed at reducing GHG emissions.

- In the **energy sector** (35-45 billion USD), the study anticipates that 35% of annual investments will be needed to shift to climate-friendly technologies, and that 55% of this investment needs to be made in developing countries. It suggests that the investment will be undertaken by public utilities or regulated private utilities, as well as domestically funded. The study also confirms the need for a 10% reduction in annual investment in fossil fuel supply.
- In the **industry sector**, an additional investment of USD 36 billion will be needed to improve energy efficiency, reduce process emissions and implement carbon capture and storage. It considers that with appropriate regulations and policies, these investments will be made by companies.
- In the **building** sector, USD 51 billion will be necessary to improve energy efficiency (electricity and fossil fuel).
- The **transportation** sector will need an investment of USD 88 billion to improve efficiency and shift to agrofuels. Almost 40% of this investment should be carried out in developing countries. Some investments will be covered by citizens (for example, by replacing their vehicle for a more efficient one), but regulations are also necessary to promote private investment in this sector.
- In order to capture methane from landfills and improve wastewater treatment, investment in **waste management** will need to be at least USD 0.9 billion, about 67% of which in developing countries.
- Investments in **agriculture** are twofold. In terms of mitigation, around USD 15 billion will be needed in agroforestry, to enhance forests, and another USD 20 billion to avoid the release of emissions (i.e. from manure). 67% of this investment is needed in developing countries.
- **Forestry** will need financial flows of up to USD 21 billion to curbe emissions, USD 12 billion to reduce deforestation, USD 8 billion for forest management and USD 1 billion for afforestation. Almost all this investment should be carried out in developing countries.
- Government spending in **energy research, development and deployment (RD&D)** has stagnated whereas private spending has been falling. The Stern review suggests public budgets need to be doubled to USD 20 billion.

On the adaptation side, costs and investment needs also seem huge:

- In **agriculture, forestry and fisheries**, around USD 14 billion will be needed (USD 3 billion for Research and Development and further USD 11 billion for adapting production and processing activities). Public resources are likely to be needed to provide direct support to small-scale producers.
- In **water resources**, an estimated USD 11 billion investment will be needed, of which 80% will be in developing countries.

- Investments in **human health** will probably go up to USD 5 billion and will be focused entirely on developing countries. Without public investment, this cost is likely to be borne mainly by the families of those affected, which poses a challenge in terms of social justice and solidarity.
- Investment in **coastal zones** will reach USD 11 billion, about half of which for developing countries. Deltaic regions, particularly the large coastal deltas in Asia and in Africa and small island states may have significant problems in responding to sea level rise. In these countries, additional sources of external public financing are likely to be needed.
- The estimated range of investment in **infrastructure** goes from USD 8 billion to USD 130 billion. Uncertainty about the exact needs explains this wide range.

All these changes will have consequences on employment, which will be further developed in module 2.

Other studies from UNFCCC outline that investment and financial flows needed for adaptation are likely to be tens of billions of dollars per year over several decades from now. They could even be more than USD 100 billion per year. The World Bank and Oxfam estimate adaptation costs at tens of billions of dollars per year.

INACTION WILL BE MUCH MORE EXPENSIVE THAN TAKING ACTION

Keeping GHG emission at current concentrations by 2030 is a first step towards obtaining larger reductions by 2050, and may imply huge investments. However, many recent studies have warned of the risk of not taking action now against climate change. This section will review how the costs of uncontrolled climate change to the environment, human health and the economy could be even worse.

The Stern review asserts that without action, a 5-6°C warming is plausible by the end of the century – note that a 2-3°C rise in temperatures is almost certain by the mid-century, so we need to focus on avoiding more serious problems associated with even higher rises in temperature. Based on this rise and taking into account the risk of an abrupt and large-scale climate change, the study estimates a 5 to 10% loss in global Gross Domestic Product (GDP), with poor countries suffering costs in excess of 10%.

This estimate does not include elements likely to aggravate the consequences of inaction. Stern estimates that the overall costs for not taking action could include a 20% reduction in current per-capita consumption.

Social Impacts cannot be measured in monetary terms.

The Stern review also points out that climate change will cause a whole set of impacts, particularly on the environment and human health, which cannot be given a precise monetary value and are thus difficult to include in the current cost calculations. These are called **"non-market" impacts** and the Stern review estimates that if they were included they could increase the total cost of climate change from 5% to 11% of GDP. Of special concern to us is that these "non-market" impacts do not contemplate social and political impacts, which also cannot be measured in monetary terms.

Finally, it is also important to remember that climate change related costs will also affect investment decisions, labour supply and productivity, and even social and political stability. Only if the right adaptation policies are in place can the negative consequences of these changes be reduced.

The poorest regions of the world will suffer disproportionately the burden of climate change

In all the scenarios examined, the most severe impacts will be felt in Africa, the Middle East, India and South-East Asia. A 20% reduction in per capita consumption will certainly drive these regions into even deeper social and economic crises. Therefore, special attention should be given when deciding how to move away from out current "path of inaction".

Inaction on climate change will impact not only production, but also welfare

According to the Stern review, climate change is projected to reduce average global welfare by an amount equivalent to a permanent cut in per-capita consumption of at least 5%. This figure, for reasons we have just mentioned, could go up to 20% if calculations included all non monetary impacts (social and political impacts).

Between the two options available for dealing with climate change, the only responsible one is to tackle it. This is because the consequences of uncontrolled climate change could greatly exceed our worst predictions, and there is little sense in preferring to pay high costs when options to reduce them are available at a lower cost.

Why then, if taking action is the only evident option, does it seem that humanity is set on a road to collision? Climate Change is a global problem that requires global responses and solidarity. While some initial steps have already been taken to deal with these problems based on a multilateral approach, self-serving policies based on a narrow and short-term vision have so far hampered further commitments and developments. This is precisely the reason why it is so important that all stakeholders, including workers and their trade unions, understand what could be done to help address this challenge.

Unit 5: INTERNATIONAL GOVERNANCE OF CLIMATE CHANGE

Key ideas

→ Climate Change is a global problem and therefore needs a global response.
→ The United Nations Framework Convention on Climate Change (UNFCCC) is the first step taken by the international community to fight climate change.
→ Its first implementation agreement, the Kyoto Protocol, sets concrete and binding targets for industrialized countries to reduce GHG emissions in the period 2008-2012.

"A Global governance problem", "the biggest market failure", "a challenge for humanity": these are just a few catchphrases to describe climate change. All of them highlight that **it is a collective issue that requires a collective solution**. How do we deal with a problem whose effects are not equally suffered by those who cause it? How do we introduce solidarity into the international arena, where *realpolitik* is the dominant rule? How can all of us agree a common policy for our children and their children, together?

This may appear an impossible mission, however…

THE INTERNATIONAL COMMUNITY REACTS

Scientific evidence and public awareness of climate change grew considerably during the 80s, however it was not until 1992, at the UN Conference on Environment and Development held in Rio de Janeiro, that the governments of the world adopted the first international instrument to tackle the problem: the United Nations Framework Convention on Climate Change (UNFCCC), which entered into force in 1994.

The United Nations Framework Convention on Climate Change (UNFCCC): its goals, its importance.

- The UNFCCC is the first international attempt to deal with climate change. As its title indicates, the Convention is a framework. This framework includes commitments, different bodies, some funding, and political support.

- Signatory governments from all over the world (with the exception of Andorra and Somalia)
  - Recognize that the climate system is a shared resource;

  - Assume that its stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases;

- Commit to stabilize GHG concentrations at a level that would prevent dangerous interference with the climate system, allowing ecosystems to adapt naturally to climate change, ensuring that food production is not threatened and enabling economic development to proceed in a sustainable manner.

And

- For the first time governments accepted to negotiate with a common goal but on a differentiated basis: countries committed according to their level of responsibility regarding climate change. Thus, industrialized countries commit to reduce their emissions while developing countries commit to follow sustainable development pathways. This is the **"common but differentiated responsibilities"** principle.

Annex I or Non-Annex I

Discussions about the Climate Change Convention often refer to **"Annex I" or "Non Annex I"** countries. These are the groupings defined by the Convention to discriminate between countries according to their responsibilities for current concentrations of GHG in the atmosphere. Annex I are industrialized countries listed in the Annex I of the Convention, while Non-Annex I tend to be all other developing countries. There is also another group of countries: the Least Developed Countries (LDCs), which are given special consideration because of their limited capacity to respond to climate change and adapt to its adverse affects.

COP, SBSTA, SBI

These are the acronyms of the governing bodies of the Convention.

1. **Conference of the Parties (COP)**: once a year, all Governments that are party to the Convention meet to adopt decisions and further develop the Convention.
2. In conjunction with the COP, the **Subsidiary Body for Scientific and Technological Advice (SBSTA)** meets to advise the COP on matters of science and technology as well as the **Subsidiary Body for Implementation**, which helps to assess and review the Convention's implementation.

IPCC

The Intergovernmental Panel on Climate Change (IPCC) is a worldwide reference on climate change. Composed of scientists from all over the world, the IPCC analyses in an exhaustive, objective, open and transparent manner, scientific, technical and socio-economical information on climate change risks, adaptation and mitigation. More than 2,500 scientists participated in the elaboration of the last report, the IPCC Fourth Assessment Review.

PUTTING THE CONVENTION INTO MOTION: THE KYOTO PROTOCOL AND ITS INSTRUMENTS

As the Convention is a framework, it was necessary to strengthen it with a more practical arm. This happened in Kyoto, in 1997, where the Conference of the Parties agreed on specific reduction targets for Annex I countries (see table below). The Kyoto Protocol aims to reduce at least 5% GHG emissions from 1990 levels in the 1st commitment period 2008-2012.

Box 1.15. Countries with emissions targets under the Kyoto Protocol

Country	Target (1990 - 2008/2012)
EU-15, Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland	-8%
USA	-7%
Canada, Hungary, Japan, Poland	-6%
Croatia	-5%
New Zealand, Russian Federation, Ukraine	0
Norway	+1%
Australia	+8%
Iceland	+10%

Although the United Stated decided not to ratify, the Kyoto Protocol came into force in 2005 thanks in part to the ratification of the Russian Federation, which ensured that at least 55 countries with emissions accounting for at least 51% of global emissions had signed up to the treaty. ***In December 2007, Australia ratified the Protocol.***

Source: UNFCCC, http://unfccc.int/kyoto_protocol/background/items/3145.php

How does the Protocol work?

Commitments under the Protocol vary from nation to nation. The overall 5 per cent target for developed countries is to be met through cuts (from 1990 levels) of 8 per cent in the European Union (EU15), Switzerland, and most Central and East European states, 7 per cent in the United States (although the US has since withdrawn its support to the Protocol); and 6 per cent in Canada, Hungary, Japan, and Poland.

New Zealand, Russia, and Ukraine are to stabilize their emissions, while Norway may increase emissions by up to 1 per cent, and Iceland by 10 per cent.

The EU has made its own internal agreement to meet its 8 per cent target by distributing different rates to its member states. These targets range from a 28 per cent reduction for Luxembourg and 21 per cent cuts for Denmark and Germany to a potential 25 per cent increase for Greece and a 27 per cent increase for Portugal.

Flexibility mechanisms, what are they about?

While countries should basically reduce their emissions by modifying the energy intensity of their economy, the **Kyoto Protocol offers flexibility in the way countries may meet their targets**. For example, they may partially compensate for their emissions by developing further carbon "sinks" – basically, forests, which help remove carbon dioxide from the atmosphere. That may be accomplished either on their own territories or in other countries. They may also fund projects abroad that result in greenhouse-gas cuts. Several mechanisms have been set up for this purpose: **the flexibility mechanisms**.

The Kyoto Protocol defined three “flexibility mechanisms” to lower the cost of achieving emissions targets. These mechanisms enable governments to reduce emissions in other countries. While the cost of limiting emissions varies considerably from region to region, the benefit for the atmosphere is the same, wherever the action is taken. “Flexibility mechanisms” are not “rights to emit” and actions in foreign countries must “complement” domestic emissions reduction.

- **Clean Development Mechanism (CDM)**: A developed country invests in a GHG emission reduction project in a developing country. It is a win-win strategy: the developed country counts these emissions reduction as if they were reduced in its own territory; the developing country receives clean technologies, which will enhance clean and sustainable development.
- **Joint Implementation (JI)**: A developed country implement an emission reduction project in the territory of another developed country and counts the resulting emission reduction towards meeting its own Kyoto target.
- **Emissions Trading**: Developed countries with emission reduction commitments can buy and sell emissions credits to and from other developed countries. Companies having received emissions rights can sell those they have not used because they have reduced their emissions, or can buy emissions rights at market price if they did not reach their emission reduction target.

WHAT’S NEXT?

The Kyoto Protocol covers emission reduction targets from 2008 to 2012.

What will happen next?

If temperatures rise more than 2-3°C in relation to pre-industrial levels, the global economy will pay a high cost for governments’ inability to commit to stronger targets for emissions reduction. In order to keep global warming from exceeding this level a 25-40% reduction is actually needed by 2020, based on 1990 levels. Note that the Kyoto Protocol committed the international community to an overall 5% reduction, so it now faces a huge challenge: it has to commit to new and more ambitious emissions reduction targets for the post-2012 period. Additionally the international community now needs to define these new targets with the participation of all industrialized economies.

Another reality to be taken into account in the current process is the lack of distinction between emerging economies and other developing countries. Discussions on how to involve these energy-intensive and growing economies in ways that do not jeopardize their development and guarantees their support of commitments to stabilize global emissions will bring new agreements.

What responsibilities do national governments have at home?

The moment international commitments are implemented at the national level is particularly important. Governments have the responsibility to adapt their international commitments to their national realities without losing the overall goal of the international agreements. In this case: the stabilization of GHG emissions.

Governments must use all available options to reduce emissions in their countries, to the extent that their capacities and national realities allow them to.

They have to involve their societies, in order to extend the commitment made at the international level to their citizens, who are an essential element to achieve the emissions reduction and will face the effects of climate change.

Democratic policies aimed at climate change mitigation and adaptation are core elements of a successful implementation of the Convention on Climate Change.

Equity is another essential issue, as climate change will hit harder those who already suffer from poor social and economical conditions. The Governments' role is to ensure these people are able to respond to climate change effects by empowering them with the knowledge, technology and resources they need to be actors of their lives, and not passive individuals faced with an incommensurable and unavoidable problem.

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NOTES:

MODULE 2:

CONSEQUENCES OF CLIMATE CHANGE ON EMPLOYMENT

Postman in flooded street, Germany
© P. Frischmuth / UNEP / Still Pictures

Module objectives:

The module aims at:

- Providing information on existing and potential medium/long term effects of climate change on employment;
- Analysing the effects of strategies against climate change, namely mitigation and adaptation, on employment.

Learning outcomes:

At the end of the session, the trainee will be familiar with:

- The potential impacts of climate change on employment in different regions and strategic sectors;
- The need to integrate employment in designing climate change mitigation and adaptation strategies.

Introduction to Module 2

Climate change seems to be just another of the many environmental problems facing mankind. However, studies have confirmed the increasing number of its impacts on all aspects of human lives. The previous module studied the impacts of climate change on the economy, on livelihoods and its linkages with development dynamics. This module will examine how employment would be affected by climate change; by policies aiming at adapting to it as well as by mitigation policies and measures aimed at tackling this problem.

Unfortunately, research in these three areas is scarce. It is easy to state that when the economy is affected, employment is as well. However, it is hard to predict how these impacts will be distributed, as impacts on the economy might not bring about immediate, visible changes in employment as a whole. Instead, some sectors will be adversely affected by these changes while others will benefit from them.

This second module is a first attempt to understand the kind of impacts on employment expected from climate change mitigation (i.e. policies who look for reducing greenhouse gas emissions) and adaptation policies (i.e. those who try to anticipate a response to climate change consequences) by examining their effects on different sectors from an environmental, economic and political perspective. It is meant to present tendencies and not net gains and losses.

The **first unit** will highlight that the impacts of climate change on employment remain mostly unexplored by science. It however addresses the possibility to identify many sectors where job losses could be expected due to extreme weather events and increase in temperature (the first having greater relevance). It will also address the issue of loss of employment in climate-sensitive sectors such as agriculture, fisheries and tourism, especially in developing countries - in Africa and Asia in particular.

The **second unit** will review how adaptation strategies can help prevent job losses and even create new job opportunities in vulnerable regions, and why economic diversification policies seem essential. It points out that the most likely immediate sources of jobs creation will be in infrastructure development and health services, at this initial stage of adaptation investments. The degree of economic diversification will determine the positive and/or negative impacts on employment for other sectors.

The **third unit** will explore why mitigation strategies are necessary to reduce future climate risks, but also to make today's adaptation strategies viable. Mitigation strategies could be a source of job creation in sectors such as energy efficiency, renewable energy, building restoration and regeneration, or public transportation. Mitigation activities will also give rise to stress in certain sectors i.e. those related to fossil fuels or energy-intensive industries and services. The unit will review the measures aimed at reducing the vulnerability and protecting workers in these sectors through re-training, social protection and local economic diversification in affected sectors and zones.

Unit 1: EFFECTS OF CLIMATE CHANGE ON EMPLOYMENT

Key ideas

→ The impacts of climate change on employment remain mostly unexplored by research.
→ However, it is possible to identify many sectors where we can expect job losses due to extreme weather events and increases in temperatures (the first having greater relevance).
→ Loss of employment in climate-sensitive sectors, such as agriculture, fisheries and tourism seem very likely, especially in developing countries - in Africa and Asia in particular.

Based on the last review of the IPCC (2007), unit 1 will provide:

- a brief summary of the key climate trends;
- their likely impacts on different sectors; and
- indicative trends for employment impacts.

Impacts will aggravate if we do not take action against climate change!

The table at the end of this unit presents a selection of climate phenomena and trends, and summarizes the expected effects on three areas: agriculture and ecosystems, health, and human settlements and society. These changes are ongoing and are set to go on evolving even if we were to stop emitting greenhouse gases today. However, we can also expect they will be stronger and more damaging to the environment, health and economic activities if larger quantities of GHG are further released into the atmosphere. This table also points out the link with a variable/factor that is little understood: employment.

LINKING EXPECTED CLIMATE CHANGE IMPACTS TO THE EMPLOYMENT VARIABLE

The table presented in box 2.1. clearly indicates that the impacts on employment in the short- to medium-term will not be due to temperature increases, as these will basically be moderate and might even have positive impacts, for example by increasing agricultural yields. Instead, negative impacts on employment are likely to arise from extreme weather events such as droughts, cyclones and/or floods. They will also arise from slower processes such as sea level rise.

Assuming a greater incidence of heavy precipitations and the damage to crops this will entail, it is anticipated that employment in the agricultural sector will be adversely affected, especially seasonal jobs that depend on harvesting and crop-processing. The greater incidence of floods will also affect urban employment, in as far as damages to transport, industrial infrastructures and settlements will affect the ability of workers to be present at their workplaces and/or find alternatives when workplaces should have to close. An example to illustrate this was the practical destruction of New Orleans (USA) by Hurricane Katrina, which resulted in the loss of about 40,000 jobs.

Another anticipated impact is the displacement of workplaces to areas less exposed to environmental risks (for example, further away from the sea, or in zones less prone to cyclones). In the context of a globalized economy, it is even harder to predict whether these displacements would take place within the same country or could be transboundary.

Increases in respiratory and/or water and food related diseases, and the risk of malnutrition will also negatively affect employment. These health related impacts will certainly affect workers' productivity as well as conditioning the future incorporation of young workers into the workforce, due to irreparable damages to their health caused during their childhood. Increased migration and mortality will further aggravate problems such as worker turn-over and the loss of qualified workers, which is of special concern as technical knowledge is essential in order to adapt to changing working conditions.

WHICH REGIONS ARE MOST VULNERABLE TO EMPLOYMENT LOSSES?

As the first module explained it, although some regions will be the first to be hardly hit, the whole planet will ultimately be affected by climate change. Regarding impacts on employment, two elements are important in determining the vulnerability of a country or region:

- **Physical factors**: countries and regions in tropical and sub-tropical areas, and those near the poles will be the first to be affected by increases in temperatures.
- **Socio-economic factors**: the weight of climate-sensitive activities in the economy (such as agriculture and fisheries) and the capacity of human settlements to resist to climatic events are key to understanding each country's vulnerability.

Taking these elements as a starting point and based on scientific information, we know that Africa and South East Asia are more vulnerable to adverse effects of climate change. As mentioned in Module 1, these regions will suffer from water stress, reduced agricultural yields and food supply, increased flooding, and exacerbation of endemic diseases.

This does not mean that other regions of the world will not be affected. In these cases however, the effects are likely to appear later in time or be extremely severe, and focused on very specific areas (as might be the case with the Caribbean in the Americas region). In these countries, jobs in strategic sectors such as tropical agriculture will be particularly at risk.

AFRICA

In Africa, climate change will affect agricultural production through increased water stress, reduced suitable areas for production and decreased yield potential. Jobs in the rural areas will be affected, not only because of the direct reduction in agricultural production, but also from indirect effects in rural economies, through the knock-on effect on the processing sector, private transport services to the cities, and non-agriculture related commerce that depends on the revenues of this activity (i.e. small shops in rural communities).

As an example, an increase of only 2°C would make areas of Uganda unsuitable for coffee production; this in a country where the coffee sector is the most important exporter and one of the biggest employers.[12]

Fisheries are a major source of work in Africa, where this industry employs up to 10 million people. In some areas, a large proportion of the population is involved in fishing. A study in Tanga (Tanzania), found that 70-80% of men were involved in it. Migrant fisheries may employ agricultural workers as crew, providing seasonal employment and contributing to village economies. Fisheries will be affected by a drastic reduction in resources due to rising water temperatures, exacerbated by continued over-fishing. Mangroves and coral-reefs are also expected to be affected, producing further consequences for this sector. Job losses are to be expected if measures are not taken to preserve resources or adapt economic activity.

Projected sea-level rise in coastal areas, where most African capitals are located, and the greater risk of floods will affect urban employment and increase stress to transport and infrastructure, many of which are already under pressure because of unplanned urbanisation and lack of public services.

ASIA

Up to 60% of the income of rural households in Asia is directly related to agriculture production, while the rest comes from waged-jobs in the same sector. Thus, rises in the frequency of floods or decreases in freshwater availability are likely to affect the two main sources of income of these households. The development of the Asian region will be subject to an increased water stress; it is predicted that up to one billion people will be affected by 2050.

Coastal areas, especially heavily-populated mega-delta regions, will be at greater risks due to increased floods and sea-level rise, which will also raise endemic morbidity and mortality due to diseases such as diarrhoea or cholera. Not to mention the damage to infrastructure, like roads and power lines, and the subsequent disruption of economic activity and reduction of worker's income. A storm in Karachi (Pakistan) killed 200 people, mostly poor workers living in densely populated areas with precarious housing. This is an illustration of workers not only losing jobs, but their lives as well.

[12] ILO (August 2007). "Green jobs: Climate change in the world of work." *World of Work.* No. 60

LATIN AMERICA

In Latin America, increasing temperatures and decreases in soil water in the eastern Amazonia will result in savanna gradually replacing tropical forests by 2050, and arid-land vegetation replacing semi-arid vegetation. Both these cases are example of changes to tropical areas which will result in a significant risk of biodiversity loss (see Module 1 for further information).

An obvious linkage between biodiversity and employment is through tourism. In Guatemala, forests are one of the main tourist attractions. The travel and tourism economy there accounted for 7.2% of GDP and 257,000 jobs in 2007 (6.3% of total employment). In the medium term, these jobs could be at risk if natural environments are not protected against changes in climate.

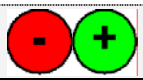
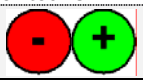
In drier areas, climate change is expected to lead to salinisation and desertification of agricultural land. Productivity of some important crops and livestock is projected to decline, with negative consequences for food security. Agriculture still accounts for 17% of the global employment share in Latin America and the Caribbean. However, the precise impact of these slow-changing trends on employment is more difficult to assess.

In temperate zones, soybean yields are projected to increase. However, due to the moderate labour-intensity of this activity major positive impacts on employment are most unlikely.

Sea level rise will increase the risk of flooding in low-lying areas. Additionally, increases in sea surface temperature are projected to adversely affect Mesoamerican coral reefs and cause shifts in the location of south-east Pacific fish stocks. This movement of the resource could affect negatively more than 60 thousand people working as fishermen and fish farmers.

While the effects of climate change on employment may seem unavoidable, it is important to remember that political choices can affect its outcomes, particularly through adaptation and mitigation.

Box 2.1 Selected environmental consequences of climate change and examples of major projected impacts by sector

Phenomenon and trend	Examples of major projected impacts by sector		
	Agriculture, forestry and ecosystems	Human health	Human settlements and society
Over most land areas; warmer and fewer cold days and nights; warmer and more frequent hot days and nights.	Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks.	Reduced human mortality due to less exposure to the cold.	Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow and ice; effects on winter tourism
Positive and/or negative impacts on employment identified			
An increase in the frequency of warm spells and heat waves over most land areas.	Reduced yields in warmer regions due to heat stress and an increase in the risk of wild fires.	Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially-isolated.	Reduction in the quality of life for people in warm areas without appropriate housing; impacts on elderly, very young and poor.
Positive and/or negative impacts on employment identified			
An increase in the frequency of heavy precipitation events over most areas.	Damage to crops; soil erosion, inability to cultivate land due to water logging of soils.	Increased risk of deaths, injuries, infectious, respiratory and skin diseases.	Disruption of settlements, commerce, transport and communities due to flooding; pressures on urban and rural infrastructures; loss of property.
Positive and/or negative impacts on employment identified			
Areas affected by increases in the frequency of drought.	Land degradation; lower yields and/or crop damage and failure; increased livestock deaths; increased risk of wildfire.	Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water and food-borne diseases.	Water shortages for settlements, industry and communities; reduced hydropower generation potentials; potentially, population migration.
Positive and/or negative impacts on employment identified			
An increase in intense tropical cyclone activity.	Damage to crops; windthrow (uprooting) of trees; damage to coral reefs.	Increased risk of deaths, injuries, water- and food-borne diseases; post-traumatic stress disorders.	Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers; potential for population migrations; loss of property.
Positive and/or negative impacts on employment identified			
Increased incidence of extreme high sea level (excludes tsunamis)	Salinisation of irrigation water, estuaries and freshwater systems.	Increased risk of deaths and injuries by drowning in floods; migration related health effects.	Costs of coastal protection *versus* costs of land-use relocation; potential for movement of populations and infrastructure.
Positive and/or negative impacts on employment identified			

Source: IPCC, 2007 and regarding employment, Sustainlabour, 2008

Unit 2: EFFECTS OF ADAPTATION ON EMPLOYMENT

Key ideas

→ Adaptation strategies can help prevent job losses and even create new job opportunities in vulnerable regions.
→ The extent of positive impacts will depend on governments' commitment to these policies, but also on the level of emissions reduction achieved. If emissions rise by more than 2°C, our capacity to adapt in the future will be severely reduced.
→ Economic diversification policies are essential, but they have to take into account the consequences on employment of changing the economic activity, and evaluate training and other transitional needs.
→ The most likely immediate sources of jobs creation will be in infrastructure development and health services, at this initial stage of adaptation investments. The degree of economic diversification will determine the positive and negative impacts on employment in other sectors.

The previous unit identified areas where jobs losses could be expected because of climate change. This unit will highlight that taking measures now to combat climate change could not only be a way to avoid the aforementioned jobs losses, but also a strategy for creating new sources of employment.

Far more regional, sectoral and local research is needed to understand the effects adaptation measures can have on employment. Nevertheless, we can safely say that adaptation strategies, by improving societies' and economies' capacity to react and adapt to climate change, do not in essence have a negative impact on employment.

Having said that, it is fair to note that policies aimed at adaptation to climate change in different productive sectors need to take into account the labour-intensity of the output product that is being substituted, in order to avoid conflicts between short-term income needs for workers and mid- to long-term policies. If policies adopted and implemented promote the substitution of a product by another because it is more economically and environmentally viable, as well as less labour intensive, then policy makers should acknowledge the potential job losses and its impacts on the local economy.

Box 2.2. "Facing the social impact of climate change"

"(…) Farmers are changing their agricultural practices, sometimes switching to entirely new crops. So far most adaptations in farming systems have related to agronomic practices like seed selection and irrigation and to the economic viability of alternative crops. There can also be significant shifts in employment and income opportunities. A recent FAO study in semi-arid Bangladesh found that mango is a good alternative to rice from an agronomic and an economic point of view. But the prospects for employment are less encouraging: mango requires much less work than rice and labour demand is highly concentrated in two short periods per year. That is bad news for the one third of households in the region who depend on work as daily labourers in agriculture.

Should the government assist the move into mango? If so, what could it do to assist the landless agricultural labourers?

This example shows that effective adaptation policies and programmes require a much better grasp of the problem and of options for tackling it. The "hotspots" need to be identified more clearly, i.e. the areas, sectors and population groups which will be most affected. The nature and dynamics of these effects need to be understood. (…)"

Source: Extract from ILO (August 2007). "Green jobs, Facing up to "an inconvenient truth"", *World of Work.* No. 60

In this case, if policy suggests substituting rice or fisheries for another agricultural product, which might be more economically and environmentally viable but needs less labour for its production, then those responsible for the policy must be aware that it can cause major local unemployment problems. What is needed is a set of transitional measures for workers affected by the change in production, designed with the participation of workers and their representatives, and adopted at the very beginning of any adaptation measure.

While climate change will generally have negative effects on employment, some adaptation measures can counteract these effects and help create new jobs.

COMBATING CLIMATE CHANGE AND CREATING NEW JOBS: THE VIRTUOUS CIRCLE?

As it has been previously explained, vulnerability to climate change is a direct consequence of poverty. Poor people have little means for planning and implementing adaptation strategies in view of the changes that will be taking place in their jobs - notably in the informal economy -, in their homes - often in slums or extremely precarious housing -, or within their families - for example with regards to the health effects of climate change. Ambitious adaptation policies can create local jobs which, if decent wages are given, could increase workers' wealth, and by doing so, reduce their vulnerability. This virtuous circle, Adaptation policies → Job creation → Wealth increase → Vulnerability reduction, needs to be explored and enhanced.

Table 2.4 presents a set of adaptation measures that could have an impact on employment, and focuses on those sectors that are most at risk and where adaptation is most important. These are agriculture, forestry and ecosystems, health and human settlements.

While climate change will, generally speaking, affect these areas negatively, if it is accompanied by adaptation measures, it can result in some positive effects on employment, or, at least, less severe negative ones. Adaptation measures vary by sector, but all of them should include provisions for workers whose jobs are at risk from changes in production needed to prepare our society and economy for the impacts of climate change.

In the previous unit we gave the example of coffee workers in Namibia whose job is at risk due to climate change. This is just one of many cases. In certain countries, rice fields will have to be replaced by other forms of agricultural production. Unfortunately, given the large number of workers in the rice sector it will be hard for policy-makers to find an alternative which will not only be able to withstand changes in weather patterns, but also provide sufficient employment and guarantee a fair market price.

In both examples the appropriate measures should guarantee a fair transition for potentially affected workers. These measures must include:

- **Social protection systems, including health coverage**

  As it is developed in the third module, access to an adequate level of social protection is recognized as a basic right for all individuals in the Philadelphia Declaration[13], in subsequent ILO declarations and in a number of international labour standards. Yet in many countries, especially developing countries, the reality falls extremely short of these ideals. Social protection is the tool modern societies have developed to deal with the vulnerability of some sectors of their population. Social protection systems must run in parallel to adaptation efforts as they can diminish vulnerability to climate change and strengthen the social security systems, especially in developing countries.

  As stated by the ILO, social protection needs to adapt in order to deal with contemporary issues, and climate change is without doubt an important one among these.

- **Economic diversification policies, able to identify potential job opportunities**

  Economic diversification policies aiming at increasing the economic resilience of, and reducing reliance on, climate-sensitive sectors such as agriculture, fisheries and tourism seems imperative in certain regions. They are essential for ensuring the continuity of the regions' economic activity.

  Economic diversification policies could be organized within the sector (by changing the agricultural output, by developing different tourist activities) or by the promotion of new activities from other economic sectors (by shifting from agriculture to the climate-insensitive industry and service sectors). Decisions on this issue need to be taken with regards to the expected impacts of climate change in concerned zones. A consultation of local stakeholders (workers, farmers, community leaders, among others) is key in order to understand as much as possible the impacts of this transition, and to integrate local knowledge about possible diversification opportunities.

[13] ILO (1944). "Declaration of Philadelphia on the aims and purposes of the Organization."

Direct economic viability of proposed production outputs needs to be completed by the analysis of impacts on employment (shifts in production could generate drastic increases or decreases in workforce needs), on local cultures and traditions, among others.

- **Training and re-qualification programmes to help workers incorporate new branches**

  It will be impossible to ensure workers a decent and sustainable life without preparing them for new jobs, through new qualifications and training opportunities. These should be anticipated as workforce training belongs to a mid- to long-term strategy. Economic diversification policies mentioned above need to foresee workforce training, in order to ensure that policies will be for the benefit of the local community.

Adaptation could also provide positive opportunities for sectors at risk and might even help to improving workers' education and income. The example of the Lesotho's National Adaptation Action Plan (NAPA) illustrates this perfectly well. All adaptation measures are analyzed according to their impact on employment and on poverty reduction, and the country only chooses those with positive outcomes in these two areas. This is to be commended since unemployment and poverty are the major challenges facing the country.

Adaptation strategies in developing countries are still few and relatively small in scale. It is to be expected that countries develop them further. In this development, social and employment issues need to be addressed in order to improve adaptation policies' impact on development and vulnerability. Civil society, and in particular trade unions and workers have the possibility to improve governments understanding of these issues and need to participate in the design and implementation of these strategies.

Generally speaking, we can observe two kinds of adaptation policies according to their positive effects on employment:

- Policies that **avoid job losses** by changing the element in production affected by climate change (i.e. changing crops);
- Policies that **create jobs** by preparing the country for climate change, engaging in labour-intensive projects (i.e. big infrastructure projects).

How can adaptation prevent job losses?

In the agriculture and forestry sector, where climate change is expected to reduce yields and damage crops, erode soils and increase livestock deaths, adaptation policies need to focus on expanding non-farming activities and farming crops that are able to face greater variability in weather conditions. These policies will reduce negative impacts of climate change on this economic activity and on related employment.

Box 2.3. Extracts from the Lesotho's National Adaptation Programme of Action (NAPA) on Climate Change

Criteria for selecting priority activities

A Multi-Criteria Analysis technique was applied in prioritizing adaptation options. The methodology involved: identification of options, scoring the options against selected criteria and weighting the criteria. Six criteria among those used to prioritize the country's needs were selected as the most appropriate for Lesotho. This selection was made in the context of the major developmental challenges facing the country (environment degradation, unemployment, poverty, gender equity, and HIV and AIDS) as well as the policies and programmes put in place to combat the challenges. The overriding consideration in selecting and prioritizing the criteria was the degree of focus on the uplifting of the vulnerable groups and enhancement of their capacity to adapt to climate change.

The criteria are as follows:

1. Impact on Vulnerable Groups and Resources (…)
2. Impact on the Economic Growth Rate of the Vulnerable Communities (…)
3. Impact on poverty reduction (…)
4. MEA synergies (…)
5. **Employment Creation**

   Unemployment in Lesotho stands at 40 percent. The situation is likely to degenerate further as more migrant workers are retrenched from the mines in South Africa, textile factories are closed following the expiration of the Multi-Fibre Agreement and the termination of AGOA in 2015.

   Unemployment is the highest cause of poverty in Lesotho hence it is regarded as a high priority challenge for poverty reduction especially among the rural communities.
6. Prospects for Sustainability (…)

Scoring of Options (Activities) and Weighting of Criteria

Allocation of scores for the options (activities) against the criteria, and allocation of weights to the criteria (prioritization of criteria), and hence identification of priority activities for the country, were attained through a rigorous consultation process.

(…) **The criteria of Employment Creation and Impact on Poverty Reduction received the highest and second highest weights respectively. This is hardly surprising since unemployment and poverty are the major challenges facing the country**.

Source: Lesotho's National Adaptation Programme of Action (NAPA) on Climate Change. Ministry of Natural Resources. Meteorological Services.
For the complete Lesotho NAPA: http://unfccc.int/adaptation/napas/items/2679.php

With regard to human health climate change is expected on the one hand to:

- Reduce workers' productivity by increasing mortality and morbidity because of the resurgence and proliferation of certain diseases;
- Degrade working conditions of workers who carry out their activity outdoors, such as building workers for example, because of rising temperatures.

In these cases adaptation policies need to improve legislation regarding occupational health and safety and/or expand health services to the most vulnerable groups. This can have a positive impact on employment and income in affected communities.

In the tourism sector, the vulnerability of workers can be reduced with policies that focus on the development of different tourist activities or promotion of economic diversification.

How can adaptation create jobs?

In the agriculture and forestry sectors, the expansion of non-farming activities, establishment of tree nurseries and promotion of local technologies are examples of policies that can help adapt to climate change and create numerous job opportunities. The last two initiatives are well known for their potential to empower poor people, in particular women, and give them the opportunity to participate in the formal economy and increase their family's income.

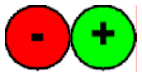
Job opportunities will also appear in the health sector if adaptation strategies are properly implemented by governments. As health needs rise because of the increased risk of diseases, new employment opportunities in the health and associated sectors (such as construction) will appear. Training and improved protection of workers from new risks have to be taken into account.

New jobs will also appear in the building sector, as a consequence of infrastructure investments, such as building of coastal defences, flood protection, drainage containment, road adaptation, etc. Buildings, infrastructure and homes will have to be better adapted to climate change, and political decisions that promote these strategies lead to new job opportunities.

The negative impacts of climate change being automatic, proactive policies could increase the potential positive impacts of climate change adaptation policies.

Box 2.4. Examples of adaptation measures and initial identification of their positive and negative impacts

Sector	Negative effects of climate change	Examples of adaptation measures	Employment effects of some adaptation measures
Agriculture, forestry and ecosystems	• Reduced yields in warmer regions due to heat stress • Damage to crops • Soil erosion, inability to cultivate land due to water logging of soils • Land degradation • Increased livestock deaths • Damage to coral reefs • Salinisation of irrigation water, estuaries and freshwater systems	• Increase productivity of paddy farming for new climate conditions • Expand non-farming economic activities • Farm crops that are able to face a wider variability in weather conditions. A broad-range of tolerance will be more important than optimal tolerance to one stress factor. • Use drought tolerant, low growing leguminous species which are useful for fodder and fuel wood. • Investigate the use of new forestry species • Promote indigenous/local technologies • Establish local tree nurseries contour planting • Fencing against livestock • Economic diversification	 ⇨ However, it takes 2-3 years before any income/livelihood benefits arise from new trees (fruit/fodder/fuel wood). In addition, the labour required for new crops or species may in fact be less. In these cases, workers need to be rewarded with outside funding in order for schemes to be viable.  ⇨ Attention should be given to impacts on employment in pastoralist communities. ⇨ The gradual shift of economic activity from a climate-sensitive agricultural and shrimp/fish culture, to the climate-insensitive industry and service sectors is a viable option to minimize risks, conserve natural resources and shift towards sustainable development. Training and other accompanying measures should be designed to minimize suffering to workers and their families.

Sector	Negative effects of climate change	Examples of adaptation measures	Employment effects of some adaptation measures
Human health	• Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially-isolated • Increased risk of deaths, injuries, infectious, respiratory and skin diseases • Increased risk of food and water shortage • Increased risk of malnutrition • Increased risk of water- and food-borne diseases • Increased risk of deaths, injuries, post-traumatic stress disorders • Increased risk of migration related health effects	• Increase capacity for management of climate related risks • Adapt healthcare and social care infrastructure (hospitals, nursing homes) to be more resilient to the effects of heat, gales and floods • Measures against health impacts (any measure that could counter increasing risks of death, injuries and illnesses)	 ⇨ Improvements in health systems can create new and greater employment opportunities. However, for this to be true, certain conditions must be fulfilled: increased training, improved protection of health workers from OHS* risks. * Occupational Health and Safety  ⇨ Any measure aimed at improving health conditions of workers will tackle the negative effects of climate change on available labour force and the productivity of workers, thus having a positive impact on employment.
Human settlements and society	• Reduction in the quality of life for people in warm areas without appropriate housing • Disruption of settlements, commerce, transport and societies due to flooding and water shortages • Pressures on urban and rural infrastructures • Impacts on the tourism sector (winter tourism, Caribbean tourism)	• Investments in infrastructure, such as coastal defences, flood protection, drainage containment, roads adaptation • Make buildings, infrastructure and homes more adaptable to climate change • Technology and behavioural changes; modifications in seasonal tourism; Economic diversification	 ⇨ In areas such as infrastructure, water management, labour-based processes in public works programmes could create large numbers of jobs.  ⇨ Depending on regions, technology and behavioural changes could slow the deteriorating impact of climate change. However, tourism can only be salvaged in the long run by ambitious climate change policies.
Source: IPCC, 2007 and regarding employment, Sustainlabour, 2008			

ANTICIPATE IN ORDER TO SUCCESSFULLY ADAPT: RESEARCH, DIALOGUE AND DEMOCRATIC DECISION-MAKING

The IPCC dedicated a third of its Fourth Assessment Report to understanding the impacts of climate change on natural and human systems, the capacity of these systems to adapt and their vulnerability. Unfortunately, no section of this report focused on employment. What is the reason for this absence?

The main reason is that no country-based studies have been undertaken, and no regional or global estimates have been made to understand the impacts of climate change on employment. Thus, there are no suggestions in the report on the kind of measures that need to be taken to reduce these impacts. There is currently no assessment on the positive effects for employment of adaptation policies, making it hard for workers to evaluate the impacts and assess the support they should give to these initiatives in the future.

We need dialogue!

By now, most countries have engaged in the construction of National Adaptation Plans of Action. In the course of their design, these plans take into account stakeholders such as employers, who can express their key concerns with regard to their business and their capacity to adapt to new environmental conditions. However, in general there have few, if any, consultation with trade unions and workers to integrate their knowledge, concerns and suggestions regarding climate change and adaptation plans into these National Adaptation Plans of Action.

One reason for this is probably the lack of awareness among workers and their organizations that these processes are taking place. If it is the case, it raises the need for strengthening the capacity of the trade unions in these essential issues. Training and education should be provided to ensure that all the knowledge that workers and Trade Unions bring to the table is taken into account, especially since the resulting adaptation plans will condition our quality of life for at least the next 30 years.

Climate change, as emphasized throughout this Manual, is a collective problem. As such, it has to be solved by all. Society cannot be expected to take responsibility for the implementation of strategies if they were not given the opportunity to participate in the decision making process along with other actors. It will be particularly difficult for workers to support strategies that could carry with them the loss of jobs, if they feel they have not been consulted and listened to.

In this initial stage of adaptation, spaces must be created for consensus building, in particular in developing countries. These can be positive for employment by bringing together different social partners. Social dialogue on adaptation can also build confidence for future discussions about mitigation, especially in sectors where dealing with impacts requires common understanding and negotiation.

Unit 3: EFFECTS OF MITIGATION ON EMPLOYMENT

Key ideas

→ Mitigation strategies are necessary to reduce future climate risks, but also to make today's adaptation strategies viable.
→ Mitigation could create jobs in sectors such as energy efficiency, renewable energy, building restoration and regeneration, or public transportation. However, the social and environmental qualities of these jobs remain unclear. We therefore have to work on the promotion of decent and green jobs from the very start.
→ Mitigation will also give rise to stress in certain sectors, such as those related to fossil fuels or energy-intensive industries and services. Measures aimed re-training, social protection and local economic diversification in affected sectors and zones are essential to protect workers from these changes.

Current efforts focused on avoiding the impacts of climate change will encounter serious difficulties in the future if governments do not undertake more ambitious measures to reduce the amount of greenhouse gas emissions in the atmosphere. This is the case because if GHG in the atmosphere rise above 450-550 ppm, irreversible damages to ecosystems and human lives will occur.

For this reason workers and trade unions should be concerned that the policies currently in place are not enough to curb the current trend. Mitigation policies need to be more ambitious and obtain wider support. Some sectors of our economy are already or will soon be targeted by these measures (i.e. energy production, energy-intensive industries, transport, etc.). Workers and trade unions need a better understanding of the impacts these measures will have on employment, not with a view to blocking them but to ensure that the most vulnerable will be prepared to face the necessary changes and not pushed even further into exclusion. A fair transition has to be designed and for this to be possible, mitigation measures must be accompanied by social protection measures whenever job or income losses are expected.

On a more positive note, this unit will demonstrate that mitigation measures can indeed have positive impacts on employment, by opening new activities in sectors affected by the targeted GHG emission reductions. In the building sector, for example, targets for emission reduction mean renewing current buildings to render them climate-friendly, which will result in a rise of employment in the sector.

Mitigation is key if we want our society to survive climate change, and workers and their organizations will have to face the challenges this transition will bring. Workers and trade unions' capacity to deal with change depends among other things, on our ability to determine the means to help those affected by the measures. On the other side, mitigation will offer opportunities which still remain unclear, but are likely to result in an important number of jobs being created. Maximizing opportunities whilst minimizing negative effects must be the common goal in this area.

MEASURES TO ADVANCE MITIGATION AND CREATE GREEN DECENT JOBS

The table in box 2.5. shows a sample of initiatives aimed at reducing GHG emissions, and which can have a positive impact on employment in different sectors.

In the **energy** sector, measures promoting energy efficiency, such as regulations, will be able to create jobs in auditing and other energy services. Auditing and evaluation of energy consumption, the analysis of reduction opportunities for industrial and commercial facilities, as well as households, are initial activities from which important sources of employment could emerge in the future.

In their study "Climate Change and Employment", the European Trade Union Confederation (ETUC), along with other research partners, assess the need for evaluating further the positive effects of energy services: "(…) our evaluations underestimate the jobs that could be sustainably created in the electricity sector through the provision of energy services to meet consumers' growing energy efficiency requirements"[14].

The expansion of labour-intensive renewable energies such as solar, wind, geothermal and agroenergy will have a positive impact on employment. However, this rise in employment opportunities can only be taken up by workers if they are trained in advance to respond to the demand. Shortages in the labour force for this key area have already been identified and would probably disappear if ambitious training and education programmes were put into place. If these deficiencies are taken care of, then the job potential in the renewable sector could be huge. In Germany, for example, a recent study[15] found 400,000 to 500,000 people may be employed in renewables by the year 2020, and 710,000 by 2030. The sector's current workforce accounts for 170,000 people.

In the case of the European Union, which has set itself ambitious targets for renewable energy development, a modelling exercise concluded that under current policies, there would be about 950,000 direct and indirect full-time job creations by 2010 and 1.4 million by 2020. Under an Advanced Renewable Strategy, there could be 1.7 million net job creations by 2010 and 2.5 million by 2020[16].

[14] ETUC (2007). "Climate Change and Employment." http://www.etuc.org/a/3673

[15] "Green Jobs, towards sustainable work in a low carbon economy." Report commissioned by UNEP as part of the UNEP, ILO, ITUC Green jobs initiative, produced by Worldwacth Institute with technical assistance of the School of International and Labor Relations/Cornell University (to be published in June 2008).

[16] European Commission, "Meeting the targets and putting renewables to work, Overview report", mentioned in "Green Jobs, towards sustainable work in a low carbon economy." Report commissioned by UNEP as part of the UNEP, ILO, ITUC Green jobs initiative, produced by Worldwacth Institute with technical assistance of the School of International and Labor Relations/Cornell University (to be published in June 2008).

In the case of agroenergies, it is clear that the number of jobs created is already very high. A study for Brazil identifies several reasons that makes ethanol production a huge opportunity for job creation[17]. We should, however, give greater importance to analysing working conditions and overall environmental impacts ahead of their promotion. As agricultural products, agrofuels will probably contribute further to already problematic working conditions (i.e. serious labour rights violations, occupational health and safety problems).

A report[18] puts together a certain number of estimates on employment in the renewable energies sector (see table below):

Box 2.5. Employment Estimates in the Renewable Energy Sector, Global and Selected Countries, 2006

Renewable Energy Source	World / Selected Countries[1]	Employment (number of jobs)
Wind	World	300,000
Solar PV	World	115,000
Solar Thermal	China, Germany, Italy, USA	624,000 +
Biomass	Brazil, USA, China, Germany	1,174,000
Hydropower	Europe, USA	39,000
Geothermal	USA, Germany	25,000
Renewables, Combined		**2,277,000**

[1] Countries for which information is available

Source: "Green Jobs, towards sustainable work in a low carbon economy." Report commissioned by UNEP as part of the UNEP, ILO, ITUC Green jobs initiative, produced by Worldwacth Institute with technical assistance of the School of International and Labor Relations/Cornell University (to be published in June 2008).

"The table suggests that current global renewables employment runs to about 2.3 million. It should be noted that this is an incomplete figure as global figures are not available for all renewables. A notable gap, for instance, concerns employment in the small hydropower in China (…).

Given strong and rapidly rising interest in these energy alternatives, future years may well see employment soar - possibly as high as 2.1 million in wind energy and 6.3 million in solar PVs by 2030, and on the order of 12 million jobs in biofuels-related agriculture and industry. Installations and maintenance of solar PV systems in particular offer tremendous job growth. With regard to the impact of biofuels development on the agriculture sector, however, there are many questions that remain to be addressed and that will determine not only the quantity of jobs, but also their quality and broad impacts on rural livelihoods and economies. The renewables sector is a possible and likely source of large-scale green employment, but a conducive policy environment is essential for translating this potential into full-fledged reality".

[17] IAEA (2006). "Brazil: A country profile on Sustainable Energy Development."

[18] "Green Jobs, towards sustainable work in a low carbon economy." Report commissioned by UNEP as part of the UNEP, ILO, ITUC Green jobs initiative, produced by Worldwacth Institute with technical assistance of the School of International and Labor Relations/Cornell University (to be published in June 2008).

In the **building** sector, promotion of climate friendly buildings and implementation of regulation aimed at building renewal are expected to create an important number of jobs. This sector (particularly labour-intensive) will nevertheless face the challenge of improving job quality, which remains very weak. Efforts will have to focus on providing workers with the training and new qualifications needed to improve their working conditions.

The European Trade Union Confederation report creates two time periods under which a 75 percent reduction in GHG emissions could take place. In the 2050 scenario, 1,377,000 Full Time Equivalent (FTE) jobs would be created; in the 2030 scenario 2,585,000 FTE jobs would be created. This ambitious EU scenario requires that government play a key role in funding energy efficiency programs which will in turn help fund new employment and stimulate economic growth. The other less ambitious scenarios would result in less job creation. The Business as Usual (BAU) and Eurima[19] scenarios, which reduce emissions by 8 and 16 percent respectively, would create 20,000 to 62,500 FTE jobs for BAU and between 160,000 and 500,000 for the Eurima scenario.[20] Comparing these scenarios demonstrates that the larger
the investment and the faster that these programs can be implemented, the larger the number of jobs that can be created.

Further research is particularly needed that looks at the evolution of the building sector in developing countries, where efforts to reduce emissions have not yet been placed on the political agenda. If positive impacts on employment of retrofitting building policies were better known, it could be envisaged to promote these policies in developing countries as part of an employment or job creation agenda. This would have another positive outcome: a reduction in greenhouse gas emissions.

In the **transport** sector, public transport jobs should increase, along with investment in the sector. Rail transportation, for both freight and passengers should also be an important source of well-trained and safe jobs. These are perfect examples of decent and green jobs.

An ECOTEC study, conducted for Friends of the Earth Great Britain in 1997, though dated now, still offers useful insights. It assessed the impact of promoting far greater use of railways and buses (70–80 percent higher in 2010 than in 1990), as well as bicycling and walking, while reducing reliance on car use. The study assumed that the total number of passenger kilometres travelled would decline by 11 percent from 1990 levels. It concluded that at least 130,000 new direct jobs could be created by 2010, more than offsetting the loss of an estimated 43,000 jobs in automobile maintenance and repair. In addition, measures to encourage the use of less polluting, more efficient automobiles (natural gas, electric, and hybrid vehicles) and to promote leasing rather than car ownership, were found to possibly create another 35,000 jobs (because of greater attention to upkeep, leased cars lead to more maintenance jobs).[21]

[19] European Mineral Wool Manufacturers Association
[20] ETUC (2007). "Climate Change and Employment" http://www.etuc.org/a/3673
[21] Friends of the Earth Trust. Jenkins, Tim (May 1997). "Less Traffic, More Jobs" *in* "Green Jobs, towards sustainable work in a low carbon economy." Report commissioned by UNEP as part of the UNEP, ILO, ITUC Green jobs initiative, produced by Worldwacth Institute with technical assistance of the School of International and Labor Relations/Cornell University (to be published in June 2008).

CLIMATE CHANGE MITIGATION IS NOT ALL GOOD NEWS: SOME MEASURES TO MINIMIZE POSSIBLE ADVERSE EFFECTS

The above table (see box 2.5.), as well as other studies on the issue, show that some sectors will suffer from efforts aimed at mitigating climate change. Furthermore, political decisions often lie behind choosing who is going to suffer most. While trade unions need to accept that changes in some sectors are necessary, they need to propose measures that prevent workers from bearing the burden of these transitions. Trade unions' long experience with regards to economic diversification in their respective countries can help find innovative options at the national level.

Sectors linked to fossil fuel energy and other energy-intensive sectors will be profoundly modified by emissions reduction policies. The latter include industries such as steel, iron, aluminium but also energy-intensive services, such as road transport.

As an example, drawing from a study by the European Trade Union Confederation, we can expect losses in the European coal sector and the oil refining industry, and because of the closure of coal plants, important effects on employment are expected in coal mining. The evolution of fossil energy in developing countries is slightly different and depends on available energy sources. Nevertheless, the long term trends –under condition of ambitious climate protection policies- appear to be similar.

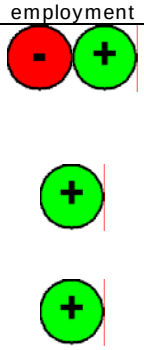
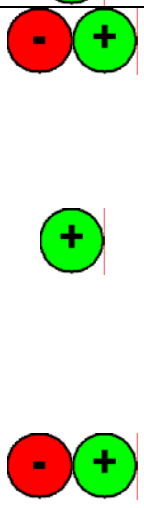
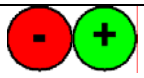
Transition policies should focus on these energy-intensive sectors first and aid the re-skilling of the workforce through training and education schemes. In our example, while there is some scope for workers of coal plants to be retrained in order to respond to vacancies in co-generation or gas plants, other aspects also need to be taken into account, such as the fact that new job opportunities will not necessarily appear in the same geographical area where jobs will be lost. Special attention should also be given to the economic diversification of areas where plants are expected to close, so that the economic basis of the community does not depend on the survival of one workplace.

If governments do not agree at the international level on an amount of CO_2 per tonne of product, no matter what the country, energy-intensive industries may also end up suffering from emission reduction policies. As their current CO_2 restrictions are very low, agreeing on this could reduce the risk for developing countries in housing polluting industries.

The consequences on employment of CO_2 reductions in energy-intensive industries seem clear: these industries have tended to make labour pay the cost for their lack of investment in research and development. In their race to reduce production costs, industries have closed factories and looked for cheaper workforce elsewhere without necessarily investing in a sustainable policy capable of modifying CO_2 patterns in their sector of activity.

In particular, in the transport sector we should see a fall in the predominance of road transport, leading to a number of jobs being lost. Workers in this sector already suffer from bad working conditions (i.e. long working hours, weak wages). However, hope can be found in experiences that demonstrate that workers can be retrained to work in expanding areas of the sector, such as urban and/or long distance rail or urban buses.

Box 2.6. Some effects of mitigation measures on employment

Sector affected by mitigation measures	Employment-related mitigation measures	Impacts on employment	Comments
Energy	• Switch in fossil fuels from coal to gas. • Expand renewable heat and power capacities, such as hydropower, solar, wind, geothermal and agro-energy. • Expand energy audits of industrial and commercial facilities.		• We should expect losses in the coal sector and some new employment opportunities in the gas sector. The closure of coal centrals will probably also have effects on employment in the coal mining sector. • While employment is expected to grow in the renewable energy sector, losses in the fossil fuels/electricity sector are to be expected. Substitutability of jobs is still unclear.
Building	• Promote and invest in efficient lighting and day light • Promote the use of more efficient electrical appliances, and heating and cooling devices. • Improve insulation.		• Buildings renovation is a labour-intensive source of direct employment. However, the quality of the jobs is weak and the building sector will thus have to make an effort on workers' training and qualification.
Transport	• Encourage shifts from road transport to rail and from private to public transport systems. • Further develop agrofuels, above all second generation ones. • Reduce individual transport use.		• Rail should be benefited by the shift in modes of transport, mainly in freight and passengers. Workers in the road transport sector (which should see its importance reduced) could be retrained to work in rail or other public transport options. • While agro-fuels are labour intensive options, labour conditions, as well as overall environmental impacts need to be looked at more carefully. Labour-sound development of second generation agrofuels could bring jobs to poor agricultural communities. • The consequences of this measure will have different impacts depending on how early industry shifts towards cleaner vehicles, being positive on a "first mover wins" dynamic.
Industry	• Implement energy efficiency measures. • Promote material recycling and substitution. • Control non-CO_2 gas emissions. • Develop process-specific technologies.		• Some sectors already suffering from outsourcing could be impacted by climate protection measures. However, R&D and a global move towards cleaner production could avoid these negative impacts.

Source: IPCC, 2007 and regarding employment, Sustainlabour, 2008

MODULE 2 REFERENCES

- IPCC (2007). “Fourth Assessment Report (AR4)” http://www.ipcc.ch/
- ETUC (2005). “Avenues for trade union action” http://www.etuc.org/a/957
- ETUC (2007). “Climate Change and Employment” http://www.etuc.org/a/3673
- Sustainlabour (2007). “Consecuencias del cambio climático” http://www.sustainlabour.org/dmdocuments/ESP76-2006.pdf
- ILO (August 2007). “Green jobs: Climate change in the world of work”. *World of Work*. No. 60 http://www.ilo.org/wow/PrintEditions/lang--en/docName--WCMS_083901/index.htm

NOTES:

MODULE 3:

TRADE UNION ACTION ON CLIMATE CHANGE

World Social Forum 2004, Mumbai
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Module objectives:

The module aims at:

- Raising awareness on the need for a fair transition to a climate-friendly economy and providing tools to achieve it;
- Reviewing possible trade union interventions on climate change;
- Providing information on existing trade union action, from the international to the workplace level, including climate change education for workers

Learning outcomes:

At the end of the session, the trainee will be familiar with:

- The basic rights and mechanisms that will lead to a fair transition;
- Practical ways for trade unions to promote climate change mitigation and adaptation strategies, in a variety of sectors and at different levels;

Introduction to Module 3

The complex problem of climate change is characterized by a wide range of components, which have to be approached from different angles. Trade unions need to analyze as many of its facets as possible and look at the different courses of action they have available.

As we have seen in previous sections of this guide, climate change will have significant impacts on the structure of economies, settlement patterns, livelihoods and employment. These impacts will be driven by three processes[22]:

- **Changes in the climate**, which have already started to cause significant suffering;
- **Adaptation to these changes** in an effort to "limit the suffering"; and
- **Mitigation**, i.e. measures to reduce emissions in order to "avoid the unmanageable".

The combination of these processes is bringing on an enormous transition in our modes of production and consumption. In this guide we will be addressing what the role of trade unions should be during this enormous transition: What can workers and their organizations do? What actions can trade unions take? What can be their specific contributions? What are they already doing?

Proper management of this transition process can be achieved through a combination of different elements. One is the **attitude and policies of governments** and institutions, which need to take into account the social and labour-related dimensions of the transition to a sustainable development path, so that it also brings about a just transition in social and labour-related terms. The **Trade Union movement** will have to come up with new proposals, educate and train its members in climate change, and transform itself into a force that is truly committed to sustainable development. Another element needed is the **extension of labour rights to the whole labour force and their broadening to incorporate their environmental dimension**. Finally, new channels of participation have to appear that incorporate workers and their representatives, trade unions, businesses and institutions, ranging all the way from the workplaces to the international arena.

Trade unions have the obligation, more than any other actor, of fighting for decent jobs, fighting poverty and implementing fair transitions. They are responsible for incorporating justice and equity to the processes of climate change adaptation and mitigation. It is an important role that trade unions need to fulfill on their own or in partnership with other social actors. Either way, this needs to be their main objective.

In the **first unit** we will show how trade unions can bring to the climate change debate the call for solidarity and social dialogue, as well as for the reinforcement

[22] ILO. Peter Poschen, ILO Senior Policy Specialist and focal point on climate change (August 2007). "Green jobs: climate change in the world of work, working time around the world". *World of Work*. No 60.

of social protection systems. Unions could play an important role in fighting climate change if their rights are respected and improved, and if adequate training is provided.

The **second unit** will present some possible union interventions aiming at reducing emissions. Some examples will help understand which kind of concrete actions can be developed in different sectors.

Unit three will expose the issues trade unions have promoted at the international level and see that trade union awareness and participation in the international climate change sphere is rising.

The **fourth unit** will focus on trade union regional action, which is an important driver for influencing international & national policies on environmental issues, including climate change.

In **unit five**, we will see that climate change is a new arena for trade union work at the national level, and remains more intense in developed countries' unions. However, the impacts of climate change will soon also make it an issue for trade unions in developing countries.

Unit six will provide examples of trade union action on climate change in the workplace, which is the proper and authentic framework for union activities.

In the **seventh and last unit**, we will highlight the need for climate change education for workers and their organizations as a means for raising awareness and participation in the fight against climate change. We will also make a special mention to union's impressive training structures and capacities.

Unit 1: BRINGING JUSTICE AND EQUITY TOGETHER: WHICH TOOLS FOR ADVANCING A FAIR TRANSITION?

Key ideas

→ Trade Unions advance the importance of solidarity & social dialogue when dealing with climate change.

→ For justice and fairness to be a reality in these policies, social protection systems must be reinforced, and in some countries, created.

→ Unions can play a major role in fighting climate change if new rights are established to allow them dealing with environmental issues, and with adequate provisions for training the workforce on these issues.

Worker organizations propose some very basic policies to help advance to a more equitable society, and can play a very important role in the changes we are facing. Let's take a look at some of them:

SOCIAL DIALOGUE FOR LABOUR MARKET TRANSITIONS

The world can ill afford to invest the huge amounts of resources required to address the climate crisis, without doing so in ways that also tackle poverty and the global job crisis. Not only would such policies be costly, they would also be socially unsustainable. A much better outcome is possible. Action on climate change, economic and social development, and employment do not have to be competing needs.

These policies and programmes can be most effective if they are designed and implemented with the active participation of those whose lives they affect: employers, workers and farmers, ranging from the national level down to the ground, on farms and factory floors. These people can help create large numbers of green jobs quickly and assist those whose jobs are not compatible with climate protection, by helping to bring about a fair transition to other sustainable sources of work and income.

The main goal of social dialogue is to promote the building of a consensus and the democratic involvement of the main stakeholders in the world of work. Successful social dialogue structures and processes have the potential to resolve important economic and social issues, encourage good governance, advance social and industrial peace and stability, and boost economic progress.

Tripartite consensus that guide the transitions, in both growing and shrinking sectors and occupations, could be the most effective way of tackling the challenge.

So, what could bring social dialogue to confrontations over the climate crisis?

- Advances towards a sustainable development model and productive system;
- Improvements in economic competitiveness, through innovation and technological capacity;
- Improving the economy in a way that creates more and better jobs, and increase social cohesion;
- Raising awareness on climate change and involving the social agents and sectors affected;
- Anticipating possible adverse social effects, in particular those related to competitiveness and employment in order to prevent, avoid or reduce them.

Anticipating possible adverse effects is key for the success of climate change policies. Workers cannot pay the cost of the transitions needed. A broad social dialogue will help take the best options because as explained in Unit 2, changes in employment will benefit certain sectors while undermining others. In some places jobs will be created, in others jobs will be destroyed. National tables where measures can be analysed in a global and a sectoral perspective could be of great help.

There are already some experience of social dialogue related to mitigation measures, as the sectoral tables in Spain (see box 3.7.), but possibilities for better planning adaptation policies, as for National Adaptation Plans, should be carefully studied.

SOLIDARITY: PUTTING THE MOST VULNERABLE FIRST

The impacts of climate change will be felt by the poorest first, due to physical and socio-economic reasons. First of all, the majority of developing countries are in tropical and sub-tropical regions, areas which are predicted to be seriously affected by the impacts of climate change: Africa, Asia, Latin America and the Small Island States have all been identified as regions of concern.

Secondly, developing countries are often less able to cope with adverse climate impacts: poverty exacerbates, and is exacerbated by, the impacts of environmental change. The livelihoods of people living in these countries are highly dependent on climate-sensitive resources, with low adaptive capacity. In addition, the poorest inhabitants already struggle to cope with current extreme weather events and climate variability.

Current international cooperation is clearly insufficient given the size of the problems facing developing countries. As a global problem, climate change requires for the international community to prioritize global solidarity.

Along with this important, international, factor, we must also take into account national and local differences in vulnerability. In every country of the world, those most at risk will be the poorest, the oldest, and the weakest, who are already the least able to adapt to changes in the modes of production.

Unions must call on governments and society to exercise solidarity with the most impacted and workers should exercise solidarity among themselves. International solidarity must be strengthened, and include aid for emergencies and disasters, funds for quick adaptation programs and strong mitigation measures. Any delays in mitigation will bring even greater suffering to the most vulnerable.

Yet, unions also need to look at themselves, and face up to issues of internal solidarity; for example, when their workers are affected by mitigation measures and changes in the production system.

Lastly, climate change, like other environmental issues, bears another important dimension, which is intergenerational solidarity. Human beings living and working currently should behave in solidarity with generations yet unborn.

SOCIAL PROTECTION

Access to an adequate level of social protection is recognized as a basic right of all individuals in the Philadelphia Declaration[23], in subsequent ILO declarations and in a number of International labour standards. It is also widely considered to be instrumental in promoting human welfare and social consensus on a broad scale, and to be conducive to and indispensable for social peace and thus improved economic growth and performance. Yet, in many countries, especially developing ones, reality falls far short of these ideals.

Social protection is the tool modern societies have developed to deal with the vulnerability of some sectors of their population.

Social protection systems must run in parallel to adaptation efforts as they can diminish vulnerability to climate change and, strengthen existing social security systems, especially in developing countries.

In many poor countries, the main issue is the very low coverage in terms of social security systems. Indeed, conventional systems of social security apply to less than 20% of the labour force in most developing countries, and to less than 10% in much of sub-Saharan Africa[24].

As stated in ILO's Decent Work agenda, social protection should adapt to deal with contemporary circumstances, and climate change is without doubt an important one among these.

[23] ILO (1944). "Declaration of Philadelphia on the aims and purposes of the Organization."
[24] ILO (1999). "Report of the Director General on Decent Work."

TRAINING THE WORKFORCE: UNDERSTANDING THE CHANGE AND BUILDING CAPACITIES FOR ADAPTATION

In a rapidly changing environment, ensuring that people who work possess the necessary knowledge and skills is critical if we want to optimize the opportunities while at the same time reducing the undesired consequences.

If climate change is going to transform our world as fast as experts foresee, and potentially adversely affect workers, then they and their representatives have to be prepared. Indeed, they have to understand the nature of these changes and how they will affect production systems, occupations and livelihoods, so that they will be more able to learn skills specific to their current jobs that may help them develop new occupations that are more sustainable and climate friendly.

Unions are important educational entities and they could be very useful in transmitting knowledge and raising awareness among their members.

In order to address this important transition, resources for occupational training need to be made available, and specific funds for building new capacities must be mainstreamed in all mitigation and adaptation policies.

Indeed, one of the main problems to a low carbon economy could be the lack of skilled labour for the new green economy. This shortage has been suffered already for renewable energy industries in Europe (Germany, Spain, etc…). A low carbon economy will need a wide variety of new occupations, diverse in training capacities and occupational profiles. Research and development, engineering and architecture, project planning and management, administration, marketing, as well as blue collar areas are concerned.

NEW RIGHTS FOR WORKERS: IMPROVING THE ENVIRONMENT THROUGH ACTION IN THE WORKPLACE

Workplaces need to be better positioned if they are to allow workers and their organizations to contribute to the fight against climate change. Workplaces can be environmentally-friendly by, for example, increasing the rights of workers to participate in processes that have a bearing on the environment.

Workers' participation in this regard will not only translate into stronger support for mitigation efforts, but also in the better application of adaptation measures, including disaster relief. However, the following preconditions are required to make this possible:

- **Right to participate**: Workers have the right to participate in decision making processes related to environmental concerns in their workplace. They may exercise this right through the joint health and safety committee or workplace safety and health representatives, or through new environmental committees.

The occupational safety delegate elected by workers in industries has been an extraordinary tool for defending workers' health and safety, and contributing to a healthy working environment. These delegates may also work on environmental matters but do not do so in general, as they lack specific entitlement to take action on environmental issues.
If environmental delegates' mandates and powers were extended, or if these delegates were elected in larger enterprises (or in enterprises with greater environmental impact), it would be possible to have more widespread environmentally friendly activities in workplaces.
At present such a right is not envisaged in national legislations, although it is gradually recognized in some large enterprises, as well as in sectoral collective agreements and voluntary regional accords.

- **Right-to-know**: Workers have the right to be aware of environmental hazards present in the workplace. These hazards can be identified and evaluated, and information concerning them must be communicated to employers and employees through labeling, material safety data sheets and employee training. This standard currently applies to chemical manufacturers or importers of chemicals (see **Training Manual on Sound and Sustainable Management of Chemicals, UNEP/Sustainlabour, 2008**), and now needs to be expanded to include climate change-related issues, i.e. the right to know about workplace emissions, technological choices, plans for energy saving, use and efficiency.

- **Whistleblower protection**: A worker may not be held liable or be disciplined for reporting workplace practices that he/she honestly believes may pose an environmental risk.

- **Right to refuse dangerous work**: A worker may not be held liable or be disciplined for refusing to perform work that he/she honestly believes may pose an immediate or serious threat to his/her or other workers' health.

- **Right to refuse work which harms the environment**: A worker may not be held liable or be disciplined for refusing to do work that he/she honestly believes may pose an immediate or serious threat to the environment.

Unit 2: THE ROLE OF TRADE UNIONS IN KEY SECTORS: WHAT CAN WE DO TO REDUCE EMISSIONS?

This section will review some possible union interventions leading to emissions' reduction. Based on principles already presented in unit 1, some examples related to mitigation will help understand what kind of concrete actions can be developed in different sectors. This section aims at providing some examples for key areas. These examples are based on the specificity of trade union work and structures at different levels.

TRADE UNION ACTION ON ENERGY

ENTERPRISE LEVEL

- Demand for recognition for workplace environmental representatives
- Training and participation in enterprise energy management
- Training and participation in enterprise energy saving diagnosis or energy auditing
- Promotion of energy saving measures such as improving lighting, refrigeration, heating and thermal insulation
- Training in the use of new more efficient equipments and systems
- Promotion of the use of renewables inside the enterprise (thermal solar for low and medium temperature heating, photovoltaic for electricity, biomass for electricity and heating, and bioclimatic construction for new buildings)
- Participation in sustainable purchasing policies

SECTORAL LEVEL

- Demand for recognition of environmental delegates at sectoral level
- Demand for sectoral social dialogue tables

NATIONAL LEVEL

- Participation in national energy planning: demand for increased investment in renewables and improved supply management
- Demand for integrated transportation systems
- Participation in demand-side management programmes for the benefit of consumers
- Promotion of green and socially fair fiscal measures

Source: Sustainlabour, 2008

TRADE UNION ACTION ON TRANSPORTATION

ENTERPRISE LEVEL

- Demand for sustainable mobility plans (including e.g. incentives for public transportation, re-planning public transport around the workplace, promotion of car-sharing, transformation of parking space into kindergartens or green areas, more parking space for bicycles)
- Demand for "mobility managers" for medium and large enterprises
- When changing workplaces, demand for sustainable mobility plans in advance
- For companies with a high level of transportation needs, implementation of transportation management programs to avoid empty rides, minimization of use of trucks and maximisation of railway transportation
- Promotion of "clean cars" for enterprise fleets

REGIONAL LEVEL

- Demand for regional sustainable mobility plans
- Demand for regional mobility managers
- In areas with high enterprise density, negotiation of adjustments in work schedules to reduce transport overcrowding
- Participation in regional economic and urban planning to promote mobility and demand for closeness between workplaces and homes

NATIONAL LEVEL

- Campaigns for public transportation
- Call for "re-skilling" of workers in unsustainable transportation branches

Source: Sustainlabour, 2008

TRADE UNION ACTION ON BUILDING / CONSTRUCTION

ENTERPRISE LEVEL

- Implementation of measures mentioned in energy section
- Promotion of bioclimatic architecture for new buildings: passive lighting, heating, cooling systems
- Promotion of use of sustainable materials (recycled, non-pollutants, low energy consumption)

REGIONAL LEVEL

- Union participation in regional planning to demand coherent urban planning
- Promotion of a balanced land use (urban, agriculture, forest, leisure)

NATIONAL LEVEL

- Promotion of sustainable construction regulations
- Promotion of waste management for construction and demolition
- Promotion of training for workers on sustainable building skills

Source: Sustainlabour, 2008

TRADE UNION ACTION ON AGRICULTURE

UNIT LEVEL

- Training on lower emitting production systems for agriculture and cattle raising (reduction of fertilizers and pesticides, more efficient watering systems, better management of ruminants, best practices for rice production, etc.)
- Management of cattle waste for transformation into biogas
- Reduction of fossil fuel consumption (tractors)
- Production of energetic crops for biomass
- Waste management from crops and food industry to produce biomass

REGIONAL / NATIONAL LEVEL

- Promotion of locally produced food
- Promotion of environmentally- and labour-friendly legislation in favour of reductions in the use of fertilizers and pesticides

Source: Sustainlabour, 2008

Unit 3: FROM UNIONS TO THE WORLD: TRADE UNION PARTICIPATION IN INTERNATIONAL DEBATES

Key ideas

→ Trade Unions have participated in Climate Change negotiations from their inception.

→ They highlighted the need to involve workers in climate change decision making, to establish fair transitions and to protect the most vulnerable from necessary changes to be undertaken in the world of work.

→ Trade Union awareness and participation in climate change international debates have risen, as well as trade union capacity to get involved in the debate. However, the number of developing countries unionists participating in the process is still very low.

Workers and trade unions all over the world are becoming increasingly conscious of the fact that current patterns of production and consumption are not sustainable, that resources are limited and that current energy models are harmful to the environment. Trade unions at the sectoral, regional and international level are now involved in sustainable development debates and are acting to develop solutions, especially in the workplace.

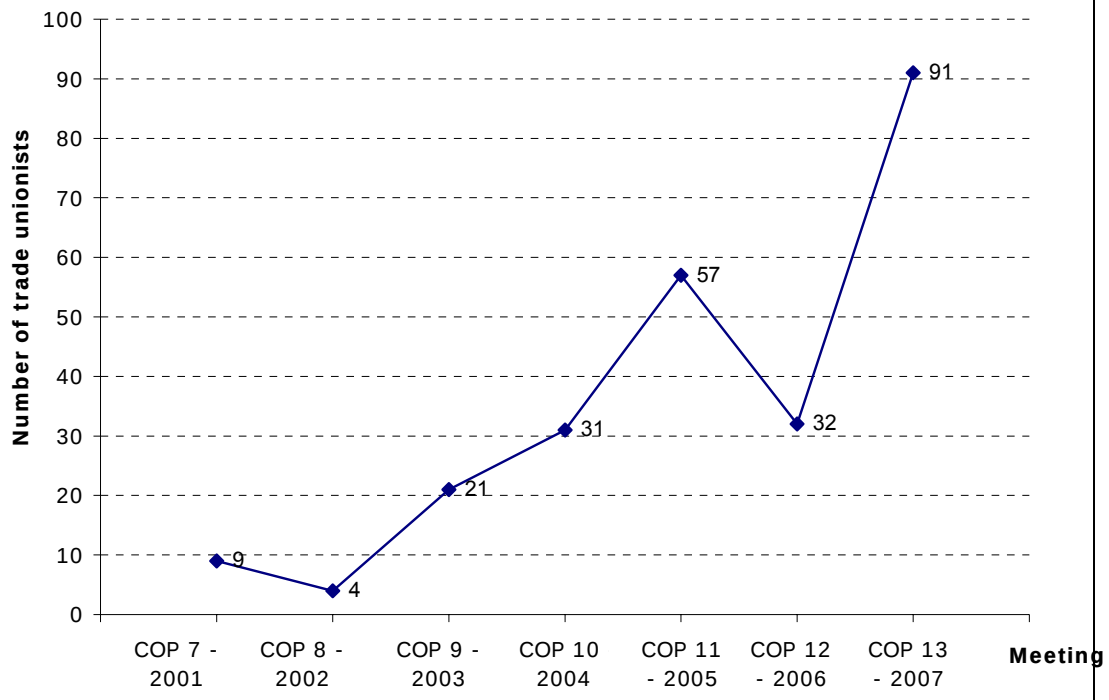
The International Trade Union Confederation (ITUC) and the Trade Union Advisory Committee to the OECD (TUAC) participated, from its inception, in the negotiations dealing with the implementation of the Kyoto Protocol. They highlighted the need to obtain workers' support in order to reach a global consensus on prevention of climate change. Any fundamental modification to the energetic model, with the aim of rendering it more sustainable, implies important changes for employment, qualifications, and lifestyles, and also for companies. Additionally, if nothing is done to fight global warming, employment in developing countries will be hard hit. These two examples illustrate reasons why trade unions should increase pressure in global negotiation processes and ensure these tackle the impacts of global warming on society and employment, as well as those derived from emissions reduction measures.

As a result of their efforts, the International Trade Union Confederation (ITUC) and the Trade Union Advisory Committee to the OECD (TUAC) won support from countries to include among the future activities of the Convention, the evaluation of social impacts of climate change adaptation.

Other demands have also been raised, in particular with regard to "just transition strategies" that could, in the framework of climate change action, support workers who face difficulties in their sector to adapt to new situations by acquiring new qualifications, receiving new training, or with other social protection mechanisms where workers cannot be re-integrated in the labour-force. Just transition strategies and plans also need to include in-depth analysis of territories that may be affected by the closure of workplaces, and promote initiatives that tend to ensure economic diversification of these zones.

From the trade unions' side, the fight against climate change has to be accompanied by good quality and well paid new jobs, which can help reduce poverty and raise the quality of life of the world's growing population. This will also help to ensure further access of poor people to energy services. In this regard, ILO's programme on Decent Work is a tool for trade unions to help eradicate poverty and accomplish the UN Millennium Development goals.

Box 3.1. Trade Union participation in UNFCCC process (2001-2007)



Source: International Trade Union Confederation (ITUC), 2007

Trade Union participation in the UN Framework Convention on Climate Change (UNFCCC) has risen gradually to such an extent that their presence is now significant. Trade Unions have been recognized as formal constituents of the Convention and can provide their input in the discussions. Trade Unions participating in the Conferences, under the umbrella of the ITUC, come mainly from developed countries, as the biggest part of industrial restructuring needs stated in the Kyoto Protocol directly concern them. However, the issue is also progressing in the Trade Unions of developing countries, which will have to face important adaptation issues, but also have the possibility of challenging the rest of the world with innovative and sustainable development pathways.

COP12 was key to confirming a trade union view on this issue and bringing an important number of developing countries unionists into the discussion, through intensive learning activities that took place during the meeting. Trade Union demands were heard, which was the opportunity to clarify the way for next steps in the process.

Following this, in 2006, the Secretariat of the UN Framework Convention on Climate Change (UNFCCC) recognized trade unions as a formal "constituency" in the process, along with business, NGOs, and research organizations. In two preparatory meetings held in Bonn and Vienna, trade unions exercised their new privileges to voice their concerns to governments preparing for Bali.

Trade Union involvement in COP13 in Bali was the most important since the beginning of trade union's work on climate change, both in terms of:

- The **number of participants**: 91 trade unionists from 23 countries participated; and
- The **clarity of the message and the understanding** among trade unionists about the issues at stake.

The size and quality of the delegation has multiplied its ability to strengthen contacts with government officials, NGOs and the UNFCCC secretariat. Nevertheless, while the visibility and number of trade union allies have grown, some short-comings still need to be addressed:

- There should be greater participation of trade unionists from developing countries, as well as a better integration of developing countries' analysis in relation to climate change (especially on adaptation and linkages with issues such as migration, desertification, and draught). A regional approach to issues could be considered for future climate change discussions in the group.
- It would be very useful for trade unions to develop a position on post Kyoto commitments.

On this last point, important agreements have already been reached, in particular regarding the need to support ambitious global emissions reductions, in proportion to the responsibilities and capabilities of each country.

The Trade Union position with regard to the climate change debate has clearly progressed with time and national and international trade union bodies have increased their involvement in this critical issue. This commitment has made it possible for trade unions to voice a core set of relevant policy demands (see unit 1 for a description of the main points of trade union focus in current negotiations). However, the difficulty to reach a common position or, once one has been reached, to advance common views for its implementation should not be brushed aside.

Moreover, the international trade union movement is a heterogeneous one. Trade Unions across the world represent workers from different economic sectors, with different educational backgrounds and from countries with diverse social, economic and political contexts. They are also old institutions with a variety of historical and cultural backgrounds. These characteristics contribute to the complexity of trade union negotiations, particularly in the case of issues of a global nature such as climate change.

However, this heterogeneity is also a source of strength. While agreements have been difficult to reach - and many others are still under discussion (on countries' emission reduction commitments; on North-South responsibilities, among others) - worker solidarity prevails. This is an essential and unique message brought by trade unions in the international arena: ambitious agreements are possible if discussions are based on principles of equity and solidarity.

Box 3.2. Strengthening Trade union participation in international environmental processes: a joint UNEP – Sustainlabour Project

UNEP and the International Labour Foundation for Sustainable Development (Sustainlabour), in partnership with the International Trade Union Confederation (ITUC), and its affiliates, the International Labour Organization (ILO), and the World Health Organization (WHO), have started, in May 2007, the implementation of a two-year project on "Strengthening trade union participation in international environmental processes" with the financial support of the Government of Spain.
This program deals with other environmental concerns, such as chemicals management and other sustainable development issues, but particular attention will be paid to climate change. In this particular area, the project focuses on:

1. Increasing participation of workers and trade unions in international environmental consultations through:
   - capacity building, in particular on climate change mitigation and adaptation, and the need for alternative methods of production and just transition;
   - sponsoring the participation of trade unionists at the Conference of the Parties of the United Framework Convention on Climate Change and related meetings.

2. Strengthening the capacities of workers and trade unions to replicate/adapt case studies on climate change in their workplaces and their communities; and

3. Building the awareness of climate change issues among workers and trade unions.

Target regions of the program are Africa, Asia and Latin America. As can be appreciated from the objectives stated above, this is a very complete program that aims to enable participation from many different angles. Trade unions from developing countries will receive training to build their capacity, be provided with spaces to build regional approaches and positions, and will also be given specific funds for sponsoring their participation in climate change meetings, and will obtain specific assistance to initiate actions in climate change. The program will also fund a person in UNEP to coordinate trade union activities, which is an innovative figure in a United Nations organization.

The estimated time of the program is two years, from June 2007 on and it is funded with approximately 1 million euros.

The guide you have in your hands is one of the results of this program.

Source: Anabella Rosemberg, Laura Martin, Sustainlabour, 2008

Unit 4: FROM UNIONS TO THE REGIONS: SUSTAINABLE DEVELOPMENT WITH A REGIONAL PERSPECTIVE

Key ideas

→ Trade Union regional action is an important driver for influencing international and national policies on environmental issues, including climate change.

→ However, certain conditions (union strength, availability of dialogue spaces, and importance of the environmental agenda) makes each region different.

→ At the European level, trade unions succeed on advancing labour agenda on climate change. In Latin America, the political context make us think of interesting advances on issues related to labour and environment. The ITUC regional organization for Asia Pacific approved a resolution on climate change, sustainable development and green jobs, in its founding congress held in September of 2007.

Several components of the regional front should not be ignored, as it is at the regional or sub-regional levels that modern approaches to the integration of markets and policies are worked out. Decision-making at this level, therefore, affects workers and the environment. We are referring not only to the European Union, configured like a regional multi-state proto-State, but also to processes such as the Latin American Common Market of the South (Mercosur) or the New Partnership for Africa's Development (NEPAD). Opportunities for trade union participation in regional environmental agendas vary greatly. While in Europe active participation is guaranteed through the European Trade Union Confederation (ETUC) and thanks to a favourable conjunction of factors (a strong trade union movement, advanced European environmental policies, available areas of participation), in other regional processes this is still an unresolved issue. Having said this, we can find the favourable conditions for progress in the Mercosur in matters related to labour and environment.

BRINGING EMPLOYMENT ISSUES TO THE FOREFRONT OF GOVERNMENTAL REGIONAL POLICIES

Box 3.3. The European Trade Union Confederation (ETUC): Assessing the synergies between climate change and employment.

A study was carried out for the European Commission by the European Trade Union Confederation (ETUC), the Social Development Agency, Syndex (France), Wuppertal Institute (Germany) and Istas (Spain). This study revealed that climate change and its mitigation policies represent a serious and unprecedented challenge for employment in Europe.

The report first examined the potential consequences for employment of global warming in Europe. The second part of the report considered the effect on employment of the transition towards a lower CO_2 European economy by 2030 in four key economic sectors: energy production, transport, the steel and cement industries, and construction/housing. In addition, extensive case studies were carried out for eleven EU Member states. The research's point of departure is the ambitious target of 40% reduction in CO_2 emissions by the year 2030 compared with a 1990 baseline.

The study's main findings can be summarized as follows:

1. Even moderate climate change (of the order of 2°C warming) will affect economic activity, employment and working conditions in Europe.
2. In the European Union, compared to a business-as-usual scenario, policies and measures to reduce EU CO_2 emissions by 40% by 2030 will probably not have a negative net impact on employment, but instead have a slightly positive one.
3. The net impact on economic activity and employment strongly depends on the level of ambition and effectiveness of appropriate economic and social policies put in place.
4. Mitigation policies will substantially change the supply and demand of jobs and qualifications within and between sectors.
5. The sector-specific impact on employment must be assessed in terms of "opportunities" and "risks" rather than of "winning" and "loosing" sectors. In each sector, jobs will be created in companies that can take advantage of opportunities created by climate policies and jobs will be lost in companies that cannot adapt.
6. Sectoral study findings can be summarized as follow:
    - Employment in the energy production sector is sensitive to energy-saving policies. For the whole economy, however, the net effect of energy savings on employment would be positive.
    - Climate policies could significantly accelerate jobs relocation in the already largely internationalized energy-intensive industries, like steel, unless a specific and coherent strategy is put in place for those industries avoiding carbon leakage and taking advantage of emission reduction potentials.
    - Transport offers huge potential for job creation in rail and public transport. On the other hand, employment in freight and passenger transport by road, and the whole automobile sector, might decline compared with the business-as-usual scenario, while remaining stable at today's levels.
    - The building/construction sector represents a very important source of employment through its obvious linkages to the energy efficiency of buildings, but professionals will have to meet the challenges of innovation and training in the new "sustainable building" sector.

Based on these findings, the study recommends that robust action on climate change in the EU should be based upon four crucial elements:

- The immediate implementation of the policy options most effective in delivering the double dividend of effectively fighting against climate change while simultaneously creating quality jobs;
- "Employment transition programmes" that have adequate funding and are negotiated with social partners in order to anticipate, control and manage the social changes resulting from adaptation and mitigation policies;
- A European social dialogue open to all stakeholders and the adaptation of collective bargaining instruments to the stakes of climate change;
- The setting up of a European observatory that deals with the economic and social upheavals linked to climate change.

Source: ETUC (2007). "Climate Change and Employment."

Box 3.4. The International Trade Union Confederation Regional Organization for the Americas (TUCA, former ORIT): pushing for a regional energetic model that is socially and environmentally balanced

Both multinational and state-owned enterprises are provoking irreversible damage to the environment and communities.

Coinciding with the First South American Energy Summit, the Trade Union Condederation of the Americas (TUCA, former ORIT), trade unions[25] and other social movements adopted a declaration that laid out the South American energy model they were prepared to defend. At the centre of the environmental concerns guiding this model are climate change and energy sovereignty.

They agreed that energy Integration processes should be developed building on the recuperation of sovereignty of regional energetic resources. They have to be based on the strengthening public energy companies, nationalisation of strategic resources and use of the revenue for sustainable development, income redistribution and construction of new models for renewable sources.

This implies that the current model has to shift from its dependency on fossil fuels that impact strongly on local populations.

- Energy sources should be renewable, clean and have low impacts. Equitable and democratic access to these sources must also be guaranteed.
- Energy projects should be viable in terms of their environmental costs, and not only economic ones.
- The social, environmental and socio-economic impacts of energy mega-projects must be examined more closely, especially when there are other alternatives, such as decentralized investments for the generation of renewable energy.
- Finally, ORIT and other organizations expressed their concern at the lack of impact assessments of energy production and consumption structures on the environment, biodiversity and ecosystems.

Source: Sustainlabour/ORIT, 2007

[25] such as Foro Latinoamericano y Caribeño de Trabajadores de la Energía, Internacional Federation of Chemical, Energy, Mine and General Workers (ICEM), Federação Única dos Petroleiros (CUT Brasil), Central de Trabajadores Argentinos (CTA Argentina)

Unit 5: FROM UNIONS TO GOVERNMENTS AND CIVIL SOCIETY: WORKING AT THE NATIONAL LEVEL

Key ideas

→ Climate change is a new arena for trade union work at the national level.

→ Because until now emission reduction policies have only taken place in developed countries, most of the examples of union action in this issue come from unions from the North.

→ However, the impacts of climate change will soon also make it an issue for trade unions in developing countries.

→ Union action at the national level includes proposing measures for rethinking national energy policy, building alliances with other social movements around climate change activities, setting social dialogue at the national and sectoral level, among others.

As we have seen in the previous section, Trade Unions can play important roles at different levels. Through their international structures, for example, they can follow, lobby and influence international negotiations. By agreeing international commitments among themselves, trade unions can play an increasing role in international debates. However, this is not the area where unions are currently most powerful or have the key to decision making processes. Unions have two other more important arenas for action: the workplace and, in an important number of countries, national policies.

This section will present different examples of national actions on climate change taken by trade unions. We will see that while trade unions try to cover different types of areas and actions, this is a new arena for their work and there are many more possibilities for specific intervention. Trade unions are starting to compile a range of novel and pioneer experiences.

Because until now emissions reductions have been a matter for developed countries to deal with, the examples cited are from trade unions from the North. However, the impacts of climate change will soon also make it an issue for trade unions in developing countries.

As it was discussed in the previous unit when talking about trade union interventions at the regional level, the conditions for labour action vary considerably from one country to the next: depending on social, economic, political and cultural reasons, depending on the strength of the trade union movement and, especially in the case of large segments of the population in a number of developing countries, depending on the levels of social protection, the vulnerability of basic rights (social and labour) and the everyday need to ensure minimum levels of subsistence.

This manual also expressed the idea that countries (and certain sectors within countries) have different levels of responsibilities with regards to climate change, transposed into the Kyoto Protocol on reduction targets or emissions' restrictions in industrialized countries. Although it is still being negotiated, the agreement which will succeed the Kyoto Protocol will, in all probability, maintain the principle of "common but differentiated responsibilities", so that the countries' commitments will continue to remain differentiated.

Having said this, we can observe that a series of trade union initiatives have emerged in countries that had to implement measures for emissions' reductions or limitations. These actions were aimed at contributing to the achievement of the various targets and, most importantly, at trying to minimize the negative impacts and take advantage of the opportunities that were on offer.

Although developing countries have not been faced with the arduous task of reducing their emissions, they have already begun to suffer from the consequences of climate change and are now having to urgently address the issue through the implementation of adaptation processes. Therefore, these countries will face new scenarios that involve a restructuring of the production system with direct consequences for the world of work. New opportunities for trade union action will hopefully emerge whose focus will be to curtail the negative impacts on employment that adaptation policies may bring about; however, in the context of a globalized economy, it is to be expected that trade unions will also get involved in debates regarding energy efficiency and carbon emissions.

This entire process can be interpreted as an opportunity to innovate and to explore alternative, environmentally, socially and economically sustainable forms of production. Through this perspective, active worker and trade union involvement, in association with other sectors of society, is essential.

While, as it has been said in the preceding paragraphs, we are aware that conditions and needs vary widely from one country to the next – making it difficult to transpose or replicate local experiences –, in the following pages are a few interesting examples of trade union actions in the areas of mitigation, energy efficiency and social dialogue. They are experiences that demonstrate the tremendous potential that exists for collective action in order to address these extremely complex issues.

CLIMATE CHANGE IS ABOUT RETHINKING ENERGY POLICIES, AND TRADE UNIONS ARE MAKING PROPOSALS

Looking ahead, the main challenges faced by trade unions lie in their capacity to formulate proposals, take initiatives and get involved proactively in designing the changes. In the last year there have been interesting proposals coming from unions that want to obtain the reductions in emissions needed to mitigate climate change while simultaneously using the opportunity to propose fairer energy policies that could create more and better jobs.

Most interesting is that the following experiences have been developed in alliances with other social partners, particularly environmental organizations. This is probably not a coincidence: Unions and environmental organization are contributing to a real participative democracy in different ways. While Unions contribute with their long fighting experience in favour of democracy and social justice, environmental organizations contribute with a new vision of the relationship between society, nature and social change.

Box 3.5. FNV Bondgenoten, the Netherlands: Green4sure, a green energy plan shared by Dutch unions and environmental NGOs

The Green4sure project is an initiative of the Dutch trade unions ABVAKABO FNV and FNV Vakcentrale, the Greenpeace Foundation, the Netherlands Society for Nature and Environment (Stichting Natuur en Milieu), Friends of the Earth-Netherlands (Vereniging Milieudefensie) and the Worldwide Fund for Nature (WWF).

These six environmental and trade unions organizations have set themselves the joint aim of developing a comprehensive energy plan based on IPCC models. They share a simple yet far-reaching objective: "To halve the Netherlands' greenhouse gas emissions by the year 2030, relative to 1990". The main focus of the study was the policy instruments the Dutch government should use to secure that objective. The policies in question had to promote development and implementation of new technologies and greater use of climate-neutral energy sources and induce behavioural change, with the net result that private citizens and industry will in the future duly account for the climate impact of their activities.

The plan takes into account that by implementing these policies, the government will be requiring citizens and industry to make substantial efforts. Those efforts need not be the same for each sector and each individual, though. In allocating efforts to the respective sectors, the plan has striven for a minimisation of costs (direct, as well as implementation costs), while at the same time remaining aware of the need for the support of consumers and industry as well as their capacity for action.
The terms of reference for the Green4sure project also included a number of explicit constraints, briefly summarized as follows and explained below:

- a European perspective;
- a rapid change in Europe's energy systems;
- limited opportunity for carbon cuts outside Europe (CDM);
- no new nuclear power plants in the Netherlands;
- no new coal-fired power stations without CO_2 sequestration;
- no unavoidable income effects;
- no net loss of jobs;
- enforcement of the "polluter pays" principle.

Green4sure opted for government policies designed to change the behaviour of trade and industry and individual citizens. These policies impinge on decision making behaviour of all kinds and make due allowance for the resistance to change that will inevitably arise.

The core policy of the plan is allocating carbon budgets to all energy users, similar to the EU Emissions Trading Scheme now in force for industry. This quota system would be supported by efficiency standards for domestic appliances, vehicles and buildings; targets and, later, standards for the use of renewable sources by energy suppliers; and facilitation of sustainable choices.

The energy plan proposes a multitude of new financial and fiscal incentives, including road pricing and suitable compensation for low-income groups and others, but also new

investments in utilities and changes to today's legislation. So that change can start apace, Green4sure propose an interim set of policies to support measures taken to protect the climate, until such time as the new regime of budgets and efficiency standards has reached maturity. These include so-called Green Funds and research grants to promote innovation, a variety of charges, environmental permits, an interim Electricity Act, tax incentives and differentiation of property transfer tax.

Another key choice concerns differentiation between sectors. Green4sure realize that any major changes to energy systems may have a far greater impact on energy-intensive and internationally operating industries than on energy-extensive businesses whose competitiveness is governed far less by energy costs.

For this reason they propose three different carbon budgets: one for industry, electrical power generation and greenhouse horticulture, a second for the transport sector, and a third for the built environment (households, offices and small businesses). This differentiation aims to ensure that each sector contributes to the cuts according to its capacity and provides scope for specific flanking policies.

The choices made in the proposed policy package make it possible for this to be a domestically led strategy; measures that can be taken at the national level can be implemented immediately. For a number of sectors and instruments, though, a European approach will be essential. Such will be the case for the carbon budgets for industry, greenhouse horticulture and transport, for example, as well as for the proposed standards for appliances, lighting and vehicles and the requirements made of electricity suppliers.

Quoting the authors: "The impact of Green4sure will be felt in a variety of ways. In the first place it will have a major impact on carbon emissions. The ambitious target of a 50% cut in emissions by 2030 proves entirely feasible. Another key impact will be the improved security of supply achieved by less fossil fuels having to be imported from politically sensitive regions. Of course we have assessed the costs and benefits of the plan and how these would pan out for individual sectors and citizens. The costs of Green4sure are certainly higher than in scenarios involving no additional climate policy, but these are offset by a variety of benefits. With time there will be modest growth in employment and there will also be added benefits in terms of new market opportunities and improved local quality of life (less air pollution by particulates and NO_x)".

Source: Green4sure/Sustainlabour, 2007

Box 3.6. AFL-CIO, Steelworkers, UNITE HERE, Apollo Alliance, USA: Labour Leaders and Environmental Leaders Unite to Take the Apollo Challenge

The mission of the Apollo Alliance is to build a broad-based constituency in support of a sustainable and clean energy economy that could generate millions of quality jobs for the United States, reduce dependence on foreign oil, and create cleaner and healthier communities.

Since its launch, 23 individual unions including the United Mineworkers of America, the United Autoworkers of America, the International Brotherhood of Electrical Workers, and the United Steelworkers of America, have provided specific endorsements of Apollo's agenda, as have the AFL-CIO Industrial Union Council, and the Building and Construction Trades Heavy and Highway Alliance. At the regional level, the Apollo project has been endorsed by 25 state and municipal Labour Councils.

In addition, leading environmental advocacy organizations including the Sierra Club, the League of Conservation Voters, the Union of Concerned Scientists, Greenpeace and the National Wildlife Federation, among others, have supported the Apollo Alliance, along with major civil rights organizations, urban, farm, faith-based and business groups.

The partners that make up the Apollo Alliance have significantly moved the public debate on energy, jobs, and the environment. The Alliance has been recognized as a leading effort to frame a strategic initiative bridging values, issues, and constituencies that conventional politics traditionally divides. Apollo coalitions have formed in dozens of states and cities around the country. Apollo partners have moved significant legislation and administrative policy in state houses and city halls, each providing proof that new energy for America is possible.

The new Apollo Initiative proposes a ten point plan:

1. Promote Advanced Technology and Hybrid Cars: Begin today to provide incentives for converting domestic assembly lines to manufacture highly efficient cars, transitioning the fleet to United States made advanced technology vehicles, increasing consumer choice and strengthening the US auto industry.
2. Invest In More Efficient Factories: Make innovative use of the tax code and economic development systems to promote more efficient and profitable manufacturing while saving energy through environmental retrofits, improved boiler operations, and industrial cogeneration of electricity, retaining jobs by investing in plants and workers' training.
3. Encourage High Performance Building: Increase investment in construction of "green buildings" and energy efficient homes and offices through innovative financing and incentives, improved building operations, and updated codes and standards, helping working families, businesses, and government realize substantial cost savings.
4. Increase Use of Energy Efficient Appliances**:** Drive a new generation of highly efficient manufactured goods into widespread use, without driving jobs overseas, by linking higher energy standards to consumer and manufacturing incentives that increase demand for new durable goods and increase investment in US factories.
5. Modernize Electrical Infrastructure: Deploy the best available technology like scrubbers to existing plants, protecting jobs and the environment; research new technology to capture and sequester carbon and improve transmission for distributed renewable generation.
6. Expand Renewable Energy Development: Diversify energy sources by promoting existing technologies in solar, biomass and wind while setting ambitious but achievable goals for increasing renewable generation, and promoting state and local policy innovations that link clean energy and jobs.
7. Improve Transportation Options: Increase mobility, job access, and transportation choice by investing in effective multimodal networks including bicycle, local bus and rail transit, regional high-speed rail and magnetic levitation rail projects.
8. Reinvest In Smart Urban Growth: Revitalize urban centres to promote strong cities and good jobs, by rebuilding and upgrading local infrastructure including road maintenance, bridge repair, and water and waste water systems, and by expanding redevelopment of idled urban "brownfield" lands, and by improving metropolitan planning and governance.
9. Plan For A Hydrogen Future: Invest in long term research & development of hydrogen fuel cell technology, and deploy the infrastructure to support hydrogen powered cars and distributed electricity generation using stationary fuel cells, to create jobs in the industries of the future.
10. Preserve Regulatory Protections: Encourage balanced growth and investment through regulation that ensures energy diversity and system reliability, that protects workers and the environment, that rewards consumers, and that establishes a fair framework for emerging technologies.

Source: Apollo Alliance, 2007

CLIMATE CHANGE AT THE TABLE: UNIONS PROMOTE SECTORAL SOCIAL DIALOGUE

Successful social dialogue structures and processes have the potential to resolve important economic and social issues, encourage good governance, advance social and industrial peace and stability, and boost economic progress. Climate change will need industries and energy production to undergo restructuring, and the dialogue table could be the best space to propose measures that fight climate change while anticipating the negative effects this might have.

Box 3.7. Comisiones Obreras, Unión General de Trabajadores, CCOO-UGT, Spain: Sectoral dialogue tables for advancing Kyoto.

Spain is very far behind with its Kyoto commitments and, in order to tackle its emission reduction objectives, a tripartite agreement was signed with the following objectives:

- Strict fulfillment of Spanish Kyoto commitments while preserving competitiveness, employment and social cohesion;
- Advancement towards a sustainable development model and productive system;
- Enhancement of the competitiveness of the Spanish economy through innovation and technological capacity;
- Improvement of Spanish economy through the creation of more and better jobs and increased social cohesion;
- Raised awareness of the importance and need for the Kyoto agreement; and
- Involvement of social agents and sectors affected.

The dialogue tables seek to anticipate the following:

- Possible adverse social effects, in particular those related to competitiveness and employment in order to prevent, avoid and/or reduce them;
- The most cost-effective options needed to meet the demands of the Kyoto Protocol, in terms of competitiveness, employment and social cohesion; and
- Opportunities for the development of the Spanish economy and in affected sectors.

In the first phase seven sectoral tables were established, corresponding to the sectors affected by the European Directive on Emissions and by the National Allocation Plan: the power sector, oil refining, iron and steel manufacturing, glass, ceramics, cement production and pulp and paper industry.

Prior to the sectoral tables, a national roundtable had agreed on their functioning and scope. Discussions during 2006 focused on evaluating the 2005 national allocation plan and forecasts for 2006, as well as problems in concrete installations, the allocations for the second allocation period (2008-2012) as well as indicators correlating employment and emissions.

In a second phase, a new important roundtable has been established on diffuse sectors: transportation and construction.

Currently, social dialogue roundtables are carrying out the following functions.

- Evaluation of yearly fulfillment of emission targets;
- Development of criteria to allocate emissions for each installation, once the sectoral allocations have been approved by the European Commission;
- Development of specific indicators for each sector and sub-sector: production, energy intensity, emissions, employment, export-import, investments, research and development;
- Monitoring of the implementation in each sector of the policies and measures from Spanish Strategy on Energy Efficiency; and
- Decision on allocation of grants and aids related to this Strategy (more than 400 million euros per year).

Source: Sustainlabour (2007). "Climate change effects on employment. Managing change through social dialogue. Case study on Spanish sectoral dialogue tables for advancing Kyoto."

Box 3.8. Deutscher Gewerkschaftsbund (DBG), Industriegewerkschaft Bauen-Agrar- Umwelt (IG BAU): Germany's Alliance for Work and Environment

German unions are collaborating within a broad coalition of government, industry and environmental NGOs to renovate buildings for climate protection goals, whilst creating sustainable jobs and improving social conditions.

The *Alliance for Work and Environment* aims to renovate 300,000 apartments, create 200,000 jobs, reduce 2 million tonnes of CO_2 per year and lower heating bills for tenants, landlords, and the State by about US$4 billion, through reduction of unemployment costs and increased income taxes etc. These effects could also be derived from a study of a joint project, *The renovation of a building – A chance for climate protection and the labour market* conducted by Greenpeace Germany and the German Trade Union IG BAU.

The immediate objective is to improve insulation of buildings, advanced heating technologies, and use of renewable energy, such as photovoltaic or solar thermal systems. Thousands of new jobs are anticipated in the construction, heating, sanitary and air-conditioning sectors, as well as in building services. Financing for the programme is provided by the German government, which will spend less than US$1.8 billion in the next 5 years. As well, a total of US$8 billion will be available through credits at favourable rates of interest.

Source: Trade Union Statement to COP13, International Trade Union Confederation, 2007

Unit 6: FROM UNIONS TO ENTERPRISES: REDUCING EMISSIONS IN THE WORKPLACE

Key ideas

→ The workplace is the proper and authentic framework for trade union action. The fight against climate change should not be an exception to this.

→ If labour rights are respected, possibilities for unions to improve the environment through collective agreements or joint action with employers are real.

→ Examples of trade union action on climate change in the workplace include: sustainable purchasing and management of raw materials, energy saving and efficiency policies, workers' mobility plans, among others.

The workplace is the area where labour relations take effect. It is the proper and authentic framework for trade union action. It is also where health risks occur and activities that might impact the neighbouring environment are carried out. Controlling the climate change impacts of businesses' activities is not contrary to workers' interests. If a business acts irresponsibly in environmental matters, workers may lose their jobs as well as their right to live and work in a healthy environment.

The biggest challenge for the trade unions lies at the enterprise level. To influence the way their company or organization affects their workplaces, lives, surrounding communities and environment, freedom of association and the right to bargain collectively are fundamental. When these preconditions are met, trade unions and employers can improve working conditions and the environment. They can develop purchasing and recycling policies aimed at environmental protection, favouring low-energy lighting, low fuel-consuming vehicles, biodegradable cleaning materials, wood from environmentally well-managed forests, recycled paper, the elimination of excessive packaging, and so on[26] .

Since workplaces consume energy and other resources and generate wastes, it is crucial that clear workplace targets for energy efficiency and waste minimization be linked to sectoral and national carbon reduction and waste reduction strategies. Since three-quarters of all greenhouse gases come from manufacturing, energy production or supply, transport and construction, workplace actions could be key to promote change in these sectors. Sustainable mobility, such as home-workplaces (in itinere) or "in mission" mobility plans provide good examples for cooperative and successful worker-employer initiatives.

[26] ILO. Peter Poschen (August 2007). "Green jobs: Climate change in the world of work". *World of Work*. No. 60

In the last decade, all the development partners have also acknowledged that workers and trade unions have a key role to play in efforts to make companies, jobs and working conditions more environmentally and economically sustainable. Their knowledge and collective bargaining power are essential if the needed changes are to be made in time. Thus governments, businesses, civil society at large and labour are natural allies in the search for more sustainable development options.

With over 200 years of experience in protecting workers' rights, trade unions can make the environment a focus of collective bargaining, advocate more sensitive methods of using natural resources, and promote benefit-sharing and access to information, and social and environmental justice. Environmentalists, in cooperation with workers, have a critical role to play in increasing awareness of environmental challenges and helping build workers' capacity to implement relevant provisions of environmental conventions, legislation and policies[27].

WORKERS IN ENERGY SAVING AND EFFICIENCY

Unions are pushing for energy efficiency in many workplaces around the world through, for example, the inclusion of specific provisions in collective agreements, participation in energy efficiency assessments, drafting of energy efficiency programs and the monitoring and evaluation of agreed measures.

Box 3.9. Trade Union Congress (TUC), UK: Greening the workplace

The Greenworkplace projects are the way trade unions actively engage in the challenge of climate change by promoting sustainable practices and policies at work. Following a number of pilot projects, summarized in "Greening the workplace", in summer 2006 the TUC launched its GreenWorkplaces Project aimed at building trade union and workers' capacity to tackle energy and climate change issues at work.

The TUC's GreenWorkplaces project has demonstrated the effectiveness of trade union engagement in joint energy savings projects with employers. Projects have documented substantial progress at Corus' steel park, Birmingham, at four major offices of Friends' Provident, at Scottish Power HQ in Edinburgh, the British Museum, the DEFRA Government office in York, and at the TUC's HQ and regional offices.

The GreenWorkplaces project is jointly funded with a grant from the Carbon Trust (CT) and match funding contributions from trade union affiliates, including the TUC's UnionLearn environmental education programmes. The Project is overseen by an inter-union steering group reporting to the Trade Union Sustainable Development Advisory Committee (TUSDAC). TUSDAC was set up in 1998 as the main forum for consultation between Government and Trade Unions on sustainable development and environmental issues.

Projects have demonstrated:

- Enthusiasm to set up joint green workplace projects, on the part of both employees and management;
- Real reductions in energy use via behaviour change;
- Evidence from employee surveys that staff are well aware of the key areas where major carbon savings are possible, with heating and lighting most frequently identified as areas for improvement; and
- Importance of employee engagement in securing real changes at work.

Key stages in project development include:

- Identification of candidate projects through union network contacts and other

[27] UNEP, Labour and the Environment, A Natural Synergy, 2007

union sources, e.g. direct approaches by union reps; informal contacts at TUC events.
- Initial scoping exercises to assess the extent of support and potential for energy savings involve union reps, members and management.
- Draft proposals submitted to Project Steering Group for approval.
- Detailed joint work towards energy saving plans.
- Joint energy audit (or follow up audit), using expert advice from the UK's Carbon Trust (an independent energy savings agency).
- Sustained employee and employer engagement through workshops, seminars and open days to enable sharing ideas about improvements.
- Tailored training courses for union reps / opinion formers.
- Survey and assessment changing attitudes and behaviours.

Source: GreenWorkplaces, TUC, 2007

MOBILITY PLANS: HOW TO REDUCE EMISSIONS AND IMPROVE WORKERS' LIVELIHOODS

Problems associated with commuting to and from the workplace are due to the urban planning model and management in place, or absent. Relations between life and work are marked by this variable. Where industries and business are, where employment is to be found, where workers live, are key aspects that need to be addressed with a view to sustainable development. Access to work is crucial for social inclusion, plays a role in environmental protection, and affects economic development. In the last decades, development has followed a path where private transportation has brought poverty and exclusion to those who could not afford it, as well as unbearable levels of air pollution and GHG emissions.

Transport consumes a quarter of the world's energy, and accounts for some 25% of total CO_2 emissions, 80% of which can be attributed to road transport. Moreover, local and regional air pollution, congestion in urban areas, land used for the building of transport infrastructure and related health effects are all crucial issues. With a growing demand for mobility in developed and developing countries, these problems will become more and more pressing.

More and more unions around the world are including mobility plans in their collective agreements, and more and more unions are demanding urban planning and public transportation systems that respect workers and the environment.

Regular union campaigns for public transport now also help reduce emissions.

Box 3.10. Congress of South African Trade Unions (COSATU), South Africa: Launch of the Red October Campaign

"Transport is critical for working people and the poor in this country because apartheid made our people live so far from work.

In the cities, our townships and informal settlements were kept on the far margins. Moreover, since the late 1980s we have seen sharp cutbacks in city bus systems and commuter rail.

This situation has been devastating for the quality of live of working people. Many workers and students must commute hours each day to work and back. The results are high costs for working people and their families as well as unsafe and exhausting conditions. Moreover, if workers cannot get to work reliably on time, they face problems with their employers.

In addition, apartheid many of our people live in remote rural areas. A third of our people still live in the former homeland areas. They face a real transport crisis, with completely inadequate access to towns, jobs and social services, including healthcare and policing.

The situation has been aggravated by the decision to shut down rural rail lines and by the deterioration in many rural roads. This has undermined farm and rural processing industries, aggravating the already high joblessness of the rural areas.

We are gathered together to back up our demands for a real public transport system.

That means, first, we want to see a qualitative expansion in municipal bus systems. Similarly, we want a substantial increase in investment in commuter rail. That investment must ensure more reliable and comfortable trains, and fund security for commuters.

In the long run, the transport crisis for our people can only be solved through a concerted effort to build more working-class housing near the cities. We need to see a vast expansion in the effort to renovate high rises in city centres. We need more medium and high-density settlements. And we need improved provision of government services and retail sites in black townships that are distant from the cities.

We realize that denser housing is more expensive to provide in the short run. But in the long run it is the only way to ensure that workers do not face excessive commutes, eating up their time and their money, and raising costs for the economy as a whole.

The improvement in public transport should also be used to boost local production and job creation. We need to see strict guidelines on local procurement for buses, taxis and rail. Today, imported buses and trains have begun to displace local production, something we cannot afford when faced with over 30% unemployment".

Source: COSATU, 2007

Unit 7: UNIONS AND THEIR MEMBERS: CLIMATE CHANGE EDUCATION

Key ideas

→ Education is a basic human right and an essential tool for achieving sustainable development.

→ Lack of access to education means that people will continue to be unaware of the close links between human and work activities, and the environment.

→ Unions can be impressive training structures for society as a whole, due to their broad membership and their communication and mobilisation structures.

Education is a basic human right and an essential tool for achieving the goals of environmentally sustainable development. There are several levels of education: basic education for all; vocational training; development of skills; trade union education and leadership training; and provision of information. With lack of access to any of these instruments will continue to make people unaware of the close links that exist between both human and work activities, and the environment.

More importantly for trade unionists, continuing trade union education provides workers with the necessary knowledge and skills to be able to actively participate in both the definition of environmentally sustainable policies and in bipartite and tripartite decision-making bodies at all levels.

Unions can be impressive training structures for society as a whole, due to their broad membership and their communication and mobilization structures. Let's take a look at some training experiences related to climate change.

Box 3.11. United Transportation Union (UTU), Canada: Railway workers commit to save one tonne.

The United Transportation Union (UTU), primarily representing railway workers from coast to coast in Canada and the US embarked on a grassroots training initiative following COP11/MOP1, providing Canada-wide training of facilitators in each province on issues related to climate change.

In turn, these facilitators were expected to deliver similar training programs to a wider trade union audience, i.e. the union membership in the workplace. The program consists of 18 hours-instruction modules to deal with the Kyoto Protocol, climate change planning, government and union programs and methods for engaging in union action on climate change, guided by the slogan "The One Tonne Challenge in the Home and the Community; The One Tonne Challenge in the Workplace".

These training modules also include a focus on transitional employment provisions that would help facilitate the introduction of changes to the industry and in workplaces. The overall program is designed to stir people into action where the greatest needs and opportunities are identified.

Note: Since the 2006 national election, a new Conservative Party government has put the project on hold, pending its review.

Source: Trade Union Statement to COP 12, International Trade Union Confederation, 2006

Box 3.12. CCOO, Comisiones Obreras, Spain, Movimiento Clima: creating an active and committed social movement to minimize human impact on climate.

"Movimiento clima" (Climate Movement in English) is an alliance of four organizations with different backgrounds: WWF Spain, Oxfam Spain, the Union of Consumer Organizations and trade union Comisiones Obreras. This initiative aims to show the general public that climate change is a problem that affects everybody buy is also caused by everybody. All actors are essential to solve it, starting with the way we produce and consume energy. The organizations called:

- **On governments and public institutions of industrialized countries**, to agree on ambitious reduction targets: 30% for 2020 (based on 1990 levels);
- **On businesses**, to switch to production systems based on energy and product efficiency and substitution of fossil fuels for clean energies. They call on businesses and organizations to adopt the fight against climate change as a priority for action; and
- **On citizens**, in their houses and workplaces, to be aware of their consumption patterns and use only as much energy as they really need.

They called for the following concrete commitments:

- **Basic commitments**
  - Complete shut down of televisions, computers, and musical equipment when not in use;
  - Unplug mobile telephone chargers when charging is complete;
  - Use the washing machine only when full and on low temperatures programs;
  - Have a shower instead a bath;
  - Install energy efficiency bulbs at home;
  - Turn down blinds in summer and avoid the use of air conditioning;
  - Use public transportation or, if possible, walk or cycle to work;
  - Insulate housings in winter; and
  - Choose only efficient household appliances.
- **Advanced commitments**
  - If buying a car chose a hybrid model;
  - Install solar panels at home; and
  - Take advantage of house reformations to integrally and effectively insulate houses.

Source: ISTAS, Movimiento Clima, 2007

Box 3.13. ORIT / Sustainlabour, Latin America: Building Trade Union capacity, Clean Development Mechanism in the Kyoto Protocol.

The seminar on Climate change and Clean Development Mechanisms (CDM) was the first activity of Sustainlabour's training programme on climate change together with the Latin America Regional Trade Union Organization, coinciding with the 10 Conference of the Parties (COP) of the UNFCCC in December 2004, Buenos Aires.

Unionists from Brazil, Paraguay, Chile, Uruguay, Venezuela and Argentina met during three sessions on climate change contents, social participation in environmental policies and participation on Clean Development Mechanisms.

With regard to implementation, flexible mechanisms such CDM participation should be effective and regulated adequately, and their effects on employment monitored. Workers' participation and cooperation can make the agreements fairer and more transparent. To this end, that seminar provided the tools for unionists to understand the Kyoto policies and measures in order to facilitate their participation as actors on sustainable development.

Particular attention was given to the inclusion and follow up of social criteria in CDM projects, workers' participation to ensure the sustainability of the projects and development of standards to distinguish project that really promote a more sustainable development.

Debates of this seminar were also enriched by the political context at the time: the Russian ratification of the Kyoto Protocol.

Source: ORIT/Sustainlabour, 2005

MODULE 3 REFERENCES

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