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ISLAND INNOVATIONS

UNDP and GEF: Leveraging the Environment
for the Sustainable Development of
Small Island Developing States



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Cover photo: A woman collects sea urchins at low tide in Comoros. Credit Zafer Kizilkaya.

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Foreword



HELEN CLARK



NAOKO ISHII

Small Island Developing States (SIDS) face extraordinary and unique sustainable development challenges as a result of their small size, remoteness, narrow resource and export base, and high dependency on imported fossil fuel. At the same time, SIDS are extraordinarily dependent on healthy ecosystems and a stable climate. Nature-based activities account for a large share of economic activity and job opportunities in SIDS.

Negative impacts from climate change, unsustainable use of natural resources, invasive species, pollution and other factors significantly exacerbate the sustainable development challenges facing SIDS. Indeed, for some SIDS, they pose an existential threat.

This publication, 'Island Innovations – UNDP and GEF: Leveraging the Environment for the Sustainable Development of SIDS', demonstrates that far from succumbing to these challenges, SIDS have time and again risen to the task of managing their fragile environments to meet their sustainable development goals. The examples included in this publication show that SIDS are confronting the challenges of sustainability and resilience head-on through a broad range of actions, including conservation and sustainable use of critical marine and coastal resources, climate change mitigation, adaptation efforts and more.

SIDS are pioneering integrated and inclusive approaches to sustainable development through comprehensive ridge-to-reef approaches that address the 'whole island' issues of conserving land, water and ocean resources while adapting to climate change, enhancing local capacity and generating economic growth.

The approaches and achievements emerging from SIDS provide important lessons that we can learn from as the world discusses a set of new sustainable development goals for the post-2015 period. The innovative and impactful projects that are included in this booklet show that their experiences are highly relevant for evaluating the effectiveness and efficacy of development innovations in the environment sector.



The Global Environment Facility (GEF) and the United Nations Development Programme (UNDP), together with our other partners, are proud to have been working with SIDS during the past two decades in line with the Barbados Programme of Action (BPOA) and the Mauritius Strategy (BPOA +10).

Going forward, as the international community identifies the priorities and Sustainable Development Goals for the post-2015 development agenda as well as a new climate change regime for the post-2020 period, we commit to further support SIDS in responding to the challenge of sustainable development by intensifying actions for the effective maintenance and protection of natural capital.

We will work as supporting partners to SIDS to expand and strengthen protected areas, integrate biodiversity and ecosystem management into key economic sectors and support ecosystem-based adaptation to and mitigation of climate change. We will promote access to sustainable energy and improved energy efficiency and help ensure effective risk management. This work will be reinforced by efforts to promote inclusive economic growth, effective governance and women's empowerment.

An integral part of these efforts is to strengthen the human resources of SIDS and build genuine and durable partnerships at the local, national and international levels, through greater South-South co-operation, more effective co-ordination and engagement with new partners on shared priorities.

On the occasion of the Third International Conference on Small Island Developing States, our message is clear: We stand ready to continue to support SIDS and their people to manage their unique environments for sustainable human development.

Helen Clark
Administrator, United Nations
Development Programme

Naoko Ishii
Chief Executive Officer and Chairperson
of the Global Environment Facility

Introduction





SMALL ISLAND DEVELOPING STATES (SIDS)

have been widely recognized by the international community as a special case for sustainable development. Each of these islands and low-lying countries, primarily located in the Caribbean Sea, Atlantic, Indian and Pacific Oceans, has its own national circumstances. Collectively, though, SIDS and their citizens share many development challenges. The economic, social and environmental issues faced by SIDS communities are interrelated and strongly influenced by external global processes. The particular characteristics of the SIDS' development setting are important for understanding the context in which SIDS determine their national priorities and for identifying best practices and coordinated strategies to achieve their development objectives.

SIDS, by definition, have small land areas. The Republic of Nauru is the smallest island country, covering 21 square kilometres. Small size has significant economic and development implications for SIDS and their people. A narrow agricultural and natural resource base limits opportunities for economic diversification and specialization and contributes to excessive dependence on international trade. A high reliance on trade leads in turn to some particular challenges for SIDS, including high vulnerability to global price shocks, especially in the food and energy sectors. Small size also contributes to

development patterns such as high population density, which strains already limited resources. For example, the Republic of the Maldives has a population density over 1,000 persons per square kilometre, which is among the highest on the planet.

While small in terms of land area, SIDS often define themselves as 'large ocean states'. For example, the Republic of Kiribati is comprised of three coral atoll groupings totalling 811 square kilometres spread over nearly 3.5 million square kilometres of ocean. This high proportion of ocean area means that marine resources are particularly valuable to SIDS, which often have a high reliance on fisheries for revenues and as food sources.

A lack of conventional energy resources has contributed to the vast majority of SIDS' heavy reliance on imported fossil fuels for energy generation and transport. While SIDS are moving towards the generation of energy from renewable sources, 95 percent of all energy consumed in SIDS stems from imported fuels. Costly energy contributes to unsustainable levels of public debt in many SIDS. Indeed, several Caribbean countries carry public debt-to-GDP ratios over 100 percent; for example, Jamaica's ratio was 123 percent and Grenada's was 110 percent in 2013.



Many SIDS are also remote. Their geographic isolation from markets contributes to high transportation, freight and communication costs, which reduces their competitiveness and thus places their economies at a disadvantage. Other shared development challenges for SIDS and their people include limited human resource and institutional capacities, small domestic markets and limited export volume. These factors contribute to difficulties in achieving economies of scale in SIDS. Relatively open markets and reliance on tourism as a primary source of revenue contribute to the high sensitivity of SIDS economies to external shocks.

Sustainable human and economic development is not possible without safeguards to maintain a healthy, clean and productive natural environment. SIDS are, perhaps more than any other group of countries, highly vulnerable to the impacts of human-induced climate change caused by global greenhouse gas emissions. Sea level rise as a result of thermal expansion of the oceans and melting of land-based ice due to global warming have been cited as existential threats to some SIDS. SIDS are among the lowest-lying countries on the planet – with some, such as the Maldives, only a couple of metres above sea level at their highest point.

Even for those SIDS with mountainous terrain, the vast majority of island economic activity is derived from the coastal zones. Pressures on human development related to sea level rise, such as saltwater intrusion into small freshwater aquifers and damage to agriculture from storm surges, may lead to internal displacement and external migration of island citizens in vulnerable communities.

Similarly, SIDS are facing increasing risks from natural hazards, such as extreme weather events, which have led to disasters that set back or even reverse hard-won development gains. For example, Grenada lost over 200 percent of its annual GDP, with 80 percent of buildings damaged during Hurricane Ivan in 2004. In 2013, Typhoon Haiyan severely damaged buildings and subsistence farms in Kayangel, the northernmost state of Palau, while, in 2014, heavy rainfall caused catastrophic flooding in the capital city of the Solomon Islands, leaving 49,000 homeless. Small resource bases further constrain the ability of SIDS to 'bounce back', with only fragile recoveries often following such events.



PHOTO BY JOHAN ROBINSON



The livelihoods of island people depend directly on environmental protection. The ocean and land environments of SIDS have remarkably high biodiversity values, which are globally significant and are critically important for the ecosystem services that they provide to SIDS. Due to their isolation and lack of continental influences, many SIDS have high rates of endemism. Protection of island biodiversity and of the natural environment is essential for development, as these are the foundation of tourism revenues upon which many SIDS rely for their primary source of foreign currency.

Biodiversity also provides the building blocks for the ecosystems, such as forests and wetlands, that provide valuable services, including fish spawning sites, water provisioning and flood prevention. Development planning and financing often do not account for these services. Overuse and premature depletion of natural resources can also limit sustainable growth in SIDS. For example, illegal, unreported fishing contributes to a reduction of fish stocks, which are the source of significant economic activity and nutrition for SIDS.

Maladaptive economic development practices, such as the introduction of invasive alien species into isolated island environments with little ability to cope, can also threaten island biodiversity. The disposal and management of waste (including hazardous waste) are also a challenge for many SIDS, where the effects of poor planning in such small, interconnected environments quickly damage the ecosystem. These and other unsustainable land management issues have caused serious land degradation problems on islands, affecting food security and increasing vulnerability to the effects of climate change. The possibility of exploiting newly identified seabed and marine coastal resources is also attracting interest as a potential source of future economic activity in SIDS' large exclusive economic zones. In response to these challenges and new opportunities, SIDS are increasingly framing their sustainable development agenda in terms of the 'blue economy', recognizing the importance of balancing conservation and use of coastal and marine-based natural resources for sustainable development.

These environmental challenges faced by SIDS have direct relevance for their efforts to pursue sustainable development. To this end, the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP), together with other partners, have been working with SIDS over the last two decades to establish environmental management systems, policies and programmes that contribute to their development agenda. The UNDP-GEF portfolio supports a substantial number of projects on the ground in SIDS and provides extensive policy support on a range of development issues, including on environment, climate change, sustainable energy, development finance, trade, gender equality, women's empowerment, health and other key sectors.

Partnership with and funding from the GEF, the designated financing mechanism for the Rio Conventions and other multilateral agreements and the single largest global source of finance for environment interventions, is central. UNDP has played and will continue to play a key role within the GEF partnership – now expanded to encompass 14 GEF agencies – in spearheading efforts to strengthen the capacities of partner countries around the world to integrate environmental considerations into development plans and strategies and to support sustainable, low-carbon, climate-resilient development pathways. Partnership with the GEF is a cornerstone of UNDP's environmental work.

Currently, over 240 UNDP-supported GEF-funded interventions in SIDS, including Enabling Activities, are at various stages of the project cycle. This sizable portfolio includes over US\$555 million in grants from the Global Environment Facility (GEF) Trust Fund, Least Developed Country Fund (LDCF), Special Climate Change Fund (SCCF) and the Adaptation Fund (AF). Those grants are complemented by more than US\$1.4 billion in co-finance from governments and other partners. Additionally, the Global Environment Facility Small Grants Programme (GEF SGP), implemented by UNDP, has supported over 2,500 projects in SIDS with a total of US\$67 million in grants and US\$84 million in co-finance. UNDP also implements environmental and energy interventions with funding from other multilateral and bilateral donors, including significant support from the Government of Japan.





The volume of this work – which represents a significant proportion of the completed and ongoing work of the UNDP-GEF and UNDP Environment and Energy Group (EEG) – speaks to the importance of supporting and promoting environmentally focused sustainable development work for transformative change in SIDS.

SIDS have demonstrated their commitment to and leadership in addressing environment issues. UNDP and the GEF have prepared this publication to showcase the outstanding results of a sample of environment- and energy-related projects from islands in all regions. The examples highlighted in the following pages reveal that SIDS are excellent locations and models for piloting global sustainable development solutions. Their size allows for modest, but important investments that are achieving tangible results in people's lives. Many projects in SIDS are examples of interventions that can be replicated in larger countries. And, just as the local issues faced by SIDS communities have global implications, the impacts of these projects in SIDS have global importance.

For example, with the support of UNDP's global Ecosystems and Biodiversity (EBD) portfolio and with funding from the GEF, national and local stakeholders have developed an effective management system for ecosystem conservation and sustainable development of the Baa Atoll in the Maldives. The project sought to mainstream biodiversity into productive sector policies and practices, with emphasis on supporting sustainable alternative livelihoods. It demonstrated the potential for the sustainable development of a 'blue economy' throughout the Maldives and the Indian Ocean region and led to the recognition of the Baa Atoll as a UNESCO World Biosphere Reserve in 2011. In Vanuatu, UNDP-GEF has helped the country to embrace sustainable land management (SLM) techniques that protect the environment and forestry resources while strengthening customary and traditional knowledge and approaches.

These national efforts are complemented by local interventions supported by GEF SGP. The publication showcases three examples hailing from three different regions, including the groundbreaking Let's Go Local! campaign on the island of Pohnpei in the Federated States





of Micronesia (FSM). With two sequential small grants of US\$50,000, the Island Food Community of Pohnpei (IFCP) was able to undertake a series of small demonstration projects that improved traditional food production and consumption and raised awareness about healthy local foods while improving community livelihoods. Through the highly successful Culture, Health, Environment, Economic and Food Security (CHEEF) campaign, IFCP promoted greater dietary diversity in local communities, stimulated new markets for the production and consumption of ready-made local foods in place of imported processed products and contributed to the in situ conservation of traditional crop germplasm. As a result, IFCP won the prestigious WHO Healthy Islands Recognition Best Practice Award in 2013 and is currently supporting the development of similar local initiatives in three other Micronesian states and regional initiatives in Palau, Papua New Guinea, Solomon Islands, Marshall Islands and Kiribati.

Regional projects have played an equally important role in demonstrating the capacity of SIDS to innovate to conserve the global environment and adapt to climate change. The UNDP-GEF Pacific Adaptation to Climate Change initiative (known as PACC) brought together 14 Pacific Island countries in 2009 to enable communities to become more resilient to climate uncertainty. Efforts focused on practical demonstration projects in three key development areas – food production and food security, coastal and water resources management, and the mainstreaming of climate risks into local, national and regional development planning and activities.

In parallel, the Pacific Island Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) also brought together 14 Pacific Island states to break down barriers to the deployment and adoption of renewable energy technologies (RETs) in the Pacific region, including solar-, hydro-, wind- and bio-energies. Over the course of 2009-2019, it is estimated that PIGGAREP will contribute to a total reduction of approximately 570,000 tonnes of CO₂ emissions in partner countries through direct energy installations, energy efficiency initiatives, training and awareness-raising.

Through its important International Waters programme, UNDP and GEF have also vigorously supported efforts to improve the joint management of transboundary marine resources. In the Caribbean, for example, Integrating Watershed and Coastal Area Management in the Caribbean SIDS (IWCAM) helped 13 Caribbean SIDS to mainstream ridge-to-reef approaches in national-level watershed and coastal policy, planning and management. Through a series of demonstration projects in eight countries, local and national stakeholders have pioneered integrated approaches to the management of their respective watersheds and coastal areas. At the regional level, this resulted in the establishment of the CARICOM Consortium on Water at the request of the Council of Ministers for Trade and Economic Development (COTED) in 2008. Today, CARICOM still works to ensure that the IWCAM community continues to establish place-effective, harmonized mechanisms to secure, manage and protect scarce water resources.

Despite these important advances, though, there is much more work to be done. SIDS have, to date, made uneven progress towards the Millennium Development Goals (MDGs). Their efforts and related investments supported by the international community need to be scaled up so that SIDS can overcome barriers and establish, maintain and accelerate progress towards sustainable development in the next decade. Coordinated and ambitious global efforts on the sustainable development agenda are required to safeguard the future for SIDS.

2014 is a critical year for sustainable development. Numerous international consultations are intensifying as United Nations Member States strive for consensus on identifying the priorities and Sustainable Development Goals for the post-2015 development agenda and on determining a new climate change regime for the post-2020 period. A SIDS Conference has been held every decade since the recognition of the SIDS development agenda at the 1992 Rio Earth Summit (UN Conference on Sustainable Development). In that context, the Third International Conference on Small Island Developing States, which will be held in Samoa during September 2014, comes at an opportune moment in the international calendar.

Following from the 2012 Rio+20 UN Conference, partnerships are emerging as a key component of the success of multilateral efforts for sustainable development, including for environmental management. For SIDS, partnerships that are tailored to their particular island circumstances, are time-bound and have resources and clear lines of reporting and transparency with all parties involved, are most likely to succeed. The theme of the Third International Conference on SIDS – sustainable development of SIDS through genuine and durable partnerships – is, therefore, well suited to take up the modern approach to development that strengthens traditional partnerships while increasing South-South cooperation and triangular partnerships, including the involvement of a new range of actors from the private sector and civil society.

The local, national and regional development choices that SIDS and their partners make will have direct relevance for international efforts to advance environmental protection and sustainable development globally in the 21st Century. UNDP and GEF stand ready to support SIDS and their people to build on, learn from and replicate these best practices in environmental management for sustainable human development.



PHOTO BY PATRICK DEBELS

Pacific





Go Local! In Micronesia – Promoting Multi-Benefits of Local Foods

PROJECT DETAILS

Title: Mand Community Project for Agricultural Biodiversity Conservation (Phases I & II)

Country: Federated States of Micronesia

Focal Areas: Biodiversity, Energy, Climate Risk Management

Implementing Partner: Island Food Community of Pohnpei (IFCP)

Sources of Funds & Value: GEF SGP Grants: US\$50,000; Co-financing: US\$71,600

FACTS

- The Federated States of Micronesia (FSM) has the longest coastline of all SIDS: over 6,000 kilometres.
- Fisheries contributed 10.1 percent to GDP of FSM in 2010.
- As of 2010, forests covered 92 percent of the total land area of FSM.

IN THE PACIFIC COUNTRY OF THE FEDERATED STATES OF MICRONESIA,

a recent shift from traditional foods to imported processed foods has created a major health crisis and environmental problems including biodiversity loss, waste management and food insecurity. It has contributed to cultural decay and impeded national and household economic growth. The Island Food Community of Pohnpei (IFCP) Let's Go Local! initiative, supported by the GEF Small Grants Programme (GEF SGP), addresses these problems by promoting and facilitating the increased production and consumption of traditional food crops, particularly those cultivars that are carotenoid-rich, for their health benefits, while protecting biodiversity and improving livelihoods.

Spread across 2,500 kilometres of the north-western Pacific Ocean, just above the equator, the Federated States of Micronesia (FSM) consists of the four states of Chuuk, Kosrae, Pohnpei and Yap and their more than 600 widespread islands, only 65 of which are inhabited.

In recent years, as these isolated communities have faced the modern pressures of globalization, they have experienced dramatic changes in consumption that have led to a range of nutritional disorders.

By 2008, an estimated 73 percent of the dietary intake of communities living in FSM came from imported food products, leaving the nation with a highly negative food trade balance and vulnerable to global food price fluctuations and disruptions to food transport. This was accompanied by increasing neglect of traditional food systems, lifestyle changes and reduced levels of exercise. A World Health Organization (WHO) STEPS assessment in the same year reported that 32 percent of Pohnpei adults had type-2 diabetes.

However, recent studies have also identified locally grown (and globally important) staple foods that could help alleviate vitamin deficiencies and anaemia, including bananas, taro and pandanus. These carotenoid-rich foods can help protect against diabetes, heart disease and some cancers.

The planting of rare diverse cultivars therefore provides a local solution to a range of development challenges, from conserving biodiversity to providing reliable and resilient local food supplies and meeting healthcare goals to generating new opportunities for sustainable livelihoods.

The GEF SGP, implemented by UNDP, has been active in the Pacific region since 2004. Grants of up to US\$50,000 are awarded to local non-governmental and community-based organizations to conserve and to restore the environment while enhancing people's well-being and livelihoods. SGP embodies the very essence of sustainable development by 'thinking globally, acting locally', demonstrating that community action can maintain the fine balance between human needs and environmental imperatives.



In 2005, SGP awarded a grant for US\$50,000 to the Island Food Community of Pohnpei (IFCP) to work in the village of Mand. Working initially in Madolenihmw Municipality at Mand Community Project for Agricultural Biodiversity Conservation in the north-east of the island, a series of small demonstration projects set out to improve traditional food production and consumption and to build awareness about healthy local foods while improving community livelihoods.

IFCP is an NGO that works to educate the people of Pohnpei about the relationship between diet and health and to help generate economic benefits and strengthen cultural identity by using local foods.

From small beginnings, the project achieved impressive results with global and local benefits.

Through ground-breaking scientific analysis of the nutritional value of local traditional foods, IFCP has shown that the cultivation and consumption of local agro-biodiversity can improve public health. This, in turn, has increased household biodiversity and greater dietary diversity in local communities. It has also stimulated demand for market availability of ready-made local foods in place of imported processed products.

The highly successful Culture, Health, Environment, Economic and Food Security (CHEEF) campaign has driven the demand behind these new markets by promoting the CHEEF benefits of growing and eating healthy biodiverse local food. "Through a dynamic mix of media and events, the CHEEF campaign has supported face-to-face nutrition education in schools and been featured in local newspapers and on national radio, reaching more than 30,000 islanders. We have run countless community events that celebrate local foods and showcase local food preservation and processing," explained the late Dr. Lois Englberger, IFCP Executive Director. "By promoting the CHEEF benefits of growing and eating healthy local food, we have revitalized traditional knowledge for managing food supply, strengthened our cultural identity and contributed to biodiversity conservation."

To conserve traditional crop germplasm, the project has created the only known in situ gene bank in the Pacific with conservation sites in various villages. More than 100 heritage cultivars are now grown and managed by local farmers, including most local varieties of giant swamp taro, banana and pandanus. The gene bank, IFCP and the partner communities have become suppliers of these rare species to a number of farmers throughout the island and planting materials have been distributed nationwide to enable other communities to grow rare cultivars, which are more resilient to the effects of changing climate regimes.

"Recently, IFCP used the gene bank to supply pandanus planting materials to participants of the Let's Go Local! Fun Run held on World Food Day in 2012. Every runner and walker was given a cutting of pandanus to plant along a designed route to raise awareness of this important local food," notes Mrs. Emihner Johnson, local food nutrition educator of the IFCP.

Through this success, the project has been able to influence food policy development at the government, community and individual levels. Government departments, schools and community events have

adopted the slogan "Let's Go Local!" and IFCP was the key advocate for the important Presidential Proclamation on Food Security 2010. This encouraged all government-sponsored events to cater with healthy, local foods. Several state departments have now banned imported foods from their offices and IFCP has been instrumental in the consideration of the soft drink tax bill.

At the community level, IFCP is currently driving the implementation of the Local Food Policy for community events and activities. At least 10 churches, CBOs, schools and private businesses have agreed on 'local food only' policies.

With a second SGP grant, the project has also catalysed the development of a small food processing industry using locally designed, affordable energy-efficient equipment such as smokeless charcoal ovens and solar dryers to support sustainable livelihoods. Only climate-resilient local foods are processed in order to decrease the small islands' reliance on imported foods and to prevent the loss of indigenous knowledge of biodiversity.

"By supporting local food growth and value-added production, such as taro flour and banana chips, we are building healthy and resilient communities that are self-sufficient and less vulnerable to global social pressures," explained Dr. Englberger. "We are working directly with the Pohnpei Women's Council and their member groups to improve women's health and livelihoods by training them in the energy-efficient food preparation of biodiverse food crops."

IFCP has now moved on to work with the rural communities of Salapwuk and Rohi and the urban Kapinga village in the centre of Pohnpei. These communities have invested in smokeless ovens and learned about the benefits of local food through the CHEEF initiative. The neighbouring islands of Chuuk, Yap and Kosrae have also invited IFCP to replicate the activities carried out in Mand.

In 2011, the FAO endorsed the IFCP approach through the publication 'Let's Go Local! – Guidelines for Promoting Pacific Island Food', a step-by-step guide to replicating the IFCP initiative. WHO and FAO recognized the transferability of the initiative and IFCP has begun supporting the development of local initiatives in three other FSM states and regionally in Palau, Papua New Guinea, the Solomon Islands, the Marshall Islands and Kiribati.

In 2013, IFCP won the prestigious WHO Healthy Islands Recognition Best Practice Award and has received a US\$100,000 competitive grant from the US Forest Service to continue the project.



PHOTO BY GEF SGP MICRONESIA

Building the Resilience of Remote Pacific SIDS – Coping with Climate Change in Cook Islands

PROJECT DETAILS

Title: Enhancing Resilience of Communities of Cook Islands through Integrated Climate Change Adaptation and Disaster Risk Reduction Measures

Country: Cook Islands

Focal Area: Climate Change Adaptation

Implementing Partner: Climate Change Cook Islands Division within the Office of the Prime Minister

Sources of Funds & Value: Adaptation Fund: US\$4,960,000

FACTS

- The Cook Islands was named after British explorer Captain Cook in 1770.
- The Cook Islands encompasses an area about the same size as Western Europe.
- In the centre of the Cook Islands flag is a circle of 15 stars, representing each of the 15 islands.

THE COOK ISLANDS IS A CHAIN OF 15 SMALL ISLANDS spread across a vast Exclusive Economic Zone of approximately 1.8 million square kilometres in the South Pacific Ocean.

The islands are divided geographically into a remote Northern Group (six islands) and a Southern Group (nine islands), presenting a high diversity from low-lying coral atolls to volcanic islands of rugged landscape and limestone formations of elevated ancient reef tops known as 'makatea'.

The population of less than 20,000 is mostly gathered on the southern island of Rarotonga. Tourism is the country's largest industry; other industries include pearls, offshore banking and the export of marine and fruit products. Due to the limited shoreline, coastal fishing is mainly for subsistence and sale to local markets.

As climate change progresses, the Cook Islands is anticipated to be at great risk due to sea level rise, extreme rainfall events, high air and sea temperatures, storm surges and strong winds. These changes are expected to harm priority sectors, including the coastal zone and coral reefs, agriculture, food security and diet, marine resources, health, water resources and biodiversity.

Development and social changes are already placing pressure on the sensitive environmental systems and sectors of the Cook Islands and the effects of climate change and sea level rise are expected to exacerbate the stress on these systems.

In response, the Cook Islands has developed the Joint National Action Plan for Disaster Risk Management and Climate Change Adaptation (JNAP for DRM and CCA) 2011-2015 to provide a roadmap to implement priority 5 (Resilience) of the National Sustainable Development Plan 2011-2015 (NSDP). Each major sector has identified information gaps and capacity-building requirements that must be addressed.

Approved in mid-2012, the project 'Strengthening the Resilience of Our Islands and Our Communities to Climate Change' (SRICCC) is working to support implementation of the Cook Islands JNAP for DRM and CCA at the national, sector and island levels.

"The SRICCC initiative is specifically supporting the 11 inhabited Pa Enua, the sister islands of Rarotonga, to adapt to climate change across the agriculture, water, health, coastal management and tourism sectors," states Ana Tiraa, Director of Climate Change Cook Islands Division. "This represents approximately 14 percent of the total funds dedicated to implementing JNAP for DRM and CCA."

The project has moved fast. At the national policy level, the project team has been closely involved in a formal review of national policies and the development of the Climate and Disaster Compatible Development Policy for 2013-2016. The new policy, which also addresses climate change mitigation, was endorsed by the Cabinet in 2013.



In addition, the Cook Islands Meteorological Service, with support from the Adaptation Fund, has prepared a prototype Operational Climate Early Warning and Information System (CLEWS). Discussions are underway with Emergency Management Cook Islands (EMCI) and the United Nations Economic and Social Committee for Asia and the Pacific (UN ESCAP) to enable SRICCC support for an information portal to disseminate CCA-DRM information around the country. The intent is to link it with the CLEWS being supported by SRICCC.

The project has also focused on the implementation of on-the-ground adaptation and disaster risk reduction measures at the community level in the remote Pa Enea.

Being low-lying coral atolls and sand cays at risk from climate change, these islands are difficult to live on and are sparsely populated. The communities living there make do with limited arable land and can be particularly hard hit by drought and by cyclones and storm surges due to their low relief and critical dependence on day-to-day water supply.

With few opportunities to even reach the far Pa Enea – planes and boats must be chartered – SRICCC has been supporting the Pa Enea Governance Unit (PEGU) to integrate climate change resilience and DRM aspects into new Community Sustainable Development Plans (CSDPs). These are island-level development plans designed to support implementation of the National Sustainable Development Plan at the local level. So far, CSDPs have been drafted and focal points identified for the islands of Mangaia, Aitutaki, Mauke, Mitiaro, Manihiki and Rakahanga.

To support capacity-building for adaptation and disaster risk reduction in a specific Pa Enea (community or enterprise), there are plans for the national operation of the GEF SGP to be extended to fund small-scale, island-level efforts to promote climate-resilient agricultural and fisheries practices, improved water practices, improved coastal protection, resilient tourism and better health support and vector-borne controls.

So far, hydroponics systems have been proposed for two villages on Manihiki Island and a cool store for agricultural produce is under consideration for Mauke. Hydroponics systems are an important livelihood and subsistence lifeline in areas where saltwater intrusion of agricultural land due to rising sea levels makes farming impossible.

The SRICCC Project Management Unit is working with the Ministry of Health to train Pa Enea health officers to manage vector-borne disease outbreaks through the procurement (and supply) of needed resources and to raise public awareness around vector-borne illnesses and responses to outbreaks.

On Tamarua, a water intake and pipeline upgrade is ready for final review and approval. Because of saline intrusion into freshwater lenses and increased flooding from the sea caused by accelerated coastal erosion and extreme weather events, islanders must have access to reliable water supplies. In addition, plans are ongoing to increase water storage capacity in three other communities

in Pa Enea (through a combination of community and household water tanks and related infrastructure) and to increase water supply through ground water management and water stream intake management to counter climate-induced disturbances of water supply.

“It is very encouraging to see how the SRICCC project has created local ownership in the Pa Enea of responses to climate change adaptation. Project coordinators are designated in each island and are working closely with the Island Councils and communities to chart a path towards greater resilience,” explains William Tuivaga, SRICCC National Project Manager. He continues: “Tangible interventions on the ground are being driven by island-specific work programmes managed by national agencies alongside community-driven actions. While building resilience to climate change, this work is also supporting income generation and sustainable livelihoods.”



PHOTO BY CELINE DYER AND ROBERT MATAPO

Managing the Impacts of Climate Change on Agriculture, Forestry and Health in Samoa

PROJECT DETAILS

Title: Integrating Climate Change Risks into the Agriculture and Health Sectors (ICCRAHS) & Integration of Climate Change Risk and Resilience into Forestry Management in Samoa (ICCRIFS)

Country: Samoa

Focal Area: Climate Change Adaptation

Implementing Partner: Minister of Natural Resources and Environment (MNRE)

Sources of Funds & Value: GEF LDCF Grants: US\$4,400,000; Government: US\$970,000; Other Donors: US\$3,660,000

FACTS

- Samoan coastal and marine ecosystems are characterized by large and vulnerable reefs, covering 490 square kilometres with 14 coral families including at least 45 species (mainly Acropora).
- The main agricultural crops of Samoa are taro, bananas, breadfruits, yams, cacao and coconuts.
- Over 100 native plants are currently used for traditional medicines that cure a variety of ailments such as headaches, morning sickness and sprains.

INCREASING EVIDENCE OF CLIMATE CHANGE-INDUCED RISKS

confronts the small island state of Samoa with serious livelihood challenges, especially in the agriculture, forestry and health sectors. The increasing frequency and length of extreme climatic events have harmed agricultural production, particularly through crop loss and soil erosion. Along with agricultural vulnerability, there are growing concerns about climate-related vector-borne, food-borne and water-borne diseases. Natural forests are equally vulnerable to climate change and unsustainable management and must be protected as important sources of cultural and environmental resources essential for the livelihoods of dependent communities.

The small island nation of Samoa is located south of the equator, about halfway between Hawaii and New Zealand in the heart of the Polynesian region of the Pacific Ocean. A picture postcard of natural beauty comprising 10 islands, Samoa harbours very distinct and different environments on each, from the rainforest-covered rugged volcanic mountain peaks of the two main islands to vast valleys leading down to blue lagoons fringed by coral reefs that keep the ocean at bay.

Samoa faces many challenges typical of Small Island Developing States (SIDS), including climate change, rising sea levels, natural disasters and environmental degradation. Vulnerable due to its small size, remoteness from large markets and susceptibility to economic and natural shocks, Samoa's economic growth and social development depend on protecting its fragile natural resources and building socio-ecological resilience.

With support from UNDP and funding from the GEF, the Government of Samoa has stepped up to meet these challenges by implementing two sequential projects to integrate climate risks into the agriculture and health sectors and into forestry management.

Addressing different National Adaptation Programme of Action (NAPA) priorities, the projects have distinctive yet mutually reinforcing features. While ICCRAHS has focused on the agriculture and health sectors, it has made major contributions to the enhancement of climate early warning systems and services (CLEWS) also benefiting the forestry sector. Together, the projects have led to improved knowledge transfer and increased cooperation among the Ministries of Natural Resources and Environment (MNRE), Agriculture and Fisheries and the National Health Service.

Integrating Climate Change Risks into the Agriculture and Health Sectors (ICCRAHS)

The 'Integrating Climate Change Risks into the Agriculture and Health Sectors' (ICCRAHS) initiative has worked at the national, subnational and local levels to strengthen the capacities of government authorities, public health workers and planners to understand climate risk dynamics.



Samoa is now able to monitor climate change risks and provide early warning communications to the agricultural and health sectors. Specifically, the Samoa Meteorology Division has been trained to monitor climate trends and provide regular, timely and accurate climate risk and early warning information to agricultural extension and public health services.

A Climate Observation Network has also been established to monitor climate variability and long-term climate change trends. It aims to comprehensively capture the elements and variability of Samoa's climate to underpin robust and relevant weather and climate services for key sectors. In turn, the MNRE Meteorology Division's Data Management Facility, known as CLIDE, has been upgraded to better manage climate data and provide accurate climate forecasts and warnings.

“The Climate Early Warning Information Service has helped the health sector in Samoa better manage climate-health risks and save lives. The Samoa Meteorology Division now provides health care professionals adequate lead time to be prepared, plan and prevent outbreaks of diarrhoea and dengue fever,” says Mr. Tamati Fau, Health Coordinator of the ICCRAHS Project.

In addition, demonstrations of adaptive crop management and climate-related disease prevention have provided a knowledge base to facilitate climate adaptation investments and policies. National soil and crop maps have been updated and enhanced with functionalities for climate risk and productivity modelling under different climate conditions.

Adaptive agricultural crop management has also been piloted in vulnerable agricultural areas and the crop analysis carried out by the local scientific organization is being integrated into the Climate Change Adaptation Strategy for Agriculture, Forestry and Fisheries.

The ICCRAHS initiative has also strengthened the capacity of Samoa's public health workers and agricultural planners to make use of climate risk information and adopt measures that increase the resilience of communities to climate-induced food security and disease risks.

A larger-than-expected number of Ministry of Health staff and National Health Services practitioners (including doctors, nurses and allied health professionals) have been trained to access, interpret and apply climate health information services. They are learning to spot climate change-related health events and trends.

Integrating Climate Change Risks into Forestry Management in Samoa (ICCRIFS)

The Integration of Climate Change Risks and Resilience into Forestry Management in Samoa (ICCRIFS) project is one of the most successful implemented in Samoa in the area of environment and natural resources management. It aims to increase the resilience and adaptive capacity of Samoa's forest areas and dependent communities to the threat of climate change.

Supported by UNDP, the forestry initiative is funded by the GEF's Least Developed Country Fund. It is an excellent example of an unintentional ridge-to-reef initiative, originally targeting mainly native species

reforestation of upland areas and agroforestry practices. The project has resulted in benefits for water resources and protecting coastal areas.

Started in 2012, demonstration projects are currently underway to promote more sustainable forestry and agroforestry practices in local communities. Using Participatory Three Dimensional (P3D) models based on mapping exercises supported by the Forestry Division, the communities have created wooden models of their territories to help them increase their understanding of key vulnerabilities and priorities for the rehabilitation of affected areas and to help them better manage key resources for resilience.

“The models are prepared through a mapping exercise based on open discussion around land use planning scenarios. Many young people have been engaged in their construction, as well as women and elderly representatives, who can contribute their unique understanding of their territory and traditional knowledge,” explains Ms. Yvette Kerslake from the Forestry Division of the MNRE.

As a result of the demonstration projects, the initiative has resulted in a range of revisions to national forestry policy and plans, enhanced coordination and forestry-related early warning systems, and better understanding among government officials of the need to support efforts in the forestry sector to adapt to climate change.

These revisions are gender-sensitive and aim to channel sorely needed resources to demonstration projects that can increase technical understanding and public awareness of climate change and its effects.

Best practices emerging from the ICCRIFS initiative are being generated and shared with stakeholders to allow field activities to feed and inform regional, national and local decision-making. Closely aligned with other initiatives supported by UNDP, NGOs and CBOs on sustainable land management and climate change adaptation in Samoa, efforts are being stepped up to ensure inter-project learning.



PHOTO BY PAULO AMERIKA

The Ni-Vanuatu Way – Land Management for Sustainable Development

PROJECT DETAILS

Title: Building Capacity and Mainstreaming Sustainable Land Management (SLM) in Vanuatu

Country: Vanuatu

Focal Area: Land Degradation

Implementing Partner: Department of Environment, Ministry of Agriculture, Ministry of Lands and Natural Resources

Sources of Funds & Value: GEF Grant: US\$497,422

FACTS

- The Republic of Vanuatu was founded in 1980. The nation's name was derived from the word *vanua* ('land' or 'home'), which occurs in several Austronesian languages, and the word *tu* ('stand'). Together, the two words indicated the independent status of the new country.
- In addition to Bislama, the lingua franca of Vanuatu, 113 indigenous languages are still spoken in Vanuatu. The per capita density of languages is the highest of any nation in the world, with an average of only 2,000 speakers per language.
- Most islands of Vanuatu are forested and mountainous, with several active volcanoes.

NI-VANUATU PEOPLE HAVE PRACTICED SUSTAINABLE LAND MANAGEMENT (SLM) for thousands of years. However, growing competition from modern land uses to generate income and produce food to sustain livelihoods is leading to widespread degradation of vital ecosystem services. Vanuatu has sought to pioneer a middle course between the need to encourage growth and economic development, on the one hand, and the fundamental importance of protecting the environmental, social, political and cultural values reflected by customary land tenure, on the other hand.

Vanuatu's growing population is increasingly pressuring fragile natural resources for agriculture, grazing, hunting and fishing. An estimated 90 percent of Vanuatu households fish and consume fish, which has caused intense fishing pressure near coastal villages.

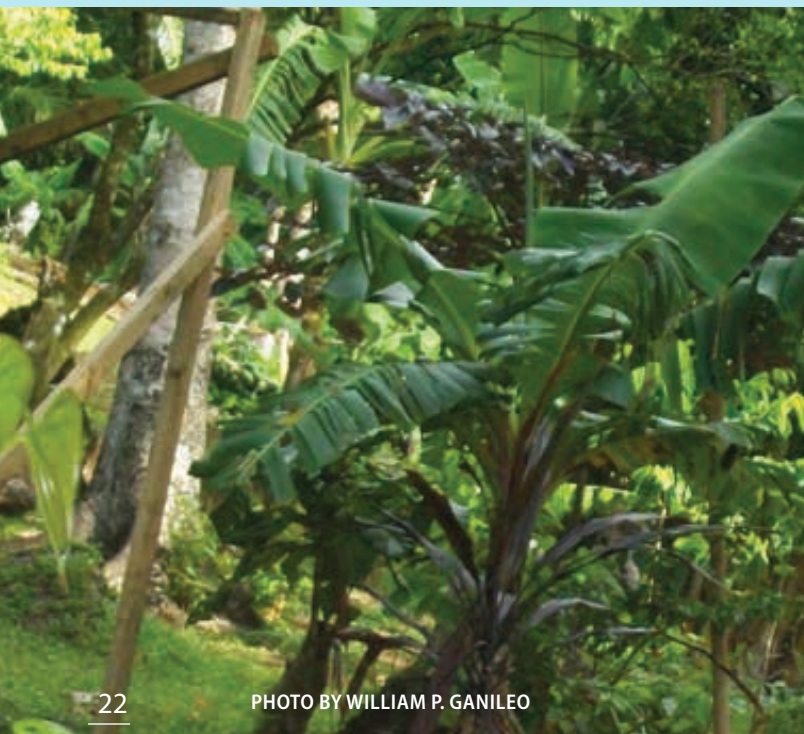
Although Vanuatu has ample vegetation, there is evidence of increased soil erosion and landslides related to land use patterns and poor management. Fresh water is becoming increasingly scarce.

Confronted with a lack of employment opportunities in industry and inaccessibility to markets, rural families are locked into lives of subsistence or self-reliance, which puts tremendous pressure on local ecosystems.

In 2008, the Government of Vanuatu sought to embrace sustainable land management techniques that protect the environment and forestry resources, building on customary and traditional knowledge and approaches.

Working in the northern part of Pentecost Island in the Lagatava and Vilvil villages, the Government of Vanuatu launched the four-year Building Capacity and Mainstreaming Sustainable Land Management (SLM) project in Vanuatu to improve sustainable land management. Supported by UNDP and funded by the GEF, this recently closed project was developed under the global Targeted Portfolio Approach for Capacity Development and Mainstreaming of Sustainable Land Management programme, which supported 46 Least Developed Countries (LDCs) and SIDS around the world.

Sustainable Land Management (SLM) involves the use of terrestrial resources and ecosystems such as soils and plants to provide goods and services such as food, drinking water, fuel and timber without detriment to the long-term productive potential of these resources and their environmental functions. SLM is critical to minimizing and rehabilitating the effects of land degradation and to ensuring optimal use of resources for sustainable development and poverty alleviation.



Specifically, the project in Vanuatu sought to mitigate land degradation by working with communities to use SLM principles to maintain the ecological integrity, stability and productivity of local terrestrial resources while mainstreaming SLM into key national policies.

In Vanuatu, land is traditionally the source of personal and clan identity, spirituality, 'kastom', power and economic livelihood – over 80 percent of the population still lives on customary land. As a result, the project enlisted the centuries of traditional ecological knowledge that current landowners have about resource management as a starting point.

Through small-scale local SLM interventions, the project delivered valuable results. Helping villagers to better understand the root causes and effects of land degradation and training individuals in new SLM techniques led to the wide adoption of SLM practices.

"These [SLM technologies] proved to be what we should be looking at seriously. They allow us to plant our gardens with our minds open to modern ideas while knowing that what we do reflects our own custom calendar and protects our land. We can now manage our land for the use of our future generations," says Leo Rani, Chief of Lagatava village.

The success of the pilots has informed a draft policy, called The Tanna Tribal Land Boundaries Initiative, to help local chiefs implement SLM. The Initiative allows the chief of the tribe to allocate land for SLM on the basis of the principles of customary ownership. It encourages communities, through their chiefs, to take responsibility for minimizing land degradation.

The Vanuatu Association of NGOs (VANGO) has worked to better communicate the aims of the project and to promote the adoption of SLM practices and approaches.

On Ambae Island, the NGO Live and Learn has promoted specific SLM practices and soil conservation, including growing Vetiver grass to reduce soil erosion on slopes and areas prone to degradation. The grass has significantly reduced erosion rates on Ambae Island, while, on Aneityum Island, the grass has allowed the reef to rejuvenate, as soil is no longer being lost into surrounding lagoons.

Several communities are now growing tropical legumes (such as *Gliricidia maculata* and *Mucuna pruriens*) for improved soil fertility. This has enabled farmers to grow more diverse traditional crops, including 12 different varieties of yams, with significant benefits to local livelihoods and health.



Pacific Island Countries Lead the Way in Renewable Energy Technologies

PROJECT DETAILS

Title: Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) & Pacific Islands Greenhouse Gas Abatement through Renewable Energy PLUS Project

Countries: Cook Islands, Fiji, Kiribati, Micronesia, Marshall Islands, Nauru, Niue, PNG, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu

Focal Area: Climate Change Mitigation

Implementing Partner: Secretariat of the Pacific Regional Environment Programme (SPREP)

Sources of Funds & Value: GEF Grant: US\$5,225,000; Denmark (SIDS DOCK Support Programme): US\$3,000,000; Donors & NGOs: US\$513,000; SPREP: US\$500,000; SOPAC/UNDP: US\$500,000

FACTS

- In Kiribati, biomass is by far the largest source of renewable energy; according to Kiribati's 2009 National Energy Policy, biomass is estimated to supply 25 percent of the gross national energy use.
- The island nation of Tonga boasts of a 99 percent literacy rate.
- In Samoa and Fiji, coconut trees and their products account for 30 percent of GDP. The majority of small-scale farmers are dependent on coconuts for their livelihoods.

CONSISTING OF LOW-LYING ISLANDS AND ATOLLS VULNERABLE TO SEA LEVEL RISE AND EXTREME WEATHER EVENTS,

Pacific Island countries (PICs) are amongst the world's most vulnerable to climate change, although they have contributed least to the problem. Yet these countries are now highly dependent on imported fossil fuels for power consumption, which is an expensive and unsustainable source of energy adding to CO₂ emissions and is placing strain on the economy and the environment. Recognizing this issue, the governments of 14 PICs have banded together to break down barriers to the deployment and adoption of renewable energy technologies (RETs) never before tried by communities in the Pacific region, including solar-, hydro-, wind- and bio-energies.

The switch to renewable energy and energy independence to mitigate climate change and also to provide greater economic stability in Pacific Island countries is a regional priority.

In recognition of this imperative, 14 PICs joined forces in 2009 to launch the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (known as PIGGAREP). The initiative has been working in these countries to support national targets to promote RETs and to raise awareness about the potential and benefits of renewable energy technology in the region.

As a result, PIGGAREP will contribute to an estimated total reduction of CO₂ emissions in these countries by approximately 570,000 tons from 2009 to 2019 through direct energy installations, energy efficiency initiatives, training and awareness-raising.

From Feasibility to Action

With funding from the GEF and the Government of Denmark and support on the ground from UNDP and the Secretariat of the Pacific Regional Environment Programme (SPREP), PIGGAREP has funded 18 monitoring and feasibility studies in 10 partner countries to determine the potential for solar, wind, hydro and biomass technologies and to identify ways to feed renewable energy onto the grid.

For example, in Niue – an isolated island country with just 1,400 inhabitants and a surface of just 260 square kilometres, or one fifth the area of London or New Delhi – the national grid is vulnerable to fluctuations in the power consumption of single customers and a more secure energy supply is required.

In 2011, the government commissioned a 52-kilowatt-peak grid-connected solar system for the local hospital and Niue Secondary School. To avoid any instability in the power supply, a study funded by PIGGAREP recommended a maximum limit of 80 percent of renewable energy into the grid. The stability study allowed Niue Power Corporation to make informed decisions about how to integrate renewable energy into the grid while maintaining stable power supply.



"In Niue, we have been very keen to increase the share of renewable energy in our energy mix. However, due to our small size, we cannot rely too heavily on solar power without putting back-up batteries or other power systems in place. The stability study, such as the one funded by PIGGAREP, increased our confidence to invest in solar power," explains Speedo Hetutu, National PIGGAREP Coordinator.

In the Cook Islands, with a small population spread over 15 disparate main islands, PIGGAREP funded feasibility studies for wind and solar in several local communities, triggering NZ\$21 million in funding from the New Zealand Ministry for Foreign Affairs and Trade (MFAT) to install solar power systems on the six remote islands of Pukapuka, Nassau, Palmerston, Manihiki, Rakahanga and Penrhyn.

Today, over 600 people on these islands are using clean renewable energy. Additional funding from Denmark in 2012 went towards solar power electrification of the island of Palmerston, which provided 29 consumers (70 people) on the island with solar power and will reduce CO₂ emissions by nearly 550 tons (nearly 55 tons per year) over the next 10 years.

"The installation of solar power systems in local communities in Cook Islands is not only an important part of our country's ambitious target of 50 percent renewable energy in the national energy mix by 2015. It is also a cost-efficient solution for us, saving thousands of dollars every year by reducing fossil fuel imports," explains Tangi Tereapii, Director of the Renewable Energy Division of the Office of the Prime Minister in the Cook Islands.

Reducing the Consumption of Fossil Fuels

Through PIGGAREP, politicians, senior government officials, civil society and the general public have been able to hear, touch, see and read about sustainable renewable energy trials on the ground and know that these efforts are actually reducing the consumption of fossil fuel.

A biofuel feasibility study in Kiribati, with support from PIGGAREP Government of Denmark (through the SIDS DOCK Support Programme), led to the development of a copra biofuel project on the island of Abemama. The project will displace a large part of the annual diesel fuel oil consumption for power generation in the island, blending diesel fuel with coconut oil.

In Samoa, for example, the Annual Renewable Energy Awareness Day specifically targeting schools reached more than 2,000 students between 2010 and 2013. Samoa imports fuel costing more than US\$22 million per year and fuel imports account for 15 percent of all imports (as of 2008). Increasing awareness of the potential benefits of renewable energy amongst the younger generation has helped to change public opinion and to reduce future dependence on fossil fuel and fuel imports.

In addition, a solar photovoltaic grid connection feasibility study funded by PIGGAREP in Samoa has led to the installation of 546-kilowatt solar panels with funding from the Government of Japan and the Pacific Environment Community (PEC). This has reduced CO₂ emissions by more than 400 tons per year.

Hydropower feasibility studies completed in Samoa also revealed the potential for mini-hydropower stations on the island, catalysing the development of hydro sites with funding from the Asian Development Bank (ADB). PIGGAREP funded a hydro data collection programme to address the lack of baseline hydrological data in the catchments with hydropower potential. Good data were obtained from 2010 until 2013, showing that six sites have potential for generating electrical power, and construction of the sites is expected to start in 2018 with support from ADB.

"Micro-, mini- and small hydropower is an untapped energy resource in Samoa. Working together with partners including UNDP, the GEF, and the ADB, as well as with local communities, will allow the Electric Power Corporation of Samoa to explore our potential further. This is the sustainable way forward for Samoa and will bring income to local communities," noted Wairapa Young, Renewable Energy Officer at Samoa Electric Power Corporation.

The implementation of the PIGGAREP initiative has resulted in a unique and important regional platform for renewable energy and mitigation activities.



PHOTO BY PAULO AMERIKA

Managing for Resilience in Pacific Communities – The Challenge of Climate Change

PROJECT DETAILS

Title: Pacific Adaptation to Climate Change (PACC)

Countries: Cook Islands, Fiji, Federated States of Micronesia, Marshall Islands, Nauru, Niue, Papua New Guinea, Palau, Samoa, Solomon Islands, Tonga, Tokelau, Tuvalu and Vanuatu

Focal Area: Climate Change Adaptation

Implementing Partner: Secretariat of the Pacific Regional Environment Programme (SPREP)

Sources of Funds & Value: GEF Special Climate Change Fund (SCCF) Grant: US\$13,125,000; Australian Government: US\$ 7,800,000; PIC Governments: US\$44,303,799; SPREP: US\$100,000; UNDP: US\$100,000

FACTS

- Tourism is a vital sector of the economies of most SIDS. Tourism accounts for more than 30 percent of their total exports; in comparison, the average for the world is just over 5 percent.
- Pacific Island Developing Countries (PIDs) are responsible for only 0.03 percent of the world's carbon dioxide emissions and the emissions of the average island resident are only one quarter of those of the average person worldwide.
- Rainwater collection systems, such as rainwater catchments on the roofs of individual houses or paved runways, are commonly used on many PIDs. On some very small low-lying PIDs, rainwater collection on roofs or community buildings is the sole source of fresh water.

CLIMATE CHANGE THREATENS THE ACHIEVEMENT OF ALL DEVELOPMENT GOALS.

In the Pacific, it threatens the very ability of Small Island Developing States (SIDS) to remain viable population centres. They are especially vulnerable to the environmental, economic and social effects of climate change due to their low topographic elevation, geographic isolation, high population density near vulnerable coastlines, limited land and natural resources and low capacity for adaptation. Pacific nations have called for urgent and coordinated regional action to strengthen resilience, enhance cooperation between island nations that face similar risks, prioritize adaptation goals and overcome technical barriers.

The people of the Pacific Islands have a long history of living and coping with a volatile climate and environment. However, rapid climate change is now increasing the vulnerability of Pacific Island societies, adding to the many environmental problems that continue to limit options for future generations of Pacific Islanders. These changes include the intensity, frequency and distribution of extreme events, changes in temperature and precipitation patterns, ocean acidification and sea level rise.

In 2009, the governments of 14 Pacific Island countries (PICs) called for the development of a region-wide systematic framework to combat climate change.

The first major climate change adaptation initiative in the region, the Pacific Adaptation to Climate Change (PACC), has helped partner countries to lay the groundwork for more resilient Pacific communities that are better able to cope with climate variability today and climate change tomorrow. Efforts are focused on three key development areas: food production and food security, coastal management and water resources management.

Demonstration projects have focused on introducing practical adaptation technologies that benefit families in pilot communities. For farmers, adaptation solutions target crop production, such as planting climate resilient crop varieties that are more resilient to drought, waterlogging, salt water intrusion and pests. Enhanced farming and land use techniques for better soil and water conservation, such as mulching, organic farming, mixed cropping and drainage, are practiced. Improved food storage and processing techniques are other important climate change adaptation tools.

“Work to promote climate change adaptation and resilience building is driven from two directions,” explains Netatua Pelesikoti, Director of Climate Change Division at SPREP. “Through pilot demonstration projects that respond to national priorities and assessments, we can demonstrate how adaptation can work on the ground while facilitating the mainstreaming of climate risks into local, national and regional development planning and activities,” she explains.

Active from 2009 to 2014, over 150 governmental institutions, 1,200 officials and 300,000 community members in 14 partner countries engaged directly in climate change adaptation processes supported



by PACC. Funds from the Government of Australia allowed for the scaling up of demonstration projects to extend adaptation benefits to more communities.

Water Resource Management

Six countries – the Marshall Islands, Nauru, Niue, Tokelau, Tonga and Tuvalu – have been testing diverse options to harvest and store rainwater. “These islands all identified water as a priority issue at the start of the PACC programme in 2009,” explains PACC Programme Officer Peni Leavai. “They all rely heavily on rainfall for their freshwater and have been experiencing problems as rainfall patterns change.” Through support from PACC, projects in each country have made some very practical advances towards national water security; at the same time, they have contributed to policy frameworks that make their water sectors more resilient to climate change.

Nauru is a single island well known for its phosphate deposits. Less well known is the challenge that the island’s more than 9,000 inhabitants face in supplying their everyday water needs. Nauruans mainly rely on groundwater, but this has become increasingly polluted and contaminated with salt water. While Nauru is short on fresh water, it has plenty of sunshine. Exploiting this, the PACC project has installed 36 solar-powered water purifiers in households that are now producing an average of 60 to 80 litres of potable water per day. This sustainable technology is now expanding across the island and beyond.

Niue is another single-island nation that depends on rainwater, with most of the 430 households responsible for collecting and storing their own water. However, the cost of importing water tanks from New Zealand, combined with poor maintenance of guttering and pipes, was leading to inefficient systems and a looming crisis. Niue’s solution was to build a tank-manufacturing facility and produce its own water tanks at about half the price while conducting a national awareness campaign on maintaining these systems, pipes and fittings. The workshop opened in late 2013 and the locally made water tanks are currently being installed around the island, with a goal of 100 percent of households having new tanks and updated systems by the end of 2014.

Sustaining Food Production

In Fiji, local stakeholders have strengthened their knowledge of climate-resilient agriculture and have begun growing resilient traditional crops and vegetables that can grow in flood-prone areas.

In the village communities of Nakelo and Deuba, local people are now successfully planting three varieties of dalo, cassava and kumala. These crops are resilient to high water levels and are, therefore, suitable for flood-sensitive villages that are often inundated by salt water and flooding due to their proximity to the coast and the very heavy rainfall throughout the entire year. In addition, 750 students and 35 teachers in secondary and primary schools have been trained as future cultivators of crops grown in the flood-prone areas. New drainage models have also been introduced to reduce waterlogging of the soil.

“For Fiji to successfully adapt to a changed climate, we need to think new,” explains Dr. Mahendra Kumar, Director of the Climate Change Unit at the Ministry of Foreign Affairs and Trade. “The experiences of Nakelo and Deuba villages show that we should cultivate plants and species that are more resilient to extreme weather. They provide us with smart and more efficient solutions to manage our food supply.

This brings hope to the farmers and younger generations of Fiji. Climate change presents serious challenges, but Fiji will outsmart them by being innovative.”

Coastal Area Management

The island of Kosrae in the Federated States of Micronesia (FSM) has a new set of tide and sea level forecasts based on measurements from a new water level sensor funded by the PACC Programme. As a result, a revised shoreline management plan has been drawn up for the islands and coastal road plans are being adapted to consider the effects of sea level rise. The data, analysed by New Zealand’s National Institute of Water and Atmospheric Research Ltd. (NIWA), help people to predict high- and low-tide levels and times.

“This is the first time Kosrae has ever had this type of automatic monitoring equipment. We can now rely on our own daily tide data, which we broadcast twice a day via the Kosrae Public Radio Station,” explains Mr. Simpson Abraham, PACC National Coordinator for the FSM. “The tide data highlight the dates of expected very high tides, which enable planning for possible flooding events that can have negative impacts on the coastal population, vegetation and infrastructure.”

“Given the amount of vulnerable development and infrastructure located within the coastal margins of Kosrae, having good sea level information to underpin adaptation and disaster management decision-making is vital,” adds Doug Ramsay of NIWA. The plan now is to replicate the work being done in Kosrae in the three other Micronesian states: Chuuk, Yap and Pohnpei.

The PACC initiative has thus evolved to become an important network and family of people and professionals representing 14 Pacific Island nations and their development partners. Working on the frontline of climate change, all are committed to working together to address future threats and to harness new opportunities.



PHOTO BY PAUL MAOATE

Managing Oceanic Fisheries in the West and Central Pacific Ocean

PROJECT DETAILS

Title: Pacific Islands Oceanic Fisheries Management Projects (PIOFMP)

Countries: Cook Islands, FSM, Fiji, Kiribati, Marshall Island, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu

Focal Area: Oceans

Implementing Partner: UNDP

Sources of Funds & Value: GEF Grant: US\$11,000,000; Governments: US\$43,300,000; Others: US\$93,100,000

FACTS

- Although occupying a small land area, Pacific Island nations become large ocean states when one also considers their ocean boundaries. For example, the area of Tuvalu's Exclusive Economic Zone is 27,000 times larger than its land area.
- For Pacific SIDS, the most common trading partners are Australia, Singapore, Japan and New Zealand.
- According to data from the Food & Agriculture Organization of the United Nations (FAO), fish (the vast majority of which is from coastal areas) represents 38.7 percent of the total animal protein intake among people in the Pacific Islands region, which is much greater than the world average of 16.1 percent.

THE WESTERN AND CENTRAL PACIFIC OCEAN (WCPO) is a vast expanse of sea dotted with islands comprising some of the world's smallest and least developed countries. With small land areas and growing populations, the sustainable management of oceanic fisheries in the Pacific is critical for the people of the islands for their livelihoods, food security and government revenue, as well as for the international community seeking to conserve this unique marine ecosystem. These global environmental benefits and local development goals have brought together governments in the Pacific Islands and the international community to manage fisheries in the region.

The Western and Central Pacific Ocean, also known as the Western Tropical Pacific Warm Pool Large Marine Ecosystem (WTP LME), is an oceanographically complex and variable, yet scientifically poorly known, water body of great value for global biodiversity and fisheries. It supports the world's largest stocks of oceanic fisheries, including about one third of the world's tuna landings. These are migratory species that travel through vast distances of ocean and many national jurisdictions, necessitating large-scale, international, collaborative approaches to management.

There are many causes of the deteriorating health of the world's oceans, including overfishing, chemical and nutrient pollution, habitat alteration, introduction of exotic species and global climate change. Collectively, these threats imperil the rich biological diversity of life in the sea. However, the effect of destructive fishing practices overshadows them all.

The region also contains globally important stocks of sharks, billfish and other large pelagic species, whales and other marine mammals and turtles, which are under threat of extinction from the unrestrained impact of human activity on this fragile ocean.

As a result, the conservation and sustainable use of globally important transboundary fish stocks and the protection of the associated species, especially sharks, seabirds and sea turtles, while considering climatic variability and change, is a global as well as regional priority.

In 2005, a number of Pacific SIDS – Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tokelau, Tuvalu and Vanuatu – joined forces to launch the Pacific Islands Oceanic Fisheries Management Project (PIOFMP) to more sustainably manage the oceanic resources and conserve the ocean biodiversity upon which they depend.

Spanning almost 40 million square kilometres – over 10 percent of the entire world's surface of the WCPO region – the PIOFMP is large in scope and complex in design.



Through the initiative, participating SIDS have received training and technical support to strengthen fisheries management through UNDP and have benefited from legal, compliance and scientific advice and assistance coordinated by the regional Pacific Islands Forum Fisheries Agency (FFA) in conjunction with the Secretariat of the Pacific Community (SPC) and the International Union for the Conservation of Nature (IUCN).

While supporting conservation efforts, the PIOFMP made a real contribution to sustainable development by tripling the dollar value of landings for the fleets and increasing revenues for the countries – the net economic benefits to PICs totalled US\$3,214,000,000.

Transforming Fisheries Management in the WCPO

The PIOFMP has transformed the management of tuna fishery in the WCPO. The region has become one of the most successful implementations of the UN Fish Stocks Convention, using science and ecosystem-based approaches and cutting-edge compliance, monitoring and enforcement technology and other measures.

By 2014, a comprehensive set of monitoring and compliance programmes, including the world's largest on-board observer initiative applying 100 percent coverage to the approximately 1.5-million-ton purse seine fishery from January 2010, was in place with lesser coverage rates across all regional tuna fisheries.

Harold Normanvilia, a fisheries monitor in the Solomon Islands, now benefits from the new monitoring. "This data is extremely important for fisheries managers and scientists to analyse fishing data within the region. This is my place, my fish. So I have to take responsibility to ensure that my country's fishing industry is properly managed," he explains.

The world's only regional satellite-based vessel tracking system requiring direct reporting to the Western and Central Pacific Fisheries (WCPF) Commission and FFA has also been established, while the first regional high seas boarding and inspection programme has been set up in accordance with the UN Fish Stocks Agreement.

The project has also helped to address fisheries conservation and management while considering the whole ecosystem and addressing by-catch and non-target species concerns, such as sharks, turtles and seabirds. For example, while fish aggregating devices are controversial, scientists are hopeful that future designs may have more sophisticated sensors that collect data on what type of biomass is beneath it, which could help fishing companies avoid by-catch.

"Technology has played a big role in increasing the catch of tuna, but at the same time technology can assist us by ensuring that our catch is sustainable. In this way not only do the fishing companies win, but we win, and the tuna win because we understand their life cycle better," observes Dr. Simon Nicol of the Secretariat of the Pacific Community.

Strengthening National and Regional Capacities to Manage Oceanic Fisheries

At the national level, support from PIOFMP has strengthened the capacity to analyse stock assessments and coordinate and monitor fisheries data. There is now increased understanding of the effects of fisheries on the region's seamounts and better management of oceanic fisheries.

At the local level, sustainably managed local fisheries for migratory fish stocks can promote long-term employment and greater food security and reduce poverty in Pacific SIDS.

Through the improved management of tuna fisheries, the livelihoods and food sources for many Pacific Islanders can become more reliable. In the Solomon Islands, for example, SolTuna, the country's tuna loining and canning processing facility, employs about 1,700 people, 65 percent of whom are women. Over 100 tons of tuna are processed daily, allowing for a greater share of the tuna value chain to be captured locally. In addition to enhancing food security and boosting exports, SolTuna provides subsidized housing and free commuter transportation, allowing people from nearby rural villages to travel to decent work.

"This cannery is really important to the people here, their lives, their families, and to the surrounding communities. Many jobs here depend totally on the fish that we catch in our waters so we must manage our resources sustainably," says Hearty Matamaru, SolTuna Quality Control Inspector in the Solomon Islands.

At the regional level, the project has helped to strengthen the scientific knowledge base of the WTP LME, including ecosystems analysis, which has led to better management decision-making in the region. Researchers for the Secretariat of the Pacific Community are tagging thousands of tuna with tracking devices to gain information about the health of the tuna population and the marine ecosystem.

Strengthening Regional Fisheries Governance

At the regional level, PIOFMP has supported the negotiation and entry into force of a major international Convention: the Western and Central Pacific Fisheries Convention. This helped to establish the Western and Central Pacific Fisheries Commission for the Convention and drove early efforts to establish conservation and management measures for the region's highly valuable tuna fisheries.

Through this process, the project has helped to build recognition of the Pacific Islands as a group of coordinated SIDS and to secure their role as leaders and partners in the Commission. This has ensured that PIC policies, laws and regulations are amended to reflect their obligations not only to regional, but also to international fisheries conventions and agreements. For example, experts in monitoring, control and surveillance of fisheries from the 17 member countries and territories of the FFA met recently in the Solomon Islands to discuss how they can better respond at a coordinated regional level to illegal fishing.

Overall, the PIOFMP has demonstrated the vital importance of large-scale, coordinated and integrated approaches in ocean-scale conservation and management. As poignantly noted by Adrian Wickham, Senior Manager at SolTuna, "If we lose our tuna, we lose our entire way of life."



PHOTO BY BARBARA HANCHARD

Africa, Indian Ocean and South China Sea (AIMS)





Mauritius Puts Energy Sector on a Green, Low-carbon Path

PROJECT DETAILS

Title: Removal of Barriers to Energy Efficiency and Energy Conservation in Buildings and Industry

Country: Mauritius

Focal Area: Energy

Implementing Partner: Ministry of Energy and Public Utilities (MEPU)

Sources of Funds & Value: GEF Grant: US\$912,411; Denmark (SIDS DOCK Support Programme): US\$1,000,000; MEPU: US\$400,000

FACTS

- In Mauritius, the two main energy-consuming sectors were transport and manufacturing, accounting for 51.8 percent and 24.4 percent of the energy consumed, respectively.
- Sugar cane is the largest crop in Mauritius, occupying 45 percent of agricultural land. Carbon dioxide emissions from one litre of sugar-cane-derived ethanol are only 10 percent of the carbon dioxide emissions from one litre of gasoline.
- The cultural diversity of Mauritius is attributable to years of French, African, Chinese, Indian and British immigrants settling on the islands.

BUILDINGS ACCOUNT FOR ABOUT 78 PERCENT OF CARBON EMISSIONS

in Mauritius. Buildings and other developments can also harm the environment through poor waste management and inefficient use of resources. Efforts to reduce carbon emissions from buildings and to ensure that planning policies help to protect and improve the natural and built environment have been stepped up in Mauritius. Work to reduce barriers to energy efficiency in residential and commercial buildings and to reinforce the development of a market approach to improve building energy efficiency in both existing and future stock is underway.

Buildings are key to global climate change mitigation efforts because their design, construction, operation and human activity inside them account for approximately one third of global final energy demand, one third of energy-related CO₂ emissions and two thirds of halocarbon emissions.

In Mauritius, energy use from buildings currently accounts for about 78 percent of carbon emissions and also harms the environment through poor waste management. Consequently, efforts to reduce carbon emissions from buildings and establish policies to make the natural and built environment more resource-efficient can bring multiple development benefits.

To date, there have been significant measures to reduce barriers to energy efficiency in residential and commercial buildings in combination with the launch of new incentives to adopt rooftop photovoltaic systems to decarbonize Mauritius's built environment. A similar approach, considered key to reducing country's energy-related CO₂ emissions and the costs of importing fuel, is now being pursued for the country's industrial sector.

The project Removal of Barriers to Energy Efficiency and Energy Conservation in Buildings, which the Ministry of Energy and Public Utilities (MEPU) launched in 2008, has made an important contribution to this effort. Funded by the GEF and supported on the ground by UNDP, the project works at the policy level to promote energy efficiency through sound governance and on the ground with businesses in the industrial sector, such as textiles and food industry processing, to improve their energy efficiency. As a result, the MEPU has played a critical role in piloting public and market-based instruments to shift investments from fossil fuels to more climate-friendly alternatives and in establishing enabling policy environments for their large-scale adoption.

Changing Policies to Promote Energy Efficiency

At the national policy level, the project has supported the development and formal enactment of the far-reaching 2012 Energy Efficiency Act, which created a functional energy efficiency market. The Act, together with the new Building Control Act and new regulations stipulating more energy efficiency standards for all new buildings, replaces building legislation that had been in place for 100 years. A new Energy Efficiency Code will be attached to the



new Energy Efficiency Act, providing a comprehensive and far-reaching new framework for the energy management of buildings in Mauritius.

In addition, the Energy Efficiency Act has led to the establishment of an Energy Efficiency Management Office (EEMO) to manage enforcement of the new regulations. With the support of the State Law Office, the EEMO is now finalizing draft regulations for mandatory energy performance standards for selected household electrical appliances.

These regulatory changes have stimulated demand and supply for energy-saving services and technologies in the building, industrial and appliance sectors. There are now several local firms specialized in performing energy audits of buildings and industrial processes and several owners of non-residential buildings and industrial plants have voluntarily undertaken energy retrofits. Dr. M. Husaundee, former project manager and current independent energy specialist, says, "There is no doubt that there is an emerging market for energy efficiency services, assessments and audits as a result of the project."

Working with Industry to Remove Barriers to Energy Efficiency

The Ministry of Industry, Commerce and Consumer Protection (Industry Division) is currently developing a software tool for the energy auditing of energy-intensive industries and has published an industrial energy audit guidebook and a code of good practice for energy management in industries. This is especially important, since studies have shown that potential annual cost savings attributable to energy efficiency measures in industrial sectors can amount to 100 million rupees, the equivalent of US\$3 million.

Surveys and feedback confirm that sector players are now using and maintaining compressed air systems, steam distribution, lighting and air conditioning in place of less efficient models. Most participants are using the Code of Good Practice to guide their energy management decisions. Energy audits in various enterprises have revealed energy savings of up to 30 percent over the past six months.

In addition, the EEMO has run a public Energy Efficiency Awareness campaign in recent months to raise awareness about the importance of improving the energy efficiency of homes and businesses. Marketing and information materials have been developed, including posters, TV clips and bus advertisements. In addition, a school essay competition on the theme of energy efficiency in buildings is currently ongoing to further promote the efficient use of energy.

Via a mixture of 'carrots and sticks', these interrelated clean energy policies and activities have made Mauritius a regional leader in adopting a low-carbon pathway.

Using Incentives to Stimulate Market Demand

Beyond just energy efficiency, the project has also significantly contributed to the promotion of small-scale renewable energy via new regulations and incentive schemes.

Prior to 2010, there was no framework that allowed small independent power producers or households to sell renewable energy back to the grid. With support from the project, the Ministry of Energy and

Public Utilities, together with the Central Electricity Board, developed a small-scale grid code to promote the connection of small-scale independent auto-producers to the national grid.

Mechanisms that provide renewable energy generators with a fixed long-term price for power and allow them guaranteed access to the electricity grid are often referred to as Feed-in Tariffs (FiTs) because they enable generators to feed their power into the electricity system, whereas the domestic energy market structure may not have previously allowed this.

In parallel to the grid code, the project supported the development of a Feed-in Tariff (FiT) scheme for small-scale distributed generation (SSDG) energy systems smaller than 50 kilowatts. The scheme has been a great success, attracting over 400 applications for residential and commercial systems (totalling 3.8 megawatts of installed capacity) and over 80 applications from public, educational, non-governmental and religious organizations. As of June 2014, close to one megawatt of these new green power systems had been installed and commissioned; the total cap supported under the GEF project is five megawatts.

This bodes well for a second phase, which will promote the development of a FiT for larger systems over 50 kilowatts. Thanks to a subsequent grant by the GEF for a dedicated project specifically promoting Solar PhotoVoltaic, the SSDG scheme is now being replicated for large-scale systems.

Looking ahead, a key challenge will be to secure a recurring source of funds to support this incentive payment until renewable energy can be on full cost parity with fossil fuels. Until now, the FiT for photovoltaic systems smaller than 50 kilowatts had been supported by a tax on fossil fuel generation, but the revenues from these taxes are insufficient to support the premium required for an FiT for larger independent power systems. The new Solar PhotoVoltaic project will help to ensure the financial sustainability and expansion of renewable energy generation in Mauritius in the medium term.



PHOTO BY ENERGY EFFICIENCY MANAGEMENT OFFICE OF MAURITIUS

Safe Disposal and Management of Persistent Organic Pollutants in Mauritius

PROJECT DETAILS

Title: Sustainable Management of Persistent Organic Pollutants

Country: Mauritius

Focal Area: Chemicals

Implementing Partner: Ministry of Environment

Sources of Funds & Value: GEF grant: US\$902,250; Ministry of Environment: US\$198,000; Ministry of Health: US\$755,000; Others: US\$30,000

FACTS

- In 2011, Mauritius was ranked second out of 91 countries for best overall air quality on the basis of a WHO study.
- Mauritius is the only place in the world where one can find sand dunes of seven different colours. This geological wonder, known as 'seven-coloured earth', is in Chamarel Park.
- One of the most famous extinct species, the dodo bird, which was indigenous to Mauritius, was last seen in 1861. Contrary to popular belief, human consumption did not wipe out the bird's presence. Rather, the alien species brought to the island by Europeans became the Dodo's first predator, which caused its extinction.

THE SAFE DISPOSAL AND MANAGEMENT OF WASTE (including hazardous waste) is a challenge for many SIDS, where the impacts of poor planning practices in small, interconnected environments quickly manifest themselves as ecosystem damage, health risks and development challenges. This rings true for the Republic of Mauritius, where there are no disposal facilities for liquid waste and there is very limited capacity for solid hazardous waste management. Until recently, owners of obsolete Persistent Organic Pollutants (POPs) have not been able to dispose of this dangerous material responsibly.

In recent decades, the use of POPs in the Republic of Mauritius was largely restricted to polychlorinated biphenyls (PCBs) in transformers and dichlorodiphenyltrichloroethane (DDT) as a malaria vector control agent. Small amounts of other pesticides were used in the past, but were never applied in significant amounts.

In line with the Dangerous Chemicals Control Act, the import, export and use of all POPs except DDT have been forbidden in Mauritius since 2004. However, the POPs inventory, undertaken in the same year, showed that more than 100 metric tonnes of DDT, five metric tonnes of PCB-containing oil and 0.1 metric tonnes of other pesticides remained on the island. While the application of PCBs in transformers was halted in the 1980s, some transformers in use still contain PCBs. Until late 2011, DDT was also still being applied for vector control, albeit in moderate amounts (around 600 kilograms per year).

As often is the case in SIDS because of their small land area, there are no disposal facilities for liquid and there is very limited capacity for solid hazardous waste disposal available in-country. Continued storage and incorrect disposal increase the potential for release to the environment.

UNDP has been assisting the Government of Mauritius in developing and implementing a project supported by the GEF. The overall objective of the project is to address the first two national priorities related to the reduction and elimination of POPs as identified by Mauritius in its 2005 National Implementation Plan (NIP): i) disposal of obsolete POP chemicals and clean-up of POP-contaminated areas and ii) development of alternative strategies for malaria vector management with reduced or eliminated reliance on DDT.

Safe Disposal and Safeguarding of Remaining POP Stockpiles

To date, UNDP has helped to repackage and ship abroad 139 metric tonnes of DDT and 5 metric tonnes of PCBs and PCB-contaminated transformers for responsible disposal. This means that virtually all POP waste in Mauritius has been eliminated. Only 5 metric tonnes of DDT – the only remaining POP on the island – will be safely stored in Pamplemousses as a precautionary measure in case of malaria outbreak. Soil remediation of three sites (at Mahebourg hospital,



Fort George and Pamplemousses) has also been carried out by transporting contaminated soil to The Netherlands for disposal at an approved facility.

Efforts to promote disposal and remediation demonstrate the increased awareness and will of all interested stakeholders to address the issue of hazardous waste management. "The implementation of the UNDP-GEF POPs project shows the determination of the Government of Mauritius to protect the population from the risks associated with the long-term use of chemicals such as DDTs and PCBs," explains the Honorable Devanand Virahsawmy, Minister of Environment and Sustainable Development. "This is why we did not hesitate to go beyond the scope of the project to decontaminate the soil and premises of Mahebourg and Pamplemousses hospitals by providing additional co-financing. The first two priorities of our NIP have thus been adequately addressed."

Developing Alternatives for POPs

The POPs project has facilitated identification, testing and selection of effective and safe alternatives to DDT, such as pyrethroids, which are derived from chrysanthemum flowers. All DDT spraying in sea and airport areas was discontinued as of end of 2011. Before the project started, 600 kilograms of DDT were used annually.

In order to reduce dependence on DDT for controlling the spread of malaria, the project is working with the Ministry of Health and Quality of Life to develop an Integrated Vector Management (IVM) strategy. The IVM is being piloted at the village level with local surveillance of mosquito breeding places and monitoring of the pyrethroid alternative to ensure safe use.

The work on piloting the new IVM strategy is being fully documented with evidence and recommendations for future decentralized approaches to IVM and will be submitted to the government. This is being helped by the development of a central database management system, which will document findings from pilot activities including local surveillance of mosquito breeding places, safe use of pyrethroids instead of DDT (which is more suitable for indoor spraying) and protection with bed nets.

Since the project's launch, no malaria outbreak has occurred and only imported cases of malaria have been observed. As a result of the project's awareness-building activities and the risk assessment report, DDT spraying has been discontinued.

Building Capacities to Manage Obsolete Stockpiles

Efforts to develop the capacity of stakeholders to safeguard obsolete stockpiles has been prioritized. The Project Steering Committee involving several line ministries and private and non-governmental stakeholders has provided a continuous platform for discussion, information exchange and project management.

Mrs. Ng, Chairperson of the Project Steering Committee and Director of the Department of Environment, emphasizes that "the success of this project hinges on excellent collaboration between all stakeholders involved – namely, governmental institutions including the Ministry of Health & Quality of Life, private sector organizations who have fully collaborated in the disposal of the POPs in their possession and old stocks of hazardous wastes as well as NGOs and civil society."

The project has prepared reports and guidance on the safeguarding of POPs wastes for the Ministry of Environment to assist in the storage, handling and transport of obsolete stockpiles. These supplement existing environmental legislation developed for hazardous and dangerous chemical wastes.

Documents setting out best practice for the safe management of POP stockpiles have also been prepared. These include 'Safeguarding of POP Waste', 'Identification of POP Chemicals and Certified Containers', 'Legal Review of Regulations and Laws Governing the Storage, Handling and Disposal of POPs', and 'Potential Remediation of Highly Contaminated POP Sites on Mauritius'.

Steps have been taken to promote awareness and training to create a sustainable POP-free system in Mauritius. A series of one-page pamphlets have been designed and printed as part of the project's Responsible Care Programme for distribution to importers, distributors, users and the general public to promote improved laboratory safety practices and better management of household and industrial chemicals generally and POPs specifically.



Atoll Ecosystem Conservation in the Maldives

PROJECT DETAILS

Title: Atoll Ecosystem-based Conservation of Globally Significant Biological Diversity in the Maldives' Baa Atoll

Country: Maldives

Focal Area: Biodiversity

Implementing Partner: Ministry of Environment & Energy

Sources of Funds & Value: GEF grant: US\$2,370,100; Government: US\$845,700; UNDP: US\$271,765; Private Sector: US\$66,192

FACTS

- Maldives is the lowest country in the world. About 80 percent of its land lies under one metre and its highest point, a spot in Villingili Island that stands at 2.3 metres, is the lowest on the planet.
- 99 percent of the area of the Maldives is water.
- The word 'atoll' is derived from the Divehi word 'atholhu', which means a ring-like coral island surrounding a lagoon. It is the only English word derived from Divehi, the language of the Maldives.

THE MALDIVES, CONSISTING ENTIRELY OF CORAL REEFS, the most diverse of all marine ecosystems, is under threat. To the naked eye, the signs of biodiversity loss and climate change are almost imperceptible. But government scientists fear that rising sea levels will eventually swamp 80 percent of its 1,200 islands, leaving the country uninhabitable within 100 years. The government is working to alleviate the worst effects, focusing on ecosystem based adaptation and biodiversity conservation to strengthen socio-ecological resilience.

In the Maldives, atoll ecosystems provide the basis for the country's existence as well as life-supporting services, including shoreline protection and goods upon which the economy entirely depends. Fisheries and tourism are the mainstays of economic growth.

But the country is desperately vulnerable to the effects of climate change. Sea level rise and extreme weather events such as tropical cyclones, in combination with biodiversity loss and ecosystem degradation due to deforestation and soil erosion from sub-standard agricultural practices, are major threats to the people, infrastructure and livelihood assets and thus to the long-term future of the Maldives.

It is estimated that sea level rise of just a metre would submerge all land of the Maldives.

In the past, many important policy decisions affecting biodiversity were taken within individual sectors, such as infrastructure, fisheries and tourism, without much coordination and integration.

Now, demand in the region is growing for systematic adaptation planning within and across relevant development sectors to protect the natural endowment that is essential to maintaining the structure and function of globally significant atoll ecosystems and the livelihoods and environmental security of the people. Improved understanding of the possible impacts of climate variability for the country as a whole and for target industries is critical.

In 2007, the Government of Maldives, in partnership with UNDP and with funding from the GEF, took up the challenge. It launched the full-sized Atoll Ecosystem-Based Conservation of Globally Significant Biological Diversity in the Maldives' Baa Atoll project, known as the Atoll Ecosystem Conservation project (AEC).

Efforts focused on designing an effective management system for atoll ecosystem conservation and sustainable development. The aim was to conserve biodiversity by mainstreaming biodiversity into productive sector policies and practices, with emphasis on supporting sustainable alternative livelihoods. Baa Atoll (also called South Maalhosmadulu Atoll), located within a marine protected area, was the pilot atoll selected for the project. Active for just five years, it is the country's first large environmental project.



In order to build support for the initiative, a participatory process brought together national and local stakeholders to discuss the conservation and sustainable use of the atoll environment. At the national level, government and non-government representatives were engaged and partnerships were established with the Ministry of Fisheries and Agriculture (MoFA), the Environment Protection Agency (EPA), the Ministry of Tourism, Arts and Culture (MTAC), the Department of National Planning, the Marine Research Centre (MRC) and the Ministry of Home Affairs.

At the local level, the Atoll Council, Island Development Councils and Women Development Committees (WDC) were the main stakeholders. Other stakeholders included the Maldives Association of Tourism Industry (MATI), the Liveaboard Association (LAM), other safari boats not belonging to LAM, dive centres, resorts, fishermen, farmers, the community in general and national and local NGOs.

In 2011, as a result of the project's work, Baa Atoll was recognized as a UNESCO World Biosphere Reserve. UNESCO noted the Baa atoll's "great potential for demonstrating sustainable development throughout the Maldives and the region", while building a 'blue' economy.

Many factors contributed to the success of the project, but the cornerstone was the effective public-private partnership established to manage the Biosphere Reserve. National and local authorities partnered with the tourist sector, which is the main economic force in Baa Atoll (employing 61 percent of the working population), to pilot environmental conservation at the atoll and island levels.

As a result of the project, stakeholders fully recognize the dependence of the Maldivian economy on fragile biological resources and natural ecosystems and the need to integrate them into economic policies, strategies and budgets to ensure sustained and equitable national economic growth.

Fuelled by healthy competition, environmentally sustainable practices were adopted throughout the tourism industry. Good practices in one dive centre or resort were quickly followed by others.

The designation of Baa Atoll as a Biosphere Reserve will ensure that the tourism industry continues to develop with biodiversity and sustainable use objectives at the forefront.

"Baa Atoll was a simple and poor atoll," says Abdul Razzaq Mohamed, the retired Chief of Baa Atoll. "It is the local people who have worked to protect and manage the atoll sustainably who have made the atoll what it is today."

The project also worked to establish eight other protected areas in Baa Atoll and the boundaries of two existing protected areas were extended to place much of the total 1,200 square kilometres of Baa Atoll under protection.

The first protected area management plan of the country was completed for the Hanifaru Protected Area, a world famous biodiversity hotspot for manta rays and sharks. Anecdotal, resorts and dive centres in the area have reported that the number of visible animals (mainly manta rays and occasionally sharks) has increased year on year since implementation of the management plan.

The government's commitment to conservation is evident in its inclusion of biodiversity conservation principles in key national and local policies.

"Maldivians have been coexisting with the environment for centuries, and we are once again beginning to take heed of it and realizing the importance of conserving nature," continues Mr. Mohamed. "If we don't protect the environment that surrounds us, what is left to save us?"

The Baa Atoll Conservation Fund, a financial mechanism to sustain livelihoods and directly benefit local communities, is also regarded as a major achievement, the first of its kind in the country's history.

The AEC Project has received political support at the highest level. At Rio+20, the President of the Maldives announced the intention to extend the Biosphere Reserve to all areas of the country within five years.



Building a Sustainable 'Blue Economy' in the Seychelles

PROJECT DETAILS

Title: Mainstreaming Biodiversity Management into Production Sector Activities in Seychelles

Country: Seychelles

Focal Area: Biodiversity

Implementing Partner: Ministry of Environment and Natural Resources

Sources of Funds & Value: GEF Grant: US\$3,600,000; Government: US\$3,009,000; NGOs: US\$2,617,950; Private Sector: US\$2,000,000

FACTS

- The Seychelles is part of one of the major biodiversity hotspots in the world (Madagascar and the Indian Ocean Islands).
- A high proportion of women (43.8 percent) hold seats in the national parliament of the Seychelles.
- In just 10 years (2002 to 2012), the Seychelles' gross national income (GNI) per capita increased by nearly 80 percent.

THE 115 ISLANDS OF THE REPUBLIC OF SEYCHELLES include the planet's oldest. Their globally significant biodiversity boasts unique plant and animal species. But tourist brochure images of pristine island paradises often belie the challenges to the islands' people, the environment and the emerging 'blue economy'.

Despite the diversity and exuberance of their natural endowment, the Seychelles faces the typical constraints of an SIDS. With a small land area and population, remoteness from major markets, limited natural resources and environmental vulnerability, addressing the country's development challenges is a balancing act.

The country's Exclusive Economic Zone covers more than 1.3 million square kilometres – an area almost the size of Antarctica – compared to its land area of only 455 square kilometres. With such a large swathe of ocean under the country's jurisdiction, the economy of the Seychelles must be blue – and sustainable – if future generations are also to reap long-term development benefits.

Today, fisheries and tourism are the most important national sectors for revenue and jobs. Tourism and associated services account for more than half of GDP. Fish catches are valued at around US\$35 million per year and account for more than 90 percent of exports. Both sectors are nature-based, so they depend directly on the services that ecosystems render to the economy, including the availability of areas of outstanding natural beauty and generous fish stocks.

In stepping up to meet the challenges of the blue economy, the Seychelles has become a global frontrunner in biodiversity and ecosystem management.

Through partnerships developed between government, tourism operators and NGOs for the protection of key biodiversity areas, the Seychelles is working to 'mainstream' biodiversity conservation into key economic policies and sectors. The fisheries and tourism sectors are priorities. This GEF-funded work has been supported by UNDP since 2007 and is part of a wider programme that addresses issues of biosecurity control, management of protected areas and restoration of degraded ecosystems in Seychelles.

To date, the project has vigorously mainstreamed biodiversity management into key policies and institutions; developed methods and means for integrating biodiversity into artisanal fisheries management; and made biodiversity conservation a routine part of business operations in the tourism sector.

The Seychelles tourism industry, in particular, has embraced the challenge of integrating biodiversity conservation into its daily operations. Ten small tourism projects, supported by UNDP and the GEF, assisting private tourism operators to preserve ecologically sensitive sites on and around their tourism establishments. These



projects include enhancing conservation of biodiversity at Port Launay, where a tourist resort operates alongside a designated Ramsar site.

Some tourism projects support the conservation efforts of Denis Private Island by increasing environmental awareness and measures for sustainable conservation management, while still others endeavour to improve native forest biodiversity, develop a stewardship approach to conserving marine biodiversity and restore coral gardens in the surrounding waters of various tourism establishments.

Of the 41,400 square kilometres that compose the Mahé Plateau, 27,000 square kilometres of land and seascapes in the Seychelles can be said to be either under ‘improved management’ or ‘heightened conservation status’.

As a result, the Seychelles Tourism Board and the Ministry of Tourism and Culture have launched a sustainable tourism label for tourism establishments, working towards eco-friendly standards. The NGO Sustainability for Seychelles (S4S) has stated, “This labelling system makes it easier for tourists to specifically choose accommodation that is more sustainable.”

In addition, over 8 square kilometres of ecologically sensitive habitat have been placed under improved conservation management plans through collaboration among NGOs, the government and private tourism operators. Priority conservation actions have included turtle habitat protection, wetland and forest rehabilitation, bird conservation and re-introduction, beachfront management and measures to control IAS.

In the fisheries sector, the project has supported the improved management of fisheries across the fishable area within the shallow strata for the Mahé Plateau – some 26,500 square kilometres. It has helped to establish the Praslin Fishers Association (PFA), the first artisanal fishermen association in the Seychelles, which has played a major role in developing the co-management of fisheries resources on Praslin Island. It is directly helping the PFA to change fishing practices and to reap the benefits of co-managed fisheries. As a direct result of the project, a 611.67 square kilometre Special Co-management Area around Praslin Island and vicinity was proposed in 2012, alongside a Fisheries Co-Management Plan, both of which are now effective.

“The fishers in the association have worked in collaboration with the Fishing Authority and the National Parks Authority to set up management measures to discontinue unsustainable fishing practices or over-fishing in the waters surrounding Praslin Island,” explains Mr. Darell Green, Chairperson of the Praslin Fishers Association. “The fishers are willing to participate in a fisheries monitoring, control and surveillance protocol to prevent the depletion of key fish stocks around the island.”

In 2013, the project facilitated and established the first fishery co-management system in the Seychelles. The Seychelles Fishing Authority and the Praslin Fishers Association has signed a

co-management plan advocating sustainable fishing around Praslin Island (the second largest in the Seychelles). The fishers will now be responsible for self-policing compliance with the agreed management rules. Consequently, the pilot management system is being adapted and replicated to establish a co-management system for artisanal fisheries on Mahé Island and the entire plateau.

The development of Land Use Plans (LUPs) is leading to improved landscape management and the promotion of effective biodiversity conservation in the Seychelles. Twenty-five LUPs covering 200.62 square kilometres are almost complete. The Plans have identified and mapped priority areas for conservation, urban expansion, housing, tourism development, agriculture and other uses. In addition, Key Biodiversity Areas have been identified and currently cover 130.26 square kilometres.

“Today, more than fifty percent of our territory is protected. We have undertaken plant rehabilitation and habitat restoration on some of the Islands to consolidate this reputation of preservation and biodiversity conservation in Seychelles,” confirms Prof. Rolph Payet, Minister for Environment and Energy for the Seychelles.



Working Towards Resilient Development in African SIDS



PROJECT DETAILS

Title: Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa (Africa Adaptation Programme)

Countries: São Tomé & Príncipe and Mauritius (of a total of 20 countries)

Focal Areas: Climate Change Adaptation; Disaster Risk Reduction

Implementing Partner: UNDP

Sources of Funds & Value: Government of Japan: US\$92,100,000

FACTS

- São Tomé & Príncipe is Africa's smallest state. The two main islands are a part of a mountain range consisting of nine active volcanoes.
- Mauritius has been designated by IUCN as a "Centre of Plant Diversity" and is part of the Madagascar and Indian Ocean Islands biodiversity hotspot.

THE EFFECTS OF CLIMATE CHANGE AND THEIR COMPLEXITY POSE CONSIDERABLE RISKS TO IMPORTANT ECONOMIC DRIVERS, human welfare and the environment in vulnerable SIDS. Without the integration of climate change adaptation into core development processes, these complex impacts are likely to jeopardize hard-won development gains in the African countries of São Tomé & Príncipe and Mauritius.

The SIDS of São Tomé & Príncipe and Mauritius are particularly vulnerable to the effects of climate change. Risks include rising temperatures, more frequent and extreme weather events (especially flooding) and sea level rise that adds to existing coastal erosion.

In order to adjust their national development processes to incorporate these climate change risks as well as opportunities, São Tomé & Príncipe and Mauritius became part of the Africa Adaptation Programme (AAP), funded by the Government of Japan and implemented by UNDP. As part of this large regional programme, Mauritius and São Tomé & Príncipe achieved valuable results in terms of climate change adaptation and disaster risk reduction.

Active from 2008-2012, the AAP was established under the Japan-UNDP Joint Framework for Building Partnership to Address Climate Change in Africa, which was founded at the Fourth Tokyo International Conference on African Development (TICAD) in May 2008. The AAP worked with 20 African countries drawn from every subregion of Africa, including 10 Least Developed Countries (LDCs) and two SIDS – Mauritius and São Tomé & Príncipe.

São Tomé & Príncipe

Through partnership with the AAP, São Tomé & Príncipe has achieved important national and local changes.

At the national level, the government, with AAP funding, commissioned a baseline study to integrate climate change priorities into the National Poverty Reduction Paper, which fed into the development of the National Priority Action Plan. Vulnerability studies were also completed to support the development of the National Disaster Response Strategy, helping to set up the Commission for the Management of Disasters and enabling local and national government agencies to formulate the National Contingency Plan and National Strategy for Natural Disaster Response.

At the local level, efforts focused on the creation of a cooperative for small-scale farmers focused on resilient agriculture and agro-forestry. Recycling wood waste products became a priority where forests were being exploited to build wooden houses.



PHOTO BY MINISTRY OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT OF MAURITIUS

The lumber industry, until then producing mountains of wood chips that were simply burned, changed direction to mix the wood chips with sand and to make bricks. With AAP funding, 45 people from rural communities (including five from construction companies) were trained to make bricks reinforced with waste-product wood chips.

As a result of this new technology, 10 new eco-houses were built as a demonstration project and the trainees returned to their communities with new eco-friendly construction skills. "The idea was that people from different rural communities should learn how to build sustainable, eco-friendly houses," says Laurent-Mascar Ngoma of UNDP São Tomé. UNDP estimated that locally built eco-houses cost about US\$6,700 each and worked with local banks to offer competitive 10- to 15-year mortgages to enable people to buy these eco-houses. "Instead of people cutting down trees to build houses, or creating new slums, why not create a system where people can take out an affordable loan for a new type of sustainable housing," he asks.

In many countries, a major cause of deforestation is the production of charcoal for use in cooking stoves. In the north of São Tomé, this has been a particularly serious problem. The area lacks water for agriculture, so many young people saw no other means of livelihood than charcoal production.

After AAP supported the installation of a pipeline to provide irrigation, 22 young men who had been charcoal producers started a successful vegetable-farming cooperative. The Ministry of Agriculture has taken over AAP's work to continue supporting these young men and to mobilize others to reduce tree-felling for charcoal.

"The legacy of the AAP project in São Tomé & Príncipe, and especially the initiative to create a 'vegetable-farming cooperative' in the community of Praia das Conchas, has been an answer to forest degradation, abusive charcoal production, unemployment and problems with our youth," says Mr. Onofre Fernandes of the Ministry of Agriculture. "The Ministry of Agriculture is now planning to expand this experience in other communities around the country as the cooperative has improved the livelihoods of many families in Praia das Conchas."

In addition, help has been provided to nine local NGOs that raised awareness about the damage caused by cutting trees for charcoal and mobilized charcoal-producers to replant 100 hectares of deforested land with some 10,000 seedlings of local tree species. AAP support enabled the Ministry of Forestry to hire and equip more forest rangers to patrol the forest and to put up a fence to protect newly planted areas. Furthermore, in a nearby community of some 300 families, 300 fuel-efficient stoves were provided for a pilot project to reduce the use of charcoal even further.

Mauritius

When countries face many challenges, adaptation to climate change can seem to be a low priority. In Mauritius, partnership with the AAP helped put climate change adaptation towards the top of the national agenda by demonstrating that the process of adapting to climate change can help resolve other critical issues.

With AAP support, Mauritius acquired a range of state-of-the-art modelling tools to monitor weather patterns and predict the effects of climate change. The establishment of an Agricultural Decision Support Programme, housed in the Ministry of Environment, meant that real-time weather information – gathered by seven weather stations funded and installed by the AAP – could be provided for farmers.

This real-time data, available through the Internet and via text message, helps farmers make decisions regarding day-to-day operations such as irrigation, fertilizer application or pest and disease control. When used effectively, the data enables farmers to adjust their activities to mitigate the effects of heavy rains, floods or heat stress that can cause economic loss and environmental damage and affect health.

Mauritius also hosted the workshop 'Leveraging Climate Finance for Resilient Development', attended by more than 30 representatives from 11 AAP countries. Participants were given a toolkit to support delivery of low-emission, climate-resilient development strategies and to illustrate how countries can access innovative international finance to combat climate change with the help of UNDP.

Through the support of the AAP, the governments, NGOs and communities of São Tomé & Príncipe and Mauritius have nourished an environment in which decisions and activities in support of adaptation are evidence-based, strategic and appropriate to the goals of sustainable development. This has resulted in long-term investment to increase resilience to climate change in these SIDS.



Developing an Ecosystem Approach to Managing African Marine Resources

PROJECT DETAILS

Title: Agulhas & Somali Current Large Marine Ecosystems Project (ASCLME)

Countries: Comoros, Mauritius and the Seychelles (of a total nine countries)

Focal Area: Oceans

Implementing Partner: UNDP

Sources of Funds & Value: GEF grant: US\$12,200,000; Governments: US\$21,463,350; UNEP: US\$750,000; Intergovernmental Organizations: US\$2,023,000; Others: US\$5,417,750

FACTS

- The fisheries sector contributes 6 percent of GDP and employs about 20 percent of the workforce for all SIDS in the Indian Ocean.
- Over 5,000 tanker voyages per year take place in the sensitive coastal waters of Comoros and Madagascar and along the coast of East Africa, passing near the World Heritage Site of Aldabra Atoll (Seychelles).
- Of all Small Island Developing Nations, the Seychelles have the largest proportion of protected land (more than 40 percent).

THE AGULHAS AND SOMALI CURRENT LARGE MARINE ECOSYSTEMS (ASCLME) INITIATIVE has been working with nine countries in the Western Indian Ocean (WIO) to increase their understanding of marine and coastal ecosystem goods and services, to identify potential and actual threats and impacts to these goods and services and to address them within a politically endorsed regional Strategic Action Programme. Three WIO SIDS – Comoros, Mauritius and the Seychelles – are involved.

The WIO is an important repository of living marine resources, which underpins the livelihoods of coastal communities in nine countries and territories along the east coast of Africa: Comoros, Kenya, Madagascar, Mauritius, Mozambique, the Seychelles, Somalia, South Africa and Tanzania.

The WIO region is divided into two large marine ecosystems (LMEs): the Somali and Agulhas LMEs. The Somali Current LME extends from north to south from the Horn of Africa to the Comoros Islands and the northern tip of Madagascar. The Agulhas Current LME includes the Agulhas Current, which flows southwards along the east coast of South Africa, as well as its sources in the Mozambique Channel and its retroflexion south of Madagascar.

This dynamic system of ocean currents and upwelling cells is responsible for regulating vital climate and influence weather patterns, sea temperatures, water chemistry, productivity, biodiversity and fisheries.

Yet, before the start of the important ASCLME project in 2007, remarkably little was known about it. What information did exist had not been synthesized, a fact that was hampering national and regional efforts to manage marine resources and to adapt human activities in the face of growing environmental variability.

Following research undertaken through the ASCLME project, data analysis supports previous scientific propositions that a third LME is most probably involved in this complex region. Before splitting into the Somali and Agulhas Currents, the South Equatorial Current first reaches the Mascarene Plateau, where a unique ecosystem has developed. Two of the three SIDS – Mauritius and the Seychelles – sit at either end of this plateau and share access to this ecosystem, not only geographically, but now in terms of management and governance through an equally unique Joint Management Agreement. The third SIDS, Comoros, sits astride the point where the South Equatorial Current splits into the Agulhas and Somali Currents, placing the SIDS in a unique position in this interactive series of LMEs.



Challenged by habitat change, overexploitation of marine resources, pollution and climate-led environmental variability, an integrated ecosystem-based management approach was required to effectively mitigate these threats.

The Agulhas and Somali Current LME programme was designed as a multi-project, multi-agency initiative to institutionalize cooperative and adaptive management of the ASCLMEs. Funded by the GEF and implemented by UNDP, a phased approach was planned to progressively strengthen management capacities at the regional scale to address transboundary environmental concerns within the LMEs, build political will for threat abatement and acquire sufficient funding for management.

Under the first phase, the ASCLME programme set out to gather new and important information about ocean currents and how they interact with and influence the climate and about the regional biodiversity and economies of the WIO region. In parallel, it sought to strengthen scientific and management expertise in order to introduce an ecosystem approach to managing shared living marine resources.

The activities also informed the preparation of a Transboundary Diagnostic Analysis (TDA) for the WIO region, building on national Marine Ecosystem Diagnostic Analyses (MEDAs), to document the environmental threats faced by countries in the region and of a Strategic Action Programme (SAP) for the ASCLMEs to guide future adaptive, ecosystem-based management in the transboundary LMEs.

International and regional experts, in collaboration with the project team, worked with the three SIDS to complete their MEDAs. Much of the information and data included in the three SIDS MEDAs were not available prior to the project – especially the oceanographic data, which is very costly to collect.

“The MEDAs and TDA laid the groundwork for the nine countries of the region to develop a strategy for collectively managing the resources on which their people and economies depend,” explains Dr. David Vousden, Director of the ASCLME project. “Going forward, efforts will focus on implementation of the Strategic Action Programme Policy Harmonization and Institutional Reforms (SAPPHIRE) project, through a further tranche of funding from GEF, which will drive and support implementation of the SAP”

Focus on SIDS – Comoros, Mauritius, Seychelles

The Seychelles, Comoros and Mauritius were assisted in the development of the Marine Ecosystem Diagnostic Analyses (MEDAs) to define the state of their coastal and marine environments, review the national economic importance of the ecosystem and summarize the existing policy and governance arrangements that oversee and administer related management processes.

While the ASCLME project is not focused on SIDS alone, the programme has assisted SIDS in many ways, in particular through the development of scientific and technical capacity to collect data on marine resources and identify management options.

For example, in the Seychelles, the development of the MEDA and TDA has improved baseline information about the surrounding marine ecosystem and particularly about the interaction of the South Equatorial Current with the Seychelles’ banks and islands. This information will be critical for the future management of marine

resources and the establishment of the Joint Management Programme with Mauritius. Having a small population, the Seychelles face limited technical capacity, so the ASCLME training programmes helped to develop capacities in oceanographic monitoring, marine data modelling and data management and dissemination.

In Mauritius, in addition to the offshore surveys that also generated new information for the management of marine and coastal ecosystems, capacity was further built for data and information management and marine surveys through the hands-on participation of staff and students from Mauritian institutes. Mauritius was also a key partner in the development of the regional inshore monitoring programme, hosting training courses and workshops for all WIO countries for the development of the programme.

When the project started, Comoros had one of the lowest capacity baselines for marine and coastal management and very limited access to information. Through the development of the MEDAs and the subsequent contribution to the TDA, Comoros (as well as all the other island groups) collated available data and information. Additional training courses and research cruises provided new data sets, improved capacity for data analysis and facilitated the development of national inshore monitoring programmes linked with ongoing national activities.

As a result of the MEDAS, the TDA now provides baseline data that can be monitored and tracked for the sustainable management of multiple (and interlinked) LMEs in the WIO region.

Building on the TDA, the SAP identified a set of priority actions to address threats and root causes at the transboundary level. The concerns of the SIDS as well as those of coastal states have been fully taken on board.

Regional- and national-level actions to address the agreed priority concerns have been captured in the SAP that envisions the conservation and sustainable use of ASCLME resources; ministers are now reviewing this.

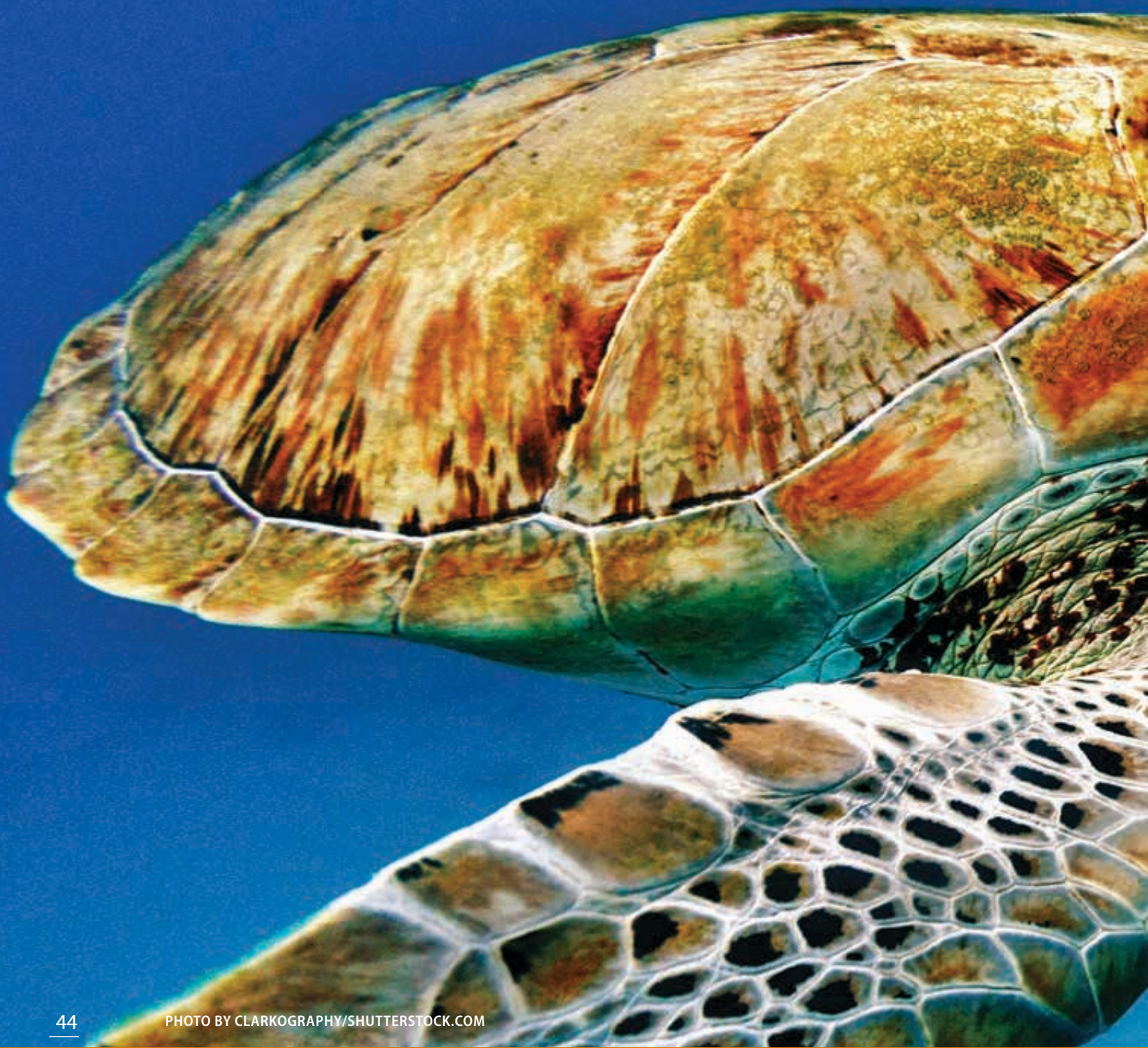
“The coastal states and islands of the Western Indian Ocean region are highly dependent on the goods and services provided by the various large marine ecosystems in this area. Yet these goods and services are under rapidly expanding threat from human impact and climate change,” says Prof. Rolph Payet, Minister for Environment & Energy, Government of Seychelles.

“Nowhere is this more obvious than within the SIDS of this region, and nowhere is it more urgent that we respond to this threat immediately with the introduction of adaptive management processes and effective governance at the regional, transboundary and cooperative scales. The Strategic Action Programme for Sustainable Management of the Western Indian Ocean large marine ecosystems that has now been developed by the countries of the region, with support from a UNDP supported GEF financed project, provides the countries with a concrete agreement and a road-map for such effective management and governance.”



PHOTO BY CLAIRE ATTWOOD

Caribbean





Engaging Local Communities in Stewardship of the Belize Barrier Reef Reserve System

PROJECT DETAILS

Title: Community Management of Protected Areas Conservation (COMPACT) Programme – Belize

Country: Belize

Focal Areas: Ridge to Reef; Protected Areas; Energy; Climate Risk

Implementing Partner: Multiple partners supporting a portfolio of projects

Sources of Funds & Value: GEF SGP grants: US\$563,616; Co-financing: US\$864,598

FACTS

- Off the coast of Belize, the Great Blue Hole is one of the largest marine sinkholes. It is over 300 metres across and 124 metres deep, with a water temperature of around 24 degrees Celsius all year round.
- Belize's population growth rate of 2.43 percent exceeds the average population growth rate for Latin American and the Caribbean, which is 1.13 percent.
- In 2011, travel and tourism accounted for 12 percent of the total GDP of Belize and generated 14,500 jobs (10.9 percent of total employment).

TWENTY-EIGHT UNESCO WORLD HERITAGE SITES (WHS)

are found in SIDS. Inscribed on the World Heritage List in 1996, the Belize Barrier Reef Reserve System (BBBRS) comprises seven marine protected areas (MPAs), with an area of 1,161.48 square kilometres. It is the second largest barrier reef system in the world, is Belize's top tourist destination and is vital to the country's fishing industry. Twenty-two coastal communities and a few inland communities live adjacent to the WHS and their coastal livelihoods depend on the health of the reef system for activities such as fishing and tourism. With funding from GEF SGP, COMPACT Belize is pioneering an integrated 'ridge-to-reef' approach based on supporting local communities in their stewardship of ecosystems.

The GEF SGP Community Management of Protected Areas Conservation Programme, known as COMPACT, was established in Belize in 2001. It followed a participatory process that brought together national and local stakeholders to discuss the conservation and sustainable use of the Belize Barrier Reef Reserve System – World Heritage Site (BBBRS – WHS).

The Belize Barrier Reef Reserve System — A Ridge-to-Reef Approach

In order to protect the BBBRS – WHS, COMPACT takes an integrated 'ridge-to-reef' approach, which focuses on supporting local communities in their stewardship of marine and related terrestrial ecosystems.

The global COMPACT programme aims to demonstrate that community-based initiatives can “significantly increase the effectiveness of biodiversity conservation in globally significant protected areas”, including WHS, Biosphere Reserves and globally important coral reefs.

Since 2001, a suite of GEF SGP COMPACT projects have been supported to protect the marine resources of the BBBRS by engaging fishing cooperatives and associations, tour guide associations, women's groups, CBOs and NGOs to implement projects that ensure environmental protection, sustainable livelihoods and community empowerment. Interventions have been diverse, from initiatives for livelihood adaptation to the re-establishment of riparian forests, coral protection and the development of the capacity co-managers of protected areas.

To date, 36 civil society projects have been funded with direct cash investment totalling approximately US\$2.5 million from the GEF and UN Foundation; have expanded the sustainable livelihoods options for community groups and community-based organizations that affect the reef system; have promoted the protection, conservation and sustainable use of resources provided by the reef system; and have developed and/or enhanced the management capacities of the community groups that use and affect the WHS.



"COMPACT invests where it matters and it invests in the people that are at the frontline of the rapid changing climate. Their work is relevant to the needs of the Belizean society, effective in promoting community awareness and understanding of environmental issues and efficient in producing outputs relating to learning, capacity building and the adoption of sustainable livelihoods activities in our communities," says Lisel Alamilla, Minister of Forestry, Fisheries and Sustainable Development.

Throughout the project's 12 years of implementation, valuable results have included:

- Rehabilitation of a community water catchment
- Empowerment of fishing cooperatives and associations, women's groups, NGOs and CBOs for sustainable fisheries management within the BBBRS
- Income generation and sustainable livelihoods for local communities
- Improved management of the recreation and tourism industry
- Reduced pollution of the BBBRS
- Contribution to the expansion and consolidation of the national protected areas system network and support for NGOs and CBOS to co-manage MPAs

Mateo Rash, a member of the group Protectors of the Corridor from Medina Bank who managed a COMPACT-funded project between 2012 and 2013, testifies to these achievements. "Through the COMPACT-funded project, group members, students and villagers have increased their understanding of how to sustainably develop the Deep River Watershed and of the effects their farming practices on marine ecosystems and specifically on the coral reef," he says. "A reforestation project has helped prevent erosion in the riparian areas. It has also helped our group, Protectors of the Corridor, to build our capacity in project management and shown us how we can work together as a community to protect the Belize Barrier Reef System."

In addition, with support from COMPACT, a local NGO has removed over 15,000 invasive and destructive lionfish from the BBBRS. Twelve workshops were conducted in coastal communities and 'lionfish hunter cards' were issued to 62 tour guides and fishermen. Although lionfish contain venom, they are not poisonous when eaten, so the fish are processed and sold at restaurants. Markets are currently being developed for export and prices for lionfish are comparable to those for grouper.

Innovative Finance through WH LEEP

In Belize, partners have also worked collaboratively to generate pipeline projects for investment from within the COMPACT network of partners and producer organizations. The World Heritage Local Ecological Entrepreneurship Programme (WH LEEP) in Belize has supported initiatives focused on community-based ecotourism; fishing cooperatives; plastics recycling businesses; and the production of honey, handicrafts, tea, cacao, dairy and other locally sourced products.

Justino Mendez, Operations Manager of the Placencia Producers Cooperative Society Limited, explains the importance of this support: "A Business Development Support grant, funded by COMPACT's WH

LEEP programme, has helped us to manage our seaweed farming project more sustainably and alleviate pressures on the Belize Barrier Reef Reserve System."

Supporting Marine Conservation of the Wider Mesoamerican Reef System

Since 2013, COMPACT Belize has also partnered with the Oak Foundation to complement its work to support the marine conservation of the wider Mesoamerican Reef System. The new partnership is investing in socially and environmentally sustainable initiatives and the sharing of lessons learned with a wide range of partners, including regulatory agencies.

For example, the initiative is supporting the improvement of fisheries legislation for the sustainable management of fish stocks and COMPACT recently awarded funding to the Toledo Institute for Development and Environment (TIDE) in Belize to support community participation in the implementation of a 'managed access' initiative co-financed by the Oak Foundation.

"The Community Stewards Programme strengthens the ability of resource users to manage the protected areas that their livelihoods depend on," explains Celia Mahung, Executive Director of TIDE. "The experiences and lessons from this pilot initiative will be used to develop and implement 'managed access' policies in other marine protected areas throughout Belize, as well as in other SIDS."



Supporting Community-based Adaptation to Climate Change in Jamaica

PROJECT DETAILS

Title: SIDS CBA – Construction of Water Harvesting Infrastructure and Improving the Community's Adaptive Capacity to Natural Hazards

Country: Jamaica

Focal Areas: Climate Change Adaptation, Sustainable Land Management

Implementing Partner: Clarendon Parish Development Committee Benevolent Society (CPDCBS)

Sources of Funds & Value: GEF SGP Grants: US\$50,000; Co-financing: US\$82,348

FACTS

- Jamaica gained independence in 1962, the first Caribbean country to do so.
- Although the contribution of agriculture to national GDP has steadily declined over the last two decades, this sector supports 20 percent of the total population and is still one of the most labour-intensive in Jamaica.
- The island of Jamaica is home to the endangered Homerus swallowtail, the largest butterfly in the Western Hemisphere. Its wingspan is 25 centimetres, which makes this insect larger than many of the island's birds.

THE SOUTHERN PART OF JAMAICA'S CLARENDON PARISH

is nationally recognized as a climate change hotspot. Increasing temperatures, heat waves and irregular rainfall have made local communities in the area vulnerable to natural disasters. The GEF SGP, through its SIDS Community-Based Adaptation (SIDS CBA) initiative, has provided a grant to a local NGO to support the rehabilitation of the community rainwater catchment and to construct an earth pond system to irrigate the Pleasant Valley Reforestation Project. It is hoped that this will enhance the community's ability to adapt to climate change.

Climate-change-driven events such as increasing temperatures, droughts, irregular rainfall, torrential rains and flooding have affected the soil quality, water availability and water quality in the southern part of Jamaica's Clarendon Parish. In turn, the fertile arable land and agricultural production that used to generate comfortable livelihoods have been decimated.

The long-term climate forecasts for the region include continual increases of temperatures, increases in the occurrences of heat waves and reduced precipitation.

The Jamaican Government, recognizing that vulnerable communities must adapt to the effects of climate change that are threatening their livelihoods and ecosystems, has recently strengthened its National Rainwater Harvesting Policy to include decentralized harvesting and storage of rainwater on a small scale at the household level.

This approach has been supported by SGP's SIDS CBA programme with a grant of US\$50,000 awarded to Clarendon Parish Development Committee Benevolent Society (CPDCBS) for a project to strengthen community resilience to the effects of climate change by promoting food and water security, natural resource management and the introduction of renewable energy in the communal catchment facility.

The project, which only started in 2012, achieved important results quickly, including:

- The rehabilitation of community water catchment to promote water security
- The construction of an earth pond system to irrigate the Pleasant Valley Reforestation project
- The development of a sustainable water harvesting system
- Increased awareness of community members about the productive use and care of rainwater harvesting ponds and catchment
- The adoption of Sustainable Land Management (SLM) principles and practices leading to improved agricultural production and the development of land-based and cottage industries.



Improving Water and Food Security

To combat drinking water shortages that communities at the project sites suffer due to reduced rainfall and increased evaporation, an unused catchment tank was been rehabilitated and now holds up to 100,000 litres of water in seven storage tanks for domestic use.

Women have benefited most directly from the project, as they no longer have to walk great distances to source water for domestic use. They have also benefited from training sessions, particularly in water management. Due to the project, many of them now feel a sense of belonging and ownership of water management in their community. "We feel we have equally contributed to something that benefits the entire community and have an equal role in the management of our local resources," says Mrs. Lusan Elliot of the Pleasant Valley Parish Development Committee.

In order to maintain the water tank and pump, the local governance group developed a roster of trained community maintenance volunteers to keep it in working order. The group has also strengthened its partnership with the Parish Council, which has enabled it to gain support for additional training in chlorination and other critical aspects of tank management.

At a larger scale, an earth pond, protected by a 4,000-metre chain-link fence, was constructed to harvest water solely for the irrigation of 1,625 square metres of land that was previously used for bauxite mining. This is now being managed using SLM and agro-forestry practices and improved water storage has reduced stress on the local ecosystem.

Introducing Renewable Energy

In conjunction with the benefits of water availability and SLM, the project introduced the concept of renewable energy in the communal catchment facility. A solar-power system has been installed to produce electricity for the water pump. This system is more energy-efficient than gas- or diesel-powered generators and is the first of its kind used in the parish.

Furthermore, the new water structures have replaced the trucked-in water tankers as the irrigation modality for agro-forestry, especially during extreme climactic events such as the 2009 drought. These interventions have diminished the burning of fossil fuels for transportation fuel.

Building Capacity and Raising Awareness

Awareness-raising, knowledge-sharing and capacity development sessions on adaptation to climate change have also played a key role in strengthening local resilience.

At least 100 residents (or 20 percent of the local population) at the community level have attended workshops to increase their understanding of the risks and opportunities associated with climate change. Forty people, including children, were trained in water resource management, including watershed management and rainwater harvesting.

Many stakeholders – including the Producers Marketing Organisation (PMO), CPDCBS, the National Association of Parish Development Committees (NAPDEC), the Forestry Department, the Rural Agricultural Development Authority (RADA), the National Irrigation Commission (NIC), the Clarendon Parish Council, the Social Development Commission (SDC), Jamalco, local schools and the Parent Teachers Association (PTA) – have been involved in the project.

As a result, community members are confident that they now have the skills, strategies and capacity that make them less vulnerable to natural disasters.

Scaling Up Success

The success of the project has had a ripple effect. For example, the local authority is now seeking funding to improve the community water scheme (community tanks) in the vicinity of Mocho. The CPDCBS has submitted a proposal to an international donor for the rehabilitation of 12 catchment facilities in surrounding communities.

"As a result of the project, rainwater harvesting is now the nationally endorsed and most viable water security strategy in Jamaica," says the Honourable Minister Robert Pickersgill, Minister for Water, Land, Environment and Climate Change. "The Ministry of Water, Land, Environment and Climate Change is now in the process of preparing a policy on Rainwater Harvesting and will draw some lessons from the Pleasant Valley and White Chapel communities' experiences."

The National Coordinator of the project has been invited to be a member of the United Nations team in Jamaica and to participate in the national development planning processes that include preparations for the Third National Communication, the formulation of a Climate Change Policy and the establishment of a Climate Change Department.

Additionally, the Jamaican Government has invited SGP's NGO partners to participate in stakeholder consultations for the planning of the new climate change policy to ensure that community concerns about water issues are addressed in an integrated manner.

Through meetings and formal discussions with planners and other government entities, CPDCBS has advocated for the inclusion of climate change into development orders and plans and the establishment of 'no-build zones' to protect people from building in vulnerable areas. Through these activities, CPDCBS now sits on the Climate Change Advisory Board for Jamaica.

The nationwide Water Management for Sustainable Communities initiative will build on the achievements of the project. The new initiative was designed to use a comprehensive, integrated and holistic approach in addressing water scarcity in Jamaica. Water management techniques and innovative solutions used in the SGP project, such as rainwater and wastewater harvesting, water usage and recycling of water, will be replicated.

The CBA project is an important model for regional and global replication in other SIDS facing similar challenges.

Safeguarding the Shared Living Resources of the Caribbean Large Marine Ecosystem

PROJECT DETAILS

Title: Sustainable Management of the Shared Living Marine Resources of the Caribbean Large Marine Ecosystem and Adjacent Regions

Countries: All 13 Caribbean SIDS (of a total 25 countries)

Focal Area: Oceans

Implementing Partner: UNDP

Sources of Funds & Value: GEF Grant: US\$7,008,116;
Co-financing: US\$38,299,837

FACTS

- Islands in the Caribbean vary in size: The biggest island, Cuba, is larger than all of the other Caribbean Islands together. At nearly 13 square kilometres, Saba is the smallest island in the Caribbean.
- In the waters of the Caribbean, sponges are an important ally of coral reefs, as they help filter water and thereby sustain the clarity of the ocean. Pollution and overfishing are threatening sponges' existence.
- Lionfish is an invasive species when found in the waters of the Caribbean, far from its natural home in the Pacific Ocean. With few predators and a large appetite, lionfish are drastically reducing the population of a number of small reef fish species found in the Caribbean.

TOGETHER, THE CARIBBEAN AND NORTH BRAZIL SHELF LARGE MARINE ECOSYSTEMS, KNOWN AS CLME+, constitute one of the geopolitically most diverse and complex sets of large marine ecosystems (LMEs) in the world. The CLME+ region also contains the highest concentration of SIDS within any LME region in the world, further contributing to the complexities of the region. The region is highly dependent on living marine resources for livelihoods and revenues, particularly from fishing and tourism. The sustainability of these shared resources is important to many countries in the region.

The semi-enclosed Caribbean Large Marine Ecosystem (CLME) is a distinct ecological region, bounded to the north by the Bahamas and the Florida Keys, to the east by the Windward Islands, to the south by South America, and to the west by the isthmus of Central America. It corresponds largely to the boundaries of the Caribbean Sea, the second largest sea in the world. The North Brazil Shelf Large Marine Ecosystem (NBSLME) extends along north-eastern South America from the boundary with the Caribbean Sea to the Parnaíba River estuary in Brazil.

Together, the Caribbean and North Brazil Shelf Large Marine Ecosystems constitute the CLME+ region.

Twenty-six independent states and 18 dependent or associated territories border or are located in the CLME+ region, which covers a marine area of approximately 4.4 million square kilometres. The region also includes some of the largest (for example, Brazil) and smallest (for example, St. Kitts and Nevis) countries in the world as well as some of the most developed (such as the United States of America) and the least developed (such as Haiti) countries.

In 2009, the 24 countries residing within the CLME+ region launched a regional initiative to strengthen regional cooperation to reverse degradation of shared living marine resources. The project was supported with funding from the GEF and implemented by UNDP.

Diagnostic Analyses

Transboundary Diagnostic Analyses (TDAs) undertaken as part of the project identified three interlinked environmental problems with severe socio-economic impacts across the CLME+ region and beyond: i) Unsustainable fisheries resulting in overexploited and collapsing fish stocks; ii) habitat degradation; and iii) pollution. As part of the TDA process, causal chain analyses were developed to link these three transboundary issues to their direct, intermediate and root causes.

The results of this process have served as the scientific basis for the development of a new programme of interventions outlined in the regionwide 10-year Strategic Action Programme for the Sustainable Management of the Shared Living Marine Resources of the Caribbean and North Brazil Shelf Large Marine Ecosystems.



Catalytic Impacts at the National and Regional Levels

The project took important steps towards building political trust and awareness of the need for collaboration across subregions and sectors within the project area. It sought to safeguard and enhance the contributions from marine ecosystem goods and services to regional and national sustainable development goals.

Sérgio Macedo Gomes de Mattos, Director of Management and Control at the Ministry of Fisheries and Aquaculture in Brazil, testifies to this achievement: "The CLME project has contributed to improving cooperation between countries in the Caribbean. It has given us access to instruments that encourage an ecosystem-based approach to fisheries management."

"We are now able to engage more effectively in the planning and implementation of programmes and projects managed by Regional Fisheries Bodies and intergovernmental fisheries agencies like the Food and Agriculture Organization (FAO). This project has also made it possible for us to cooperate directly with other countries, fisheries research institutions, and governmental and non-governmental funding institutions, ensuring a straightforward and transparent exchange of knowledge and experiences across the region," he adds.

"This is a significant development as it shows that we can take clear action to strengthen governance arrangements for shared living marine resources in the region," reports Milton Haughton, Executive Director of the Caribbean Regional Fisheries Mechanism (CRFM) on the adoption of the Sub-regional Fishery Management Plan for the Eastern Caribbean Flying Fish.

By blending foundational diagnostic work with a number of well-selected pilots and case studies, the project has fed new information and insights into the preparation of the regional Strategic Action Programme and led to significant achievements, including:

- A Memorandum of Understanding between the Caribbean Regional Fisheries Mechanism (CRFM) and the Organization of Fishing and Aquaculture in Central America (OSPESCA) to work more closely together and the adoption of a Joint Action Plan
- A Memorandum of Understanding and Cooperation between OSPESCA and the Central American Commission for Environment and Development (CCAD), which brought fisheries management and environment protection together for the first time through encompassing the full Central American Caribbean coast
- The development and adoption of the Subregional Fishery Management Plan for the Eastern Caribbean Flying Fish, the first regional fisheries management plan of the CLME+ Region, completed as part of the Flying Fish Case Study
- For the last five years (2010-2014), Belize, Guatemala, Honduras, Nicaragua, Costa Rica, Dominican Republic and Panama have implemented a joint closed season for the Caribbean spiny lobster fishery to safeguard the sustainability of stocks of the Caribbean's economically most important fishery species. The new seasonal ban is in effect from 1 March until 30 June, covering the lobster's reproductive period.

Going Forward – Implementation of the CLME+ Strategic Action Plan

The project culminated in the delivery and regionwide adoption of the 10-year Strategic Action Programme for the Sustainable Management of the Shared Living Marine Resources of the Caribbean and North Brazil Shelf Large Marine Ecosystems (known as the CLME+ SAP). The SAP combines actions for structural change with capacity building at the regional, national and local levels and high-priority management interventions and investments on the ground. Thirty-one ministers in 22 countries have endorsed this at the political level.

"This project has the largest number of countries that have jointly endorsed an LME-based Strategic Action Programme in the history of the GEF," explains Patrick Debels, CLME Regional Project Coordinator. "It is notable that a very large share of these countries and territories are SIDS."



PHOTO BY OSPESCA

From Ridge to Reef – Integrating Watershed and Coastal Area Management in the Caribbean SIDS

PROJECT DETAILS

Title: Integrating Watershed and Coastal Area Management in the Caribbean SIDS (IWCAM)

Countries: Antigua and Barbuda, The Bahamas, Barbados, Cuba, Grenada, Dominica, Dominican Republic, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago.

Focal Areas: Oceans, Biodiversity, Land Degradation

Implementing Partner: UNDP & UNEP

Sources of Funds & Value: GEF Grant: US\$14,391,000; Secretariat of Cartagena: US\$3,075,000; UNEP: US\$116,000; UNDP: US\$1,771,000; Governments: US\$82,899,000; NGOs: US\$7,091,000; Private Sector: US\$1,409,000

FACTS

- Continued reef degradation could reduce net annual revenues derived from coral reef fisheries by US\$95 million to US\$140 million per year by 2015.
- The wider Caribbean region has over 285 marine protected areas that contain 20 percent of the region's coral reefs.
- A cruise liner's anchor can ruin up to 200 square kilometres of ocean floor by direct physical damage.

IN THE CARIBBEAN SIDS, high population densities, combined with population growth, urbanization and increased development, particularly residential and tourist resort development, have contaminated underlying aquifers and surface water and harmed the quality of coastal water. Recognizing the need for urgent action to better manage their connected coastal areas and watersheds, 13 Caribbean SIDS joined forces to conserve and use their aquatic resources and ecosystems more sustainably.

The watersheds and coastal areas of the Caribbean contain some of the world's most diverse and productive habitats and encompass extensive areas of complex and unique ecosystems. The coastal areas include mangroves, coral reefs, sea grass beds and river deltas, which are an important source of food production and support a variety of economic activities such as fisheries, tourism and the related uses of recreation and transportation.

Yet these fragile marine and coastal environments are under threat of degradation from human activity. Diminishing freshwater supplies, degraded freshwater and coastal water quality, unsustainable tourism, inappropriate land use, biodiversity loss, climate change and natural disasters are the main problems.

The Caribbean islands are listed as a biodiversity hotspot and, with relatively short distances from the peaks to the ocean, terrestrial and coastal environments cannot be considered or managed separately.

By 2004, it had become clear that there was an urgent need to more effectively manage national watersheds, which supply fresh water, and to protect the fisheries and coastal ecosystems on which livelihoods and revenues (especially tourism) depend.

In response, 13 Caribbean SIDS – Antigua and Barbuda, The Bahamas, Barbados, Cuba, Grenada, Dominica, Dominican Republic, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago – joined forces in 2005 to launch the Integrating Watershed and Coastal Area Management (IWCAM) initiative to strengthen their commitment and capacity to implement an integrated approach to the management of their respective watersheds and coastal areas.

Practical Approaches to Integrated Water and Coastal Area Management

From 2005 to 2010, nine demonstration projects were implemented in eight partner countries in parallel with support to mainstream IWCAM (ridge-to-reef) approaches into national-level watershed and coastal policy, planning and management.

As a result, industrial waste pollution in the Dominican Republic's Haina River was reduced and the Basseterre Valley of St. Kitts and Nevis was rehabilitated and placed under better management to protect the underlying aquifer.



In St. Lucia, the watershed services of the Fond D'Or watershed were protected and successful demonstrations of rainwater harvesting resulted in the replication of this approach by the government for all health centres from late 2010. A local Watershed Committee was also established to oversee and implement project activities. At a very early stage, the Committee explored options to ensure sustainability post-project by setting up an NGO (the Trust for the Management of Rivers) to continue the work.

Meanwhile, local communities in Cuba applied methodologies for water re-use and recycling, agro-forestry and soil conservation. Ramón Nuñez, Coordinator of the IWCAM demonstration project in Cuba, reports, "When we started planting, there was nothing. Now we have organic material and an irrigation system, and we know we will continue with the IWCAM approach, for the better."

Finally, as a result of other demonstrations, plans were made for land and sea use for water recharge protection and management in Andros, Bahamas; marina waste at Elizabeth Harbor, Exuma, Bahamas was better managed; and the groundwater and coastal effects of sewage discharges on St. John's and Antigua and Barbuda were mitigated.

Through these projects, teams developed indicator frameworks to monitor changes in the state of the watershed and coastal environments, identify trends in socio-economic pressures and conditions in watershed communities and coastal towns and assess the efficacy of IWCAM in addressing these issues and mitigating harmful impacts.

Nelson Andrade, Regional Coordinator of UNEP-CAR/RCU, observes, "While the ratification of agreements such as the Land-Based Sources of Marine Pollution (or LBS) Protocol and the strengthening of national policies and laws were major achievements for IWCAM, the most profound impact was at the grass-roots and community levels."

Stakeholder Involvement

Local stakeholder involvement was extensive throughout the project.

In Jamaica, the Drivers River Stakeholders Group engaged stakeholders in East Portland through four subcommittees: Governance and Enforcement; Sanitation and Livelihoods; Environmental Monitoring; and Public Awareness. Sheries Simpson, Manager for Project Planning and Monitoring at the National Environment and Planning Agency (NEPA) in Jamaica, notes, "Not only were many improvements achieved as the result of the project's initiatives within the Driver's River Watershed, but also most of the activities are being sustained as a result of ongoing collaboration between government departments and units."

NEPA has now adopted a Watershed Area Management Mechanism (WAMM) for management of watersheds that has been rolled out in the Black River Watershed. It will eventually be replicated in all of Jamaica's watersheds.

In the Dominican Republic, the private sector participated in an extensive survey of industrial practices in the Lower Haina River Basin as well as in the identification and implementation of cleaner production mechanisms planned for the short, medium and long terms. As a result, the number of businesses registered in the Ministry

of Environment's System of Environmental Authorization increased from 42.7 percent to 51 percent and cleaner production mechanisms to reduce point source pollutants were identified and are being implemented in 10 factories with a view to be replicated in other businesses.

In Tobago, the Anse Fromager Ecological Environmental Protection Organization, a community group largely dedicated to clean-ups and fighting wild fires on the hills of the Courland Watershed, became involved in all planning and execution activities for the Watershed's reforestation effort.

Policy and Institutional Reform

As a result of the IWCAM initiative, partner countries have adopted new policy, legislative and institutional changes. This has been important to ensure the sustainability of the IWCAM approach as a way to help countries achieve the targets of Multilateral Environment Agreements, including the Land-Based Sources of Marine Pollution Protocol.

The IWCAM initiative has driven many efforts. These include the Land and Sea Use Plan in Andros; the IWCAM Watershed Area Management Model (WAMM) policy adopted countrywide in Jamaica; the new Water Act in Saint Kitts; the private-public partnership that will continue remediation efforts in the Haina Basin in the Dominican Republic; and the Integrated Water Resources Management (IWRM) Road Maps and policy statements adopted by Antigua, Dominica, Barbados, Grenada, St. Lucia and Union Island.

Partnerships for the Future

Partnerships make up a major part of the IWCAM legacy. Communities, the private sector and governments worked together throughout the initiative, while high-level sessions of ministers at the regional level established forums, including the Caribbean Water and Wastewater Association (CWWA), the Caribbean Water and Sewerage Association (CAWASA) and the Global Water Partnership-Caribbean (GWP-C).

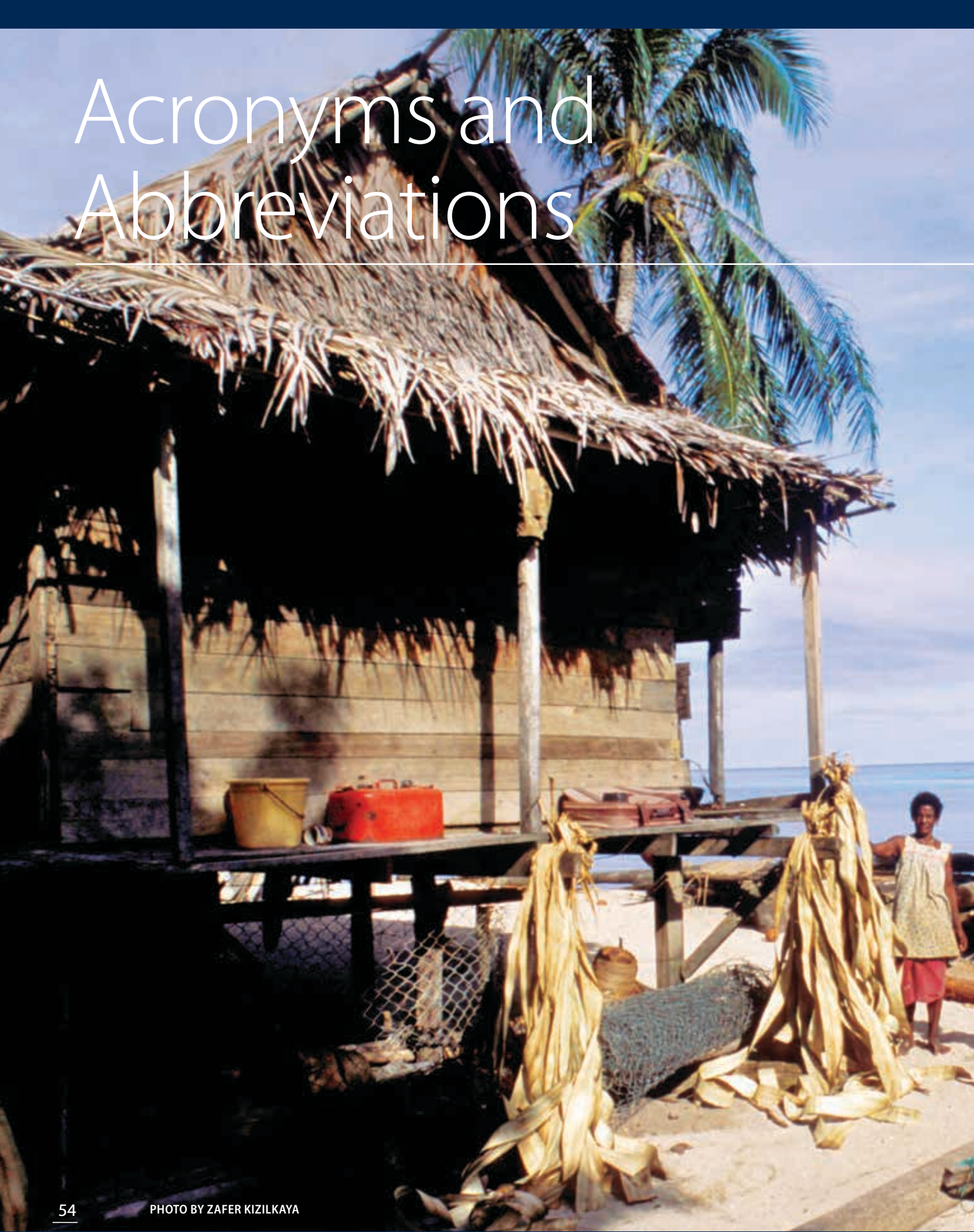
An Informal Working Group on Integrated Water Resource Management started by IWCAM has now evolved into the CARICOM Consortium on Water, which was mandated by the Council of Ministers for Trade and Economic Development (COTED) in 2008.

The CARICOM Consortium on Water is working to ensure that the IWCAM community continues to establish effective harmonized mechanisms to secure, manage and protect scarce water resources.



PHOTO BY IWCAM PROJECT

Acronyms and Abbreviations



AIMS	Africa, Indian Ocean and South China Sea (Region)
CARICOM	Caribbean Community
CBO	Community-Based Organization
COTED	CARICOM's Council of Trade and Economic Development
FAO	Food and Agriculture Organization of the United Nations
FSM	Federated States of Micronesia
GDP	Gross Domestic Product
GEF	Global Environment Facility
IUCN	International Union for Conservation of Nature
LDCS	Least Developed Countries
LDCF	Least Developed Countries Fund (GEF)
LME	Large Marine Ecosystem
NGO	Non-Governmental Organization
PICS	Pacific Island Countries
POPS	Persistent Organic Pollutants
RETS	Renewable Energy Technologies
SGP	GEF Small Grants Programme
SIDS	Small Island Developing States
SLM	Sustainable Land Management
SPREP	Secretariat of the Pacific Regional Environment Programme
TDA	Transboundary Diagnostic Analysis
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
WHO	World Health Organization







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