UNFCCC expert meeting on a range of approaches to address loss and damage associated with the adverse effects of climate change, including impacts related to extreme weather and slow onset events, Small Island Developing States

9-11 October 2012 Bridgetown, Barbados

COMPILATION DOCUMENT

A range of approaches to address loss and damage associated with climate change impacts

A range of approaches to address loss and damage associated with climate change impacts related to slow onset events

Goal of Approach:

Protect, expand and manage water resources on low lying coral atolls against slow onset of sea level rise.

Input provided by: Strategic National Policy Unit and the Kiribati Adaptation Program, Office of the President, Kiribati

Main elements of the implementation strategy

The main elements of the implementation strategy are to:

- Perform complete assessment of the aged water distribution system starting from the extraction to circulation to the delivery to the final consumer with the latest estimates indicating a complete overall on at least 50% of the system.
- provide foreshore protection mainly for major civil infrastructure that in turn provide protection to the water lenses this is done using combinations of concrete and soft measures
- provide an enabling environment for the general public to increase water catchment capacity.
- Another soft approach is to encourage people to practice water conservation as water will never be abundant except for the occasional rain showers that overflow the limited number of water catchments on the islands.

Targeted beneficiaries

The targeted beneficiaries are the whole Kiribati population however preparatory works for the supporting infrastructure is ongoing and main beneficiaries to these preparatory works are:

- Office of Te Beretitenti/The Office of the President (OB) who were strengthened in capacity to coordinate and manage climate change adaptation and disaster risk reduction;
- Line Ministries, particularly: Ministry of Public Works and Utilities (MPWU); Ministry of Environment, Lands and Agricultural Development (MELAD); Ministry of Finance and Economic Development (MFED); Ministry of Internal and Social Affairs (MISA); Ministry of Fisheries and Marine Resources Development (MFMRD); Ministry of Health and Medical Services (MHMS)) who received on-the-job training and TA in design solutions and adaptation measures.

Local development partners will be:

- Civil society notably local NGOs and the National Council of Churches who have benefited from capacity building sessions and viewed as vital partners to perform community engagement aspects of climate change adaptation;
- The private sector, particularly local consultants and contractors who will benefit through business opportunities for consultancy services and small works funded under the Project

Key benefits from the ongoing work preparatory work are knowledge gained and local capacity as well as infrastructure to assist people to become:

- Resilient communities in terms of water requirements.
- Enhanced preparedness through reducing risk associated with droughts and salination of ground water sources
- Aware of targeted investments aimed at climate proofing developments

Any significant lessons learned

- From the first Kiribati Adaptation Program, it was realized that the capacity and infrastructure building for the support services required is vital for the success of the project.
- Community participation and ownership is vital to ensure sustainability and relevance of interventions undertaken
- A balance of 'hard' physical investments and 'soft' behavior change and natural resource management solutions is a must
- Focus on integrating adaptation investments into national economic planning and preparation of sectoral plans and budgets for mainstreaming implementation

Resource requirements

- Financial resources for sustainability and expansion of projects to cover all islands in Kiribati
- Capacity building and strengthening both at institutional and national level.
- Data acquisition, management and sharing

Potential for replication or scaling-up

- KAP achievements are currently being replicated by subsequent phases of the programme including new programmes in the area of water resource extraction, management and protection.
- The programme as set ground work upon which future interventions that would see the scaling up of the interventions at a national level.

Any additional information

The 2000 World Bank Regional Economic Report estimated that by 2050 up to 25-54 % of areas in Bikenibeu, South Tarawa and 55-80 % of Buariki, North Tarawa, could become inundated. Extreme weather events associated with climate change and sea level rise could also severely affect the main Tarawa groundwater lens which supports approximately 50% of Kiribati population.

By 2050, if no adaptation measures are undertaken, Kiribati could face economic damages due to climate change and sea level rise of US$8-$16 million a year, equivalent to 17-34 percent of its 1998 GDP (WB 2000). To address these rising risks, the Government of Kiribati is undertaking an Adaptation Program, supported by the World Bank, the Global Environmental Facility, the Global fund for Disaster Risk Reduction and bilateral donors.

The Kiribati Adaptation Project was designed for implementation in three phases. Phase I involves preparation and identification of priority pilot investments for Phase II. The second phase of the project focused on pilot implementation and where water resources protection is one of the two key pilot components of the program. The program has just started its third phase and will focus on expanding and replicating pilot investments implemented in the second phase.

The program in its second phase was aimed supporting measures that reduce Kiribati's vulnerability to the effects of climate change and sea level rise by raising awareness of climate change. Its specific objective however, was to develop and demonstrate the systematic diagnosis of climate-related problems and the design and implementation of cost-effective adaptation measures. As such the focus was on the country's most vulnerable sectors in the most highly populated areas and includes Initiatives such as improving water supply management in and around Tarawa.

A range of approaches to address loss and damage associated with climate change impacts at the local/subnational level

Goal of Approach:

Prepare I-Kiribati people for eventual relocation through targeted vocational trainings and labour mobility schemes.

Input provided by: Strategic National Policy Unit, Office of Te Beretitenti, Kiribati

Main elements of the implementation strategy

To this end and as part of our development agenda to further our climate change adaptation policy, Kiribati had already embarked on the improvement of training and up-skilling in the technical and vocational skills areas to prepare its population in the even that they so wish to migrate:

1. Introduction and improvement of the technical and vocational programs accredited to International standards to prepare our young people for competition in the global labor:
    a. TVET up-skilling and training (Australian standards) and infrastructure expansion
    b. Maritime Training for Merchant and Fishing seafarers (STCW 95 approved)
    c. Nursing Training (require alignment with international standards)
    d. Kiribati Teacher's College
    e. Police Academy
2. Seasonal Employment Programmes in Australia and New Zealand through exposure of I-Kiribati people participating in the programs acquire experience and working conditions outside of Kiribati and cultural norms which are quite different. In the seasonal arrangement, positive initiatives by the labour receiving countries have shown the willingness to provide on the ground training for the workers whilst on assignment.
3. Up-skilling of English skills for primary school teachers to form a foundation for the courses as the students progresses through the formal education program

Targeted beneficiaries

The target beneficiaries are the youth aged 16 to 24 both male and female and with no discrimination of any sort, however in the progress of the carrying out these projects, there are also those outside of the target group who through the years need to be upskilled in order to provide the deliver to the target groups.

- The TVET project's targeted beneficiaries are the youth aged 16 to 24 who have completed some formal education qualify to continue with the course offerings at the five main TVET institutes which are the:
    - Kiribati Institute of Technology
    - Nursing School
    - Marine Training Centre
    - Fisheries Training Centre
    - Kiribati Teacher's College
    - Kiribati Police Academy
- The seasonal work programs with Australia and New Zealand targets the rural population with very little formal education with no opportunity to compete for entry to the tvet programs.
- Ongoing work at the Marine Training Centre has as beneficiaries those graduates who have maintained their employment with overseas companies and periodically require upgrading courses to maintain

good standing under STCW requirements.

- The recent adoption of the STCW-F convention is received well by Kiribati as work is already ongoing to prepare the Fisheries Training Centre to be conform with the convention.

Any significant lessons learned

- Existing local infrastructure is not able to support the timely implementation of the TVET project which is similar case for a number of other projects. This is has shown that for any project to be implemented all local infrastructure that it will require support from will need to figure in the planning process of the project to be implemented as a prerequisite to any project.
- International alignment of all course carried in country is a must which has always been the case at the Marine Training Centre and resulted in the current employment of over 1,000 seafarers aboard foreign ships. This number is relatively high when measuring it against our population.
- Given that the TVET and ongoing expansion of the certain TVET institutions is at the initial stages, there will need to be major steps taken to provide for the needs of the young population of Kiribati.

Resource requirements

Resources are scarce and Kiribati and we are fortunate that our development partners have been very generous in providing required technical and financial resources to realize the ongoing programs. It is must also be highlighted that current commitments will exhaust soon and will require additional resources to fully realize the impacts of this positive interventions. Ongoing programs have already identified gaps that require additional resources for the programs to reach their targeted beneficiaries.

Resources both financial and technical are needed but will need to assessed properly before proceeding.

Potential for replication or scaling-up

The potential for replication and scaling-up exists. This is especially true given the success experienced from ongoing programs at the Marine Training Centre and the newly introduced TVET project programs at the Kiribati Institute of Technology.

- Replication of the arrangements at the Marine Training Centre and the Kiribati Institute of Technology will need to be carried out to the other TVET institutions. Given that our local capacity in this area is limited Kiribati will need ongoing technical assistance in it.
- Given the rise in interest to enter the TVET institutions, scaling is not a question but it more how and when. The how and the when will have to wait for the willing partners to be identified.

Any additional information

Due to the extreme vulnerability of our nation and economy, Kiribati needs to think beyond adaptation. New and innovative initiatives (as has already been taken by Government) on the ultimate – and unthinkable – consequences of climate change, need to be actively pursued now and dialogue with our development partners on how this is to be approached should start immediately.

We may think along the lines of the slow onset of sea level rise but then we will always have that doubt of just how slow!

A range of approaches to address loss and damage associated with climate change impacts at the local/subnational level

Goal of Approach:

The Federated States of Micronesia (FSM) is currently subject to increasing sea-level rise and sea surface temperatures, a development that is expected to increase over the next decades. The Loss and Damage in Vulnerable Countries Initiative funded by the CDKN and coordinate by the United Nations University for Environment and Human Security (UNU-EHS), aims to assess the loss and damage already occurring as a result of climate change in eight countries around the world. Impacts of climate change can differ across the different countries; the focus of this case study is to look at the impacts of coastal erosion.

The case-study of loss and damage on Kosrae, FSM thus aims to assess the **Loss and damage associated with the adverse impacts of coastal erosion on housing in Kosrae, The Federated States of Micronesia.** The research is carried out by means of both quantitative as well as qualitative methods and involves household surveys, in-depth interviews and focus group discussions. The results will provide a thorough understanding of the loss and damage already occurring.

Input provided by: Iris Monnereau (UNU-EHS)/ UWI-CERMES

Main elements of the implementation strategy

Coastal erosion is a significant problem on Kosrae where the majority of the inhabitants live in low-lying areas close to the sea. This study can help address specific areas where households are most prone to suffer from coastal erosion, both the result of extreme weather events and more slow-onset processes. The FSM already acknowledges the increasing negative impacts of climate change. Various recent policy documents in the FSM highlight this fact, such as; the Nationwide Climate Change Policy (2009), the National Energy Policy and State Action Plans (2010), and the National Action Plan to Combat Land Degradation (2011). The state of Kosrae is also the only state in the FSM that has a Climate Change Bill in place. This study can help specify the specific areas where households on Kosrae and the state need support to combat climate change impacts in relation to coastal erosion on people's housing conditions. It also enhances the understanding of what adaptation measures households have already undertaken, and the impacts of those measures.

Targeted beneficiaries

This study will enhance the current knowledge on the loss and damages households on Kosrae suffer as a result of coastal erosion and the adaptation measures they have undertaken. The study will therefore provide a thorough understanding of how vulnerable households and areas of Kosrae can be best supported to combat the impacts of coastal erosion and diminish the loss and damage households suffer in the future. This information can be used to further propose courses of action that need to be undertaken in order to counter these impacts in the future, both by means of national policy-making as potential international support.

Any significant lessons learned

The majority of the survey respondents (86%) on Kosrae indicated that they have experienced coastal erosion over eh past 20 years. Of these 86%, 63% indicated this impact was severe and 24% indicated the coastal erosion they had experienced had had a limited impact. The coast-line has retreated, beaches have disappeared, people have suffered loss of land and damage to houses, and coastal roads are at risk of being washed away.

Housing and properties

Of those who have experienced negative impacts of coastal erosion, 39 % reported damage to their house. Residents' houses are often damaged because of floods but also because of gradual coastal erosion. Land has been lost because of coastal erosion and this has increased the impact of storms and floods. The shoreline is

often right alongside the house rather than 10 meters away from the house 15 years ago.

Extreme weather events
Besides the more gradual changes, a 60.4 % of the surveyed households have also suffered adverse effects of extreme weather events such as storm surges and 'high tides'. Houses were flooded and damaged, both the exterior as well as inside of the house. Many crops planted and economic trees, such as banana, breadfruit and coconut have died as a result of salt water intrusion.

Adaptation
About half the respondents (50.3 %) indicated they have taken measures to adapt to the threat of coastal erosion. The most popular measures are:

- Building of seawalls
- Elevating housing
- Reinforcing houses with cement walls
- Planting trees along the coastline
- Moving upland

Despite these measures, 95% of those respondents who indicated they face problems of coastal erosion and have carried out adaptation measures still suffer from the consequences of climate change. The respondents indicated that the seawalls they have built are insufficient to protect against ongoing sea level rise, coastal erosion and storm surges. Even when residents build the foundation of their house of cement rather than wood, the continuous flooding will still seriously damage their houses and deteriorate its construction. Survey respondents who did not carry out any adaptation measures indicated that this was mostly a result of lack of financial means (50 %), knowledge (32%), or skills (28%) to do so. Only 2% of the respondents who have suffered from an extreme weather event didn't carry out any adaptation measures because it wasn't considered a priority, which highlights coastal erosion is perceived to be a very serious threat on the island

The case-study findings will be shared (along with the other seven case studies) at the COP 18 in Qatar 2012. The lessons of this case-study will thus be shared with policy makers at the national, regional and international level. It will provide insights into the current state of loss and damage in Kosrae and in addition will help inform decision makers regarding appropriate measures to avoid loss and damage and help those most vulnerable.

Resource requirements

This study has aimed to assess the loss and damage already occurring and the adaptation measures people have carried out. More resources are needed to adequately combat the severe coastal erosion taking place on the island and diminish the impacts of further sea-level rise and increased weather events. Comprehensive capacity building is needed at all levels of Kosrae to further help diminish the loss and damage households' experience.

A large majority of the respondents, 86% indicated they suffer from coastal erosion and approximately half of the respondents have indicated they have taken measures to adapt Yet, 95% of these respondents indicated these measures were insufficient and they still suffer from coastal erosion. Resources are therefore highly needed to help residents and the island of Kosrae in general carry out adequate measures. In order to do so, a comprehensive study on coastal protection measures, aided by international experts, are necessary for the different areas of Kosrae. This entails expertise from local sources, international coastal engineers and e.g. modeling assessments in order to map current coastal erosion by comparing historical aerial photographs with current satellite images.

Potential for replication or scaling-up

This case-study has strong potential for replication and scaling up. We would wish to see similar studies carried out in islands in the region to help them address the impacts of loss and damage. In addition, this study could be the start of a larger framework to help combat loss and damage of coastal inhabitants on Kosrae.

Any additional information

www.loss-and-damage.net
www.ehs.unu.edu

A range of approaches to address loss and damage associated with climate change impacts at the local/subnational level

Goal of Approach:

Design and demonstration of the implementation of appropriate interventions to reinforce an emergency shelter to intensified wind speeds from hurricanes and outfitting this building (renewable energy, water storage) to facilitate functioning during and after a hurricane, as appropriate

Input provided by: Sustainable Development and Environment Division Ministry of Sustainable Development, Energy, Science and Technology Norman Francis Building, Balata, Castries SAINT LUCIA

Main elements of the implementation strategy

Part of the vision of the Government for the demonstration site entails enhancing the usefulness of the building as an emergency shelter during natural disasters, noting also, that water and electricity shortages are commonplace during and following a hurricane and other natural disasters. This vision includes the establishment of the following:

- Water storage (both potable water from the authorised water utility company and rainwater harvesting).
- Water conservation, through the use of low-flush toilets, low water flow taps.
- Enhanced structural integrity through the installation of hurricane straps and impact resistant window.
- Installation of a ramp to facilitate the physically challenged entering the building.
- Natural ventilation, through the installation of dormers to obviate the need for air-conditioning.
- Generation of electricity using photovoltaic (PV) technology (solar electricity).

The use of photovoltaic technology is an adaptation response to enhance the usefulness of the demonstration site in the aftermath of a hurricane or other natural disaster, with accompanying climate change mitigation benefits.

Stakeholders and Partners include:

Ministry of Sustainable Development, Energy, Science and Technology; Ministry of Social Transformation, Local Government and Community Empowerment; Ministry of Physical Development, Housing and Urban Renewal; Ministry of Infrastructure, Ports, Services and Transport; Community Leaders; Consultant Engineer; Contractor; Photo-Voltaic (PV) Supplier; Caribbean Renewable Energy, Development Programme (CREDP)

This Project is consistent with Saint Lucia's:

- National Energy Policy , 2010
- National Emergency Management Plan, 2009
- National Water Policy, 2004
- Sustainable Energy Plan, 2001
- Organization of Eastern Caribbean States (OECS) Building Code

Targeted beneficiaries

- Availability of an emergency shelter that embodies engineering guidelines, centred on the ability to withstand wind speeds greater than Category 3 Hurricane, as anticipated from climate change;
- Design specifications may be incorporated into Building Code
- Enhanced awareness and application of new design hurricane wind speed standards by engineers and architects, building contractors, insurers and others, with the expectation of adaptive replication
- Continuity in provision of service during and post-disaster
- Protection of vulnerable or affected community residents during and post extreme weather/climate events
- A safe source of water during and after a disaster
- Increased sustainability of the building and its functions (building used by community for many activities aside from disaster functions)

Any significant lessons learned

- …Need for a close working relationship (a regular presence) between climate change/environmental expert, engineer, architect and contractor to ensure that the retrofitting is done according to the initial plan
- …The need to build into the design, some flexibility to facilitate expansion and add-ons, as funding becomes available
- …Some of the 'old ways' of adapting that are less common today are sometimes the best ways to adapt (e.g. rainwater harvesting, natural ventilation via dormers)

Resource requirements

- Data on winds speeds specific to the country or area , as applicable
- Engineering guidelines that correspond to the data on wind speeds
- Expertise in wind speeds, photo-voltaic installation, green architecture, engineering
- All of the above are dependent on adequate financing

Potential for replication or scaling-up

Significant potential for replication in community centres, health centres, hospitals and schools around the island

Any additional information

The ultimate goal of the Project that gives due recognition of the anticipated impacts of climate change, specifically, increased severity of hurricanes, is the institution of revised design hurricane wind speed standards to facilitate enhanced designing, construction and retrofitting in Saint Lucia, for public and commercial buildings in the first instance

A range of approaches to address loss and damage associated with climate change impacts at the local/subnational level

Input provided by: Caribbean Risk Managers Ltd

Goal of Approach:

Microinsurance Catastrophe Risk Organisation (MiCRO)

MiCRO is a specialty reinsurance company that designs and delivers solutions that enable low-income people to protect themselves against losses after catastrophes. The poorest of the poor often live in conditions that leave them particularly vulnerable to natural disasters such as heavy rain, wind, or earthquakes. Microentrepreneurs who strive to escape poverty deserve financial tools to protect their business assets and minimize losses when disasters occur. However, insurance for low-income, vulnerable people (called microinsurance), is often scarce or imprecise in its payouts; and in the absence of effective insurance, a catastrophe like a hurricane or earthquake can send them back to square one. MiCRO seeks to break this cycle by offering a reinsurance product that allows microfinance institutions and other organizations to protect their clients or members against losses from catastrophic events. Established in March 2011, MiCRO was developed with a mission to empower those living in poverty to manage their risks in a sustainable and fair manner by bridging the divide between global markets and the most vulnerable. **MiCRO is an innovative public-private partnership offering a first-of-its-kind hybrid reinsurance product: a set of natural hazard triggers corresponding to wind speed, rainfall and earthquake shaking that offer a rapid payout, combined with coverage for additional funding to the extent that the triggers do not reflect actual losses on the ground.** The company's scalable model for microinsurance relies on an innovative structure that uses local partners to aggregate micro-risk, and international (re)insurers to price, manage and retain this risk.

Main elements of the implementation strategy

MiCRO was formed in the wake of the devastating 2010 earthquake in Haiti as a public-private partnership of the global humanitarian agency Mercy Corps, the international reinsurance leader Swiss Re, and the Haitian microfinance institution Fonkoze. The company is supported by the UK's Department for International Development (DFID) and the International Finance Corporation (IFC). Each player contributes something unique: Swiss Re brings expertise from the insurance world and provides the reinsurance backing for MiCRO's initial product, Mercy Corps brings decades of experience connecting the world's poor with financial tools and other resources, and Fonkoze is MiCRO's first client and implementing partner.

No other entity – nonprofit or for-profit – is currently offering a product like MiCRO's. The catastrophe coverage provided by MiCRO's reinsurance product takes advantage of the cost and expediency of parametric insurance, creatively combining it with a possible second payout in the event that the parametric payout is not sufficient to cover actual losses. This coverage of "basis risk" is critical to ensure that a client organisation's real losses can be compensated. For example, if a tropical storm in Haiti triggers a $200,000 parametric payout, but microentrepreneurs actually suffered losses of $250,000,

MiCRO's hybrid product would ensure that client organizations have funding to cover the actual losses. Through the use of parametric triggers, MiCRO's policy process increases transparency to buyers and enhances rapid claim settlement after a disaster strikes. It also buffers Microfinance Institutions (MFIs) and their clients against basis risk by offering them the option to purchase basis risk coverage. Basis risk coverage is MiCRO's key innovation, as it provides a hedge against an impediment to the development of viable parametric micro (re)insurance products.

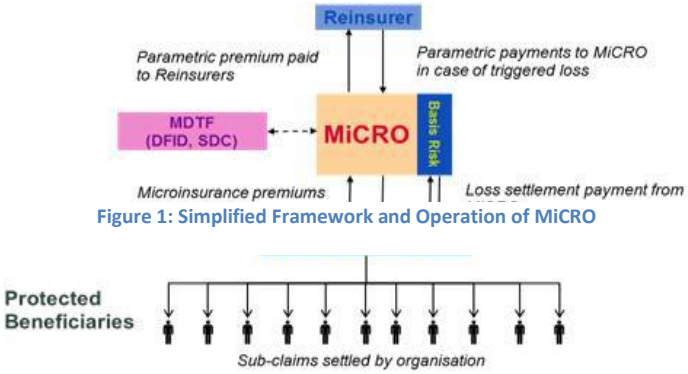

Figure 1: Simplified Framework and Operation of MiCRO

Currently, the parametric policy is backed by global insurance leader Swiss Re, while funds to pay basis risk claims are provided by MiCRO's risk-bearing cell for Haiti and further backed by a Multi-Donor Trust Fund (MDTF) managed by the Caribbean Development Bank. Support from DFID as well as the SDC has contributed both to the MDTF and MiCRO's risk-bearing cell for Haiti. The diagram (right) shows the simplified framework and operation of MiCRO.

The product offered by MiCRO encompasses the following features:

- **Customisable:** Policy can be designed to suit each organisation;
- **Replicable:** Initial introduction in Haiti; can develop catastrophic risk transfer solutions nearly anywhere in the world;
- **Sustainable:** Designed and supported by private commercial enterprises with targeted public-sector support;
- **Efficient:** Parametric policy streamlines programme administration and payout process reducing reliance on aid for disaster recovery;
- **Interest Alignment:** Cell structure enables segregation of the regional company liabilities and facilitates requisite investments by basis risk transfer policyholders**.**

Targeted beneficiaries

MiCRO was established to support the provision of microinsurance solutions to the poorest and most vulnerable populations, living in high-risk regions of the world. Customised programmes can be created for almost any kind of entity but are aimed at the 'informal sector' – the organised poor who have taken steps to increase their economic standing and stability through the creation of small businesses. In Haiti, Fonkoze offers MiCRO's benefits to its members – all Haitian women who have taken out small loans to start or expand businesses – through the catastrophe recovery product 'Kore W'. The borrowers benefit from: (i) Elimination of borrower's debt (loan balance reimbursement to Fonkoze); (ii) Emergency HTG 5,000 (US$125) cash payment; (iii) A new loan to recapitalise their business when the client was ready. Fonkoze made Kore W available to nearly 55,000 members starting in early 2011. In the company's first year, MiCRO provided US$1.64 million in payouts that Fonkoze has used to provide funds to nearly 6,800 Haitian women. Most recently, Tropical Storm Isaac, which struck Haiti in late August, triggered a payout to Fonkoze of more than $217,000.

Any significant lessons learned

(i) The self-sustaining, financial security model of MiCRO presents a wise investment for donors who want to build resilience in vulnerable communities and reduce the need for post-disaster assistance; (ii) MiCRO's hybrid product makes it financially feasible for client organisations to provide microentrepreneurs with a more responsive insurance programme (tailored to the geography, income level and vulnerability of their clients) that protects assets and limits losses from catastrophes; (iii) Microinsurance can help MFIs retain and grow their client base - when Kore W was introduced at the beginning of 2011, Fonkoze had close to 50,000 clients; by the end of the year, they had 59,000 and Fonkoze's dropout rate was also lower than ever before; (iv) MiCRO's product signals a significant step forward for self-sustainability of microfinance clients and offers a form of disaster risk reduction that allows microentrepreneurs to rebuild after catastrophes instead of falling back into abject poverty and aid dependency; (v) Cost and claims settlement process are the key drivers of client satisfaction; (vi) Merging parametric and basis risk transfer allows the international risk markets to participate in coverage designed to meet needs at the individual level in a least-developed country, a pre-requisite for catastrophe microinsurance at scale. (We note, however, that designing such hybrid products continues to be challenging and new lessons are constantly being learned.)

Resource requirements

(i) Hazard parameters on which triggers are based are available globally and are in the public domain; technical capacity required to design triggers and operate real-time trigger and payout calculation systems; (ii) *Kore W* claims settlement requires significant resources to manage response, particularly after major events; (iii) MiCRO basis risk coverage requires capital to underwrite at best-possible cost bearing in mind the high uncertainty in analysing this risk.

Potential for replication or scaling-up

Achieving transfer of Haitian MFI client's catastrophe risk to the international risk markets is a major key to developing catastrophe micro-insurance programmes for the world's most vulnerable people at a scale at which they can achieve real impact in building resilience. Low-cost loss adjustment/claims processing model developed by Fonkoze through *Kore W* and necessary for cost-effective basis risk coverage, is also replicable and scaleable.

Any additional information

For additional information and resources please visit MiCRO's website: http://www.microrisk.org/

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

Cook Islands Disaster Emergency Trust Fund.

The purpose of the trust fund is to enable a swift coordinated response by the Disaster Response Executive once a State of Emergency or Disaster is activated.

The expected results of the trust fund is to be able to

Initiate and deploy rapid assessment team(s);

reestablish (where applicable) essential services i.e. communications, electricity, water supplies, and health services;

support Cook Islands Red Cross (if/when required) efforts with provisions i.e. temporary shelter, food, water, blankets, and clothing;

deployment of key government staff to the affected area(s) whether it is on Rarotonga or the Outer Islands to assist or relieve staff;

deployment of skilled volunteers, and equipment to assist with clearance, immediate and crucial repairs, and ensure that essential services are operational;

transportation, accommodation, food, and water for volunteers and relief workers is provided;

and all cost associated with either air or sea freight accounted for.

The fund is intended to address loss and damage at the time of a disaster, it is not intended to address the longer-term recovery process. A separate system deals with the long-term recovery under the establishment of a "Recovery Committee and Coordinator" which is appointed by government with a plan that has been approved by cabinet.

Input provided by: Cook Islands. Office of the Prime Minister, Climate Change Cook Islands Division

Main elements of the implementation strategy

The Cook Islands Government initiated the fund with the transfer of $200,000 NZD into a interest bearing bank account. The Ministry of Finance and Economic Management (MFEM) will manage the fund in accordance to policies and procedures under the MFEM Act, and Trust Fund Procedures. The startup funds is to demonstrate to outside donors government's commitment to enhanced response measures and attempt to encourage outside contribution towards the targeted amount of $500,000 NZD, based on the cost incurred in the Aitutaki Cyclone Disaster in 2010.

The trustees of the fund are: the (a) Police Commissioner; (b) Director of Emergency Management Cook Islands; (c) Secretary of the Ministry of Infrastructure and Planning; and the MFEM Financial Secretary.

The trust funds existence relates to strategic areas within the 2011-2015 National Sustainable Development Plan, Priority Area 5 - Resilience 5.1 Strong Governance arrangements for Disaster Risk Management (DRM) and Climate Change Adaptation (CCA), as well as 5.3 Enhanced Effective Preparedness, Response and Recovery. In addition the fund is also linked to the 2011-2015 Joint National Action Plan for DRM and CCA.

The national policies have incorporated, and are a by-product of the Pacific Regional DRM Framework for Action and the Pacific Islands Framework for Action on Climate Change, and the international Hyogo Framework for Action and the United Nations Framework Convention on Climate Change.

Targeted beneficiaries

- Cook Islands Government fulfilling national responsibilities, enabling improved responses to disasters.
- The Cook islands people. This will increase confidence in the people of the Cook Islands knowing that there is a strategic plan and funds by government to be able to respond efficiently and effectively.

Any significant lessons learned

- Communication needs to attract external funding (next steps).
- The importance of political will to support.
- the lack of significant cyclone insurance coverage e.g. it covers flooding from rain water, but not sea water
- Properties are only eligible if the owner meets the insurance criteria which in most cases becomes to expensive for owners to afford the right coverage.

Resource requirements

- *External Donor funding support.*
- *Scoping the functions and ToR of the Trustees.*

Potential for replication or scaling-up

There is a similar policy in draft to replicate this trust fund that focuses on disaster risk reduction and climate change with the intent to synergise policy, planning, institutional and human capabilities, as well as financial resources and mechanisms for implementation at national and local levels with specific focus on reducing vulnerability and building resilience.

Any additional information

The Cook Islands are expected to incur, on average, about 5 million USD per year in losses due to natural disasters. In the next 50 years, the Cook Islands have a 50% chance of experiencing a loss exceeding 75 million USD and casualties larger than 130 people, and a 10% chance of experiencing a loss exceeding 270 million USD and causalities larger than 200 people.

Pacific Catastrophe Risk Assessment and Financing Initiative, Country Risk Profile: Cook Islands, September 2011, http://pacrisk.sopac.org/

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

- On the adaptation to drought, measures were taken as: strengthening the capacity and knowledge of stakeholders (rural peasants) were constructed for extraction wells and groundwater storage.
- Studies on the impacts of climate change on agriculture: shifting cultivation.

Input provided by: Dominican Republic

Main elements of the implementation strategy

- Interagency coordination
- Use adapter rail
- support facilities of government and international organizations
- Parties involved: Ministry of Agriculture, Meteorology, Ministry of Environment, Cuba meteorology office.
- The links were associated with the law 64-00 on environment and natural resources.

Targeted beneficiaries

- Small producers in the northwest and southwest.

Any significant lessons learned

- Take into account their opinions and actions regarding the shape of their crops, because they have learned how to do over time.
- Must achieve the involvement of the beneficiaries so that they are part of the project implementation

Resource requirements

- It takes training and resources to build dams and wells, and technologies to work the land (agricultural machinery)

Potential for replication or scaling-up

- This knowledge can be replicated due to its operation.

Any additional information

- For the study was used drought adaptation of IAN guide Burton.

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

The Climate Vulnerability Monitor states: The physical vulnerability of the Dominican Republic is evident, given its clear exposure to hurricanes and intense tropical weather. Flooding, which is becoming more prevalent and severe with climate change, is a particular cause of concern, and accounts for the majority of climate related extreme weather damages affecting the Dominican Republic. Most models expect less rainfall, more heat, including more frequent hot days and thus likely more drought. Wider risk transfer via insurance or catastrophe bonds to the private sector would strengthen resilience against major economic damages from increasingly severe weather incidents.

The USAID-supported Environmental Protection Program (EPP), implemented by The Nature Conservancy (TNC), supports the Dominican Republic´s ability to adapt to global climate change and reduce the risk of loss and damage from climate shocks by involving stakeholders at the local and national levels in a comprehensive approach that includes capacity building, policy development, and ecosystem-based adaptation in selected sites, mainly Samaná Bay and Bayahibe.

USAID is also launching a new project to help smallholder farmers in the Dominican Republic access and use a widened menu of climate risk management tools. These tools address loss and damage by helping farmers reduce and transfer their risks. Each tool will be targeted at the risks that it can most appropriately and cost-effectively address. This project will support the development of one or more sustainable, market-based insurance products that complement risk reduction efforts, reflect small farmers' needs, and are replicable and marketable in communities across the country by local insurers in subsequent years. It will also motivate and facilitate the adoption of risk reduction practices and technologies that can complement the insurance and address shocks that are more frequent but less severe.

Input provided by: United States (USAID/Dominican Republic)

Main elements of the implementation strategy

The EPP builds Dominican capacity to interpret information on climate change and its impacts, to coordinate among government offices at all levels, NGOs, and the private sector to develop the enabling policy environment for climate adaptation actions, and to implement on-the-ground adaptation interventions that build society's resilience to climate change. This is a five-year initiative implemented through a cooperative agreement with The Nature Conservancy and sub-awards with the Technological Institute of Santo Domingo (INTEC), the Center for the Conservation and Eco-Development of Samaná Bay and Its Surrounding Areas (CEBSE), the Pro-Naturaleza Fund, Inc. (PRONATURA), Dominican Institute for Integral Development (IDDI) and Foundation for Marine Studies (FUNDEMAR). Major activities regarding climate change adaptation have included:

- Identifying gaps in public policy tools (including legislation), and supporting the development of key instruments to address long term impacts of climate change to the DR. The USAID/TNC EPP is working closely with the Council for Climate Change and the Environment Ministry to engage key stakeholders in this effort.
- Increasing public awareness of climate change at local and national levels through activities with partners and producing reliable information for decision making and demonstrations of adaptive measures. Additionally, a broad effort to inform, educate and engage private sector, NGOs, CBOs and the public in general is being carried out through various methods including a public awareness survey and campaign.
- Creating the first community-based climate change adaptation network with 32 different community based organizations - representing popular neighborhoods of Santo Domingo and some government

entities.

The project will also include modeling of climate change impacts on the hydrological cycles in major watersheds and support for the integration of climate change adaptation in municipal planning in 6 municipalities in the DR.

Meanwhile, the new project on climate risk management tools for Dominican farmers will:

- Provide climate change and agriculture technical training for farmer groups, and increase farmer knowledge on climate change impacts
- Increase farmers' access to climate and weather information for decision making
- Increase farmers' adoption of risk reduction measures, such as water storage
- Increase farmers' access to risk transfer mechanisms such as index insurance for climate-related risks to agriculture

This project will partner with agricultural producer clusters, an international reinsurer, and local insurance companies, among others.

Targeted beneficiaries

These projects will increase climate change awareness and planning capacity among a range of stakeholders, and also contribute to on-the-ground measures that directly reduce the risk of loss and damage from adverse climate change impacts.

With increased adaptive capacity and resilience to climate change, Dominican farmers will be able to increase their agricultural and therefore economic productivity, thereby improving the country's food security.

Any significant lessons learned

Resource requirements

These projects are identifying and addressing key capacity needs, including among government decision makers at different levels, the private sector, NGOs, CBOs, farmers, and the general public.

Experiences from other developing countries show that implementing weather index insurance often requires addressing data gaps and building capacity among local insurers, target beneficiaries, and/or government officials and regulators.

Potential for replication or scaling-up

These projects will demonstrate adaptation measures in agriculture and other sectors; exposure to successful measures can motivate additional communities and individuals to implement similar actions.

In addition, as Dominican insurance companies become increasingly familiar with innovative products like index insurance, these products could be scaled to other parts of the country and marketed by more companies, thereby reducing costs.

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

Though agriculture comprises just 5% of Jamaican GDP, it provides employment for 20% of the labor force, and 73% of those living below the poverty line reside in rural areas. Increased temperature, rising sea levels, more intense storms, and longer dry spells threaten to increase soil erosion and pest outbreaks, decrease crop yields and water supply, and damage infrastructure.

USAID/Jamaica has an approved Country Assistance Strategy (for 2010-2014) with a Priority Goal of "Promoting Economic Prosperity and Sustainable Development," which will be directly impacted by climate change. Until now, USAID mostly focused its adaptation activities in the agriculture sector, in particular through the MAJIC (Marketing and Agriculture for Jamaican Improved Competitiveness) project. The goal of this USAID-supported project, implemented by ACDI/VOCA, is "To protect rural lives, livelihoods and ecosystems in targeted Jamaican communities affected by climate change through interventions that drive adaptation and build resilience." Activities will be organized into two objectives:

- To improve the adaptive capacity of Jamaican partners and institutions to promote livelihoods and natural systems that are resilient to climate change and its impacts
- To strengthen local and national institutions to support the processes of adaptation and sustainability

These activities will help avert loss and damage related to climate change impacts in Jamaica's rural communities and by extension the agricultural sector.

Future climate change activities supported by USAID/Jamaica over the next strategic period 2012-2017 will broaden focus to other sectors in the areas of:

1. Increasing resilience of targeted livelihoods and ecosystems to the negative impacts of climate change.
2. Improving risk management planning, especially through community-based approaches.
3. Increasing institutional capacity to reduce emissions and mitigate and manage GCC impacts through policy and planning.

Input provided by: United States (USAID/Jamaica)

Main elements of the implementation strategy

The main activities of the future climate change adaptation programming include, but are not limited to:

- *Development of a climate change awareness strategy*: ACDI/VOCA has initiated a Knowledge Attitude and Awareness (KAP) assessment for a community members and farmers. The findings have been used to develop a series of awareness building posters for the agricultural sector.
- *Award and monitoring of grant activities for climate change adaptation and disaster risk reduction*: Grants will support livelihood risk assessments, crop suitability modeling, and water harvesting. The risk assessments and suitability maps will provide farmers with a better understanding of how climate change is likely to impact key crops and what geographic areas will be most suitable for growing particular crops under different climate change scenarios.
- *Capacity building*: Extension officers will be trained to deliver a curriculum on climate smart agriculture to community groups. In addition, agricultural extension officers will be trained on agro-meteorology, in order to build capacity for agro-meteorological forecasting within the extension agency. This will be complemented by support for upgraded equipment for select weather stations.
- *Monitoring and evaluation* of project activities, including GIS mapping of project sites and vulnerabilities faced by farmers.

ACDI/VOCA will implement CEDAR (Communities Engaged to Drive Adaptation Responses), a method which engages local stakeholders in participatory activities that identify, prioritize and lead sustainable responses to climate change. The project also uses participatory, discovery-based adult learning methods such as Farmer Field Schools (FFS).

Grant funding to the University of the West Indies will continue to provide baseline information for decision-making. Additional linkages to local stakeholders such as the Meteorological Office, technical specialists and insurance providers have been made.

USAID also supported the Government of Jamaica (GOJ) in convening a National Climate Change Workshop in July 2012 to develop an integrated climate change mitigation and adaptation policy framework. The workshop brought together key Ministers, government representatives, NGOs, and development partners. It was attended by more than 150 individuals. An important feature of the climate framework is that it is being mainstreamed into the country's existing long-term national development plan, *Vision 2030 Jamaica*. USAID will continue to support the Government of Jamaica as it develops this policy framework. A National Policy Framework on Climate Change is expected to be submitted to Cabinet by December 2012 in the form of a green paper.

Targeted beneficiaries

The target beneficiaries are vulnerable farmers and agricultural value chain members. The activities help reduce the risk of loss and damage from climate change impacts in Jamaica's agricultural sector.

By building resiliency in the agricultural sector, this project also helps support the Jamaican Ministry of Agriculture and Fisheries (MOAF) priority goal of "*assisting Jamaica's agricultural sector to become a market-driven, profitable and competitive industry*."

Any significant lessons learned

- The process of programming change must be carefully managed within the context of a 4-year development assistance program to ensure effective use of resources and sustained impacts of the interventions supported.
- Adaptive management is critical in a complex project implementation environment where programming approaches are continuously changing along with programming focus, funding sources and priorities.
- Site specific vulnerability assessments are required for a more targeted adaptation/mitigation intervention.

Resource requirements

USAID support for Adaptation in Jamaica totaled $1 million in fiscal year 2010, $3 million in fiscal year 2011, and $2 million in fiscal year 2012.

The project has identified and is currently addressing key capacity needs, including among agricultural extension agents, farmers, and rural communities.

Potential for replication or scaling-up

The Farmer Field School extension methodology has successfully contributed to adoption of best practices and transfer of technologies. The method has also been successful in building cohesiveness among members of producer groups. It also demonstrates the benefit of group-focused technical assistance delivery and has relevance for application to address capacity building needs in other sectors.

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

In partnership with the South Pacific Regional Environment Programme (SPREP), the U.S. Government seeks to improve the ability of outer island communities of Kiribati to increase resilience of water resources. It will address loss and damage associated with the adverse effects of climate change by increasing capacity for rainwater harvesting and storage and enhancing existing ground wells (e.g., through better surfacing, water quality monitoring to shut down pumps at certain levels of contamination, etc.). The partnership will also provide training and technical assistance to the Health Ministry, which has recognized the importance of adaptation and its own lack of capacity on this issue, to integrate adaptation into national health planning and policies.

Kiribati is among the poorest and least developed countries in the world, with few natural resources. A ground water lens exists on the atolls and is the main source of potable water for the majority of people on the outer islands. Climate change will affect rainfall and the amount of habitable land through erosion and accretion, which will in turn affect the availability of fresh water. The Government of Kiribati identified water in its 2007 National Adaptation Programme of Action, and specifically well improvement, as one of nine key areas for adaptation implementation. The program will respond to this urgent and immediate need.

Input provided by: United States (USAID/Barbados)

Main elements of the implementation strategy

SPREP and USAID seek to strengthen the climate-resilience of water resources among communities in Kiribati. Main elements of the strategy to reduce climate risks include:

- Training communities in Kiribati on vulnerability assessments, disaster risk reduction, and identification and prioritization of adaptation and risk reduction strategies and activities.
- Identifying and assessing with communities cost-benefits of options for adaptation and risk reduction.
- Working with communities, technicians, and service providers to implement adaptation and risk reduction measures, such as improving the capacity for rainwater harvesting and storage and enhancing underground water wells to increase their resilience to storm surges and run-off through better surfacing, water quality monitoring, etc.
- Training environmental health officials at the Ministry of Health in Kiribati on climate variability and change.
- Providing technical assistance to environmental health officials at the Ministry of Health as they integrate adaptation into national health policies and planning.

Targeted beneficiaries

Communities, technicians, and service providers in Kiribati, as well as Ministry of Health officials.

Any significant lessons learned

Resource requirements

$2 million through 2015.

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

In partnership with the South Pacific Regional Environment Programme (SPREP), the U.S. Government will promote healthy ecosystems in the Solomon Islands. Healthy ecosystems, such as mangroves, coral reefs, and wetlands, form natural barriers against extreme weather events, e.g. storm surges, and increase resilience to rising sea levels and changing rainfall patterns, and reduce risks associated with these events. As natural buffers, ecosystems can be less expensive to maintain than man-made infrastructure, such as dykes, levees, and concrete break walls. Healthy ecosystems also provide important economic and social benefits to local populations, including firewood, clean water, and food. The program will contribute to a broader effort in the region to implement ecosystem-based adaptation.

Input provided by: United States (USAID/Barbados)

Main elements of the implementation strategy

SPREP, in partnership with the U.S. Government, seeks to promote healthy ecosystems in the Solomon Islands to reduce vulnerability to the impacts of climate change and to protect crucial ecosystem services, such as clean water and food, and therefore to address loss and damage associated with the adverse effects of climate change. Main elements of the strategy include:

- Developing resources and tools that integrate ecosystem-based adaptation into existing guidelines for community-based adaptation.
- Training government officials, community leaders and stakeholder groups, such as women and youth, on ecosystem-based adaptation and the identification and prioritization of ecosystem-based adaptation strategies and activities.
- Gathering information, via surveys, rapid participatory appraisal techniques, and focus group discussions, on vulnerability to climate change impacts.
- Identifying and assessing potential ecosystem-based adaptation measures.
- Working with government officials and communities to implement appropriate ecosystem-based adaptation measures, such as protecting or rehabilitating mangroves and other coastal vegetation that has the potential to serve as a protective barrier against storm surges and sea level rise, and implementing upland and watershed management for effective water storage and flood regulation services.

Targeted beneficiaries

Government officials and communities in the Solomon Islands

Any significant lessons learned

Resource requirements

$2 million through 2015

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

Over the past decade, a variety of funds have emerged that can be used to support adaptation. The growth of funding sources has created a shared need among Pacific SIDS for help in understanding how to access available funds and make effective use of resources. The ADAPT Asia-Pacific project will enhance institutional and human capacity in the region to access adaptation funds.

The principal objective of ADAPT Asia-Pacific is to establish a fully functional and self-sustaining adaptation project preparation facility that will not only support preparation of specific projects, but also build the capacity of the region's governments to independently access climate adaptation funds and thereby address loss and damage associated with the adverse effects of climate change..

ADAPT Asia-Pacific focus countries include Bangladesh, Cambodia, India, Indonesia, Laos, Maldives, Mongolia, Nepal, Philippines, Sri Lanka, Thailand, Timor-Leste, and Vietnam. Eligible nations in the Pacific include: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

Input provided by: United States (USAID/Barbados)

Main elements of the implementation strategy

ADAPT Asia-Pacific works closely with development organizations and government agencies to address loss and damage through focused activities in four key areas:

1. **Knowledge Sharing Platform**. ADAPT Asia-Pacific works in close coordination with Asia-Pacific Adaptation Network (APAN) as the regional knowledge sharing platform to disseminate information on adaptation-related topics.
2. **Annual Forum**. Held in a different country each year, the ADAPT Asia-Pacific Annual Forum brings adaptation funds and project proponents together and establishes the forum as a key mechanism in Asia and the Pacific for facilitating access to funding opportunities.
3. **Capacity Building Program**. ADAPT Asia-Pacific provides the capacity building necessary to develop in-country skills to prepare sound adaptation projects for financing.
4. **Project Preparation and Finance**. ADAPT Asia-Pacific identifies potential project proponents and mobilizes teams of highly-skilled project preparation and technical specialists on an as-needed basis to help create bankable projects.

An important component of ADAPT Asia-Pacific is capacity building, using both existing and new curriculum that will be offered through regional institutions. For example, the project is beginning development, in cooperation with UNDP, regional learning institutions and U.S. universities, of a curriculum on the economics of climate change adaptation. Among a range of topics, it will address issues like linking probabilistic risk assessment methodologies with downscaled general circulation model information to better understand how the hazard event frequency relationships may change allowing quantified estimates of the costs associated climate change impacts, particularly extreme events.

Targeted beneficiaries

National governments in the Pacific SIDS

Any significant lessons learned

Direct access to adaptation funds by Pacific SIDS has proven difficult; most of the specialized adaptation funds flow through the multilateral agencies. Cognizant of the need to more effectively manage international and domestic climate-related finance, countries in the Pacific require assistance to develop, test and employ assessment methodologies that can identify, tag and track the use of international and domestic climate finance, such as the Climate Public Expenditure and Institutional Review. Further support for regional sharing of lessons from the design and implementation of existing National Climate Funds can sharpen the effectiveness of this mechanism in the region. Lack of government staff numbers argues for basing training on distance learning models delivered through regional educational institutions, such as the University of the Pacific.

Resource requirements

ADAPT is a five year $17 million project.

Potential for replication or scaling-up

ADAPT Asia-Pacific anticipates contributing to the design and implementation arrangements of the Regional Technical Support Mechanism, being set up by the CROP agencies, WB, and ABD, as a strategic long-term response to facilitate rapid access to technical and advisory services by Pacific SIDS and to strengthen national capacities to effectively respond to climate change, essentially mirroring the principal goal of ADAPT Asia-Pacific.

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

The objective of the Coastal Community Adaptation Project (C-CAP) is to build the resiliency of vulnerable coastal communities in the Pacific region to withstand more intense and frequent weather events and ecosystem degradation in the short-term, and sea level rise in the long-term. C-CAP will strengthen community resiliency to climate change, and thereby address loss and damage, in the following twelve Pacific Island countries: Papua New Guinea, Solomon Islands, Nauru, Tuvalu, Vanuatu, Kiribati, Fiji, Samoa, Tonga, Republic of Marshall Islands, Federated States of Micronesia, and Palau.

Input provided by: United States (USAID/Barbados)

Main elements of the implementation strategy

To address loss and damage associated with the adverse impacts of climate change, C-CAP will have three main components:

1. Reduce risk by rehabilitating and constructing new climate-resilient social and economic infrastructure in coastal zones

   Social and economic infrastructure in low-lying coastal communities is particularly vulnerable to the effects of more frequent and intense weather events and sea level rise. All infrastructure rehabilitation or new construction activities undertaken by this project will be determined through a community-based identification and priority setting exercise. The focus of the infrastructure component will be on facility or system rehabilitation, repair or upgrading, or its protection through coastal erosion control measures, and to a lesser degree, on relocating structures and new construction to insulate social and economic infrastructure, improve resiliency to climate change, support disaster prevention and preparedness plans, and safeguard access to health, education and other basic services.

2. Build community engagement in disaster risk prevention and preparedness

At a local level, Pacific Island communities require a greater ability to anticipate extreme events, safeguard their assets, and reduce risks. Disaster risk reduction activities may build on existing efforts, and be tailored to local concerns and decision-making norms. Activities under this component, including risk identification, options evaluation, and risk reduction activities, complement investments in social infrastructure (component one) and long term planning (component three) by increasing communities' adaptive capacities to deal with the impacts of climate variability and change that cannot be avoided.

3. Work with stakeholders to reduce risks by integrating climate-resilient policies and practices into community and district land use plans and building standards.

   Building climate resiliency into land use planning as well as in building standards for construction is a long-term objective to protect future investments in infrastructure. Climate resilient land use management plans guide these investments to areas less vulnerable to flooding and sea level rise. Climate resilient building standards for new infrastructure projects produce stronger, safer facilities and systems and may result in cost savings over time (i.e. lower maintenance costs due to resiliency to intense weather events).

Targeted beneficiaries

Up to 90 vulnerable coastal communities across 12 Pacific Island countries.

Any significant lessons learned
Resource requirements
Up to $23.6 million over five years.
Potential for replication or scaling-up
Any additional information
USAID has contracted the global development company Development Alternatives International (DAI) to implement C-CAP.

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

USAID climate change support for the countries in the Eastern Caribbean is based on information gathered from stakeholder workshops held in St. Lucia and Barbados in 2010. Two critical areas were identified as requiring special attention: coastal zone management and resilience, and freshwater resources management.

USAID is helping Barbados manage climate change impacts on water, and manage flood risks along the west coast of the island, thereby reducing the risk of loss and damage from flooding. USAID is also working with Organization of Eastern Caribbean States (OECS) to provide information and capacity building to support adaptation and risk reduction in the region.

Input provided by: United States (USAID/Barbados)

Main elements of the implementation strategy

The program focuses on four component areas which are essential to address specific vulnerabilities related to water and climate resources:

1. Fostering and improving the enabling environment to build understanding and support for policies and laws that reduce vulnerability to climate stresses.
2. Launching interventions in freshwater and coastal management to build resilience and demonstrate results.
3. Building institutional capacity and addressing information gaps through support for key practitioners in government and related sectors affected by climate change as well as support for institutions in the region such as training facilities, government departments and entities charged with developing data.
4. Building public awareness on climate change issues and improving capacities for climate change adaptation.

The program includes the following activities:

Interventions to build resilience and adapt to climate change: USAID funds are supporting high impact "on-the-ground" demonstration activities in the water and coastal management sectors, with relevance for the tourism and agriculture sectors. Planned interventions include:

- Adaptation planning and interventions in coastal communities in Dominica to reduce risks associated with storm surge and flooding.
- Preparation of a Climate Change Adaptation Plan in Grenada to address storm surge and flooding.
- Trainings on water audits to promote water conservation practices in St. Kitts, where saline wedge intrusion threatens freshwater reserves.
- Development of a drainage master plan in Nevis that considers predicted climate change impacts, such as flash flooding.
- Using GIS technologies to map water infrastructure in the northern parts of St. Lucia, and improve water management.
- Establishing water harvesting systems to reduce the risk of water shortages during climatic shocks in St. Vincent.
- Increasing water storage capacity and installing distribution lines for a reverse osmosis plant in Bequia, where freshwater is expected to become increasingly scarce due to sea level rise and increased droughts.

Information strengthening: The OECS Secretariat is working in collaboration with USAID and the Coastal

Zone Management Unit – Barbados and Caribbean Institute for Meteorology and Hydrogeology (CIMH) to develop an OECS regional marine monitoring and forecasting system.

Building capacity through training, workshops and seminars: A series of seminars is being held by the OECS on areas relating to water and coastal resources, economic sectors, and climate change. These seminars seek to empower decision-makers and other key interest groups to examine the effects of current management policies, which may be directly contributing to increased vulnerability of natural systems and economic sectors to climate change impacts, and provide guidance on the way forward. In September 2011, a seminar on Integrated Water Resource Management was held. Discussions at this forum led to plans to develop an OECS Water Sector Model Act. A second seminar on coastal area management was held in September 2012 in St Kitts. This resulted in the call for common policies on coastal area management and information access and sharing in the OECS. These policies will be formulated in 2013.
In addition, OECS and CIMH are providing training for local monitoring and forecasting practitioners, including a Meteorology Entry level technician course; Meteorology Mid-level technician course; and a Hydrological technician course.

Targeted beneficiaries

The beneficiaries of these projects include local monitoring and forecasting practitioners, decision-makers at all levels, vulnerable communities and coastal residents. The activities help reduce the risk of loss and damage from climate change impacts on coastal communities and important economic sectors such as tourism and agriculture.

Any significant lessons learned

Resource requirements

The program has identified and is currently addressing a number of key capacity needs. Assistance is being provided to strengthen the capacity of technical organizations in areas such as meteorology, coastal and marine science. This will be complemented with the strengthening of training institutions serving the region to increase the cadre of persons at both the technical and decision-making levels to address issues related to climate change.

US support for Adaptation in the Eastern Caribbean region totaled $5 million in fiscal year 2010, $5.5 million in fiscal year 2011, and $4.5 million in fiscal year 2012 (http://foreignassistance.gov/Initiative_GCC_2010.aspx?FY=2010).

Potential for replication or scaling-up

The program seeks to build the enabling environment for reducing vulnerability to climate change by improving the regulatory framework in support of national adaptation strategies - demonstration initiatives that can be modeled or used as best practices throughout the region. The "on-the-ground" activities listed above are also intended to serve as demonstration projects that can inform more widespread implementation of risk reduction measures.

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach:

The ability of Pacific Islanders to achieve food security is affected by population growth, rural-urban migration, deforestation, and soil erosion. Changes in distribution of rainfall and an increase in frequency and/or intensity of extreme weather events, when combined with these non-climate change factors, will heighten food security challenges faced by Pacific Small Island Developing States over coming decades.

In partnership with the Secretariat of the Pacific Community (SPC), the U.S. Government will strengthen food security among farming communities in Fiji, Kiribati, Samoa, Solomon Islands, Tonga, and Vanuatu and therefore reduce loss and damage associated with the adverse effects of climate change. The program will build scientific and technical capacity to apply Geographic Information System (GIS) land-use, forestry and soil mapping techniques in order to make informed decisions to improve the climate resilience of terrestrial food production systems. This partnership will also implement innovative techniques and management approaches to increase the climate change resilience of terrestrial food production systems.

Input provided by: United States (USAID/Barbados)

Main elements of the implementation strategy

The program seeks to improve land use mapping and the application of GIS tools and techniques in Fiji, Kiribati, Samoa, Solomon Islands, Tonga, and Vanuatu to identify key areas of food supply vulnerability and to monitor vegetation and land cover change over time. Main elements of the strategy include:

- Developing customized GIS systems, operated at the national level and hosted by the ministry responsible for agriculture, or another ministry nominated by the government.
- Establishing a regional GIS technical support network to ensure that GIS systems can be supported and updated on an ongoing basis after the completion of the project.
- Using GIS data on land use to generate maps, which will allow for the identification of the volume and location of specific agricultural products that are critical for Pacific island food security (e.g., bread fruit, pandanus) and form baseline information for the development and implementation of adaptation measures.
- Providing in-country training and technical assistance to government officials and technical specialists to utilize analytical tools, such as data collection and management, GIS, cost-benefit analysis, and socioeconomic impact assessments, to inform adaptation decision-making.

The program also seeks to strengthen climate-resilient terrestrial food production systems among farming communities in Fiji, Kiribati, Samoa, Solomon Islands, Tonga, and Vanuatu. Main elements of the strategy include:

- Carrying out participatory rural appraisals, focus group discussions and surveys at all sites to identify present and future constraints on food production and to develop understanding of the adaptive capacity of communities.
- Building awareness among farmers, communities and agricultural officials of adaptation options,
- Training to encourage farmers to introduce innovative and sustainable pest control strategies and integrated crop management approaches, with support from GIS systems to map and monitor pests and/or diseases and predict where crop varieties will grow.
- Piloting farmer field schools.
- Designing and implementing adaptation approaches, such as: the utilization of animal waste in the production and application of manure to improve soil structure and fertility, crop associations to reduce incidence of pests and diseases, and agro-forestry practices.

- Providing in-country training and technical assistance to government officials to scale up successful approaches to improving the resilience of terrestrial food production systems and to integrate those approaches into national, sectoral and cross-sectoral developing planning, programs, and strategies.

Targeted beneficiaries

Farming communities in Fiji, Kiribati, Samoa, Solomon Islands, Tonga, and Vanuatu

Any significant lessons learned

Resource requirements

$4 million through 2015

A range of approaches to address loss and damage associated with climate change impacts at the national level

Losses and damages associated with "the Adverse Effects of Climate Change"[1]

Losses and damages associated with The Adverse Effects of Climate Change, Including Impacts Related to Extreme Weather, has been the experience of many Grenadian households including our farming households.
We would remember the devastation that Grenada experienced after the passage of both hurricanes Ivan and Emily in 2004 and 2005. Our agriculture was severely affected, we could not feed ourselves. Again in 2008 to 2010 the Island experienced some severe drought conditions with the added problem of bush fires.

BUSH FIRES RECORDED

Location	Approximate Acreage affected	Farmers Affected	Crops affected
Mt. Ceni	150	16	Mango, Citrus, Cocoa, Nutmeg Mix cultivation
Mt. Moritz	67	03	11 acres Cocoa, Mangoes
Constantine	08	02	Fruit Trees, Bamboo
Grand Roy	20	01	Forest
Mt. Dor	120	02	Fruit Trees
Perseverance	30		Forest
Concord	40		Cocoa, Nutmeg
Palmiste	40		Forest
Bop Plant Mt.	80		Forest
La Potrie Mt.	45		Forest
Grenton	25		
Maran	70	20	
Bois Congo	18	07	Cocoa, nutmeg, citrus mix
TOTAL	**713**	**46**	

As a result through several externally funded projects a range of approaches was used to address the problems.

1. A demonstration site was set up to demonstrate "Rain water harvesting techniques.

[1] This information provided by Grenada to the secretariat has been reproduced here in its original form.

2. The soft loan irrigation project for farmers.
3. A Small Farmer Venerability Reduction Initiative project.
4. A Labour Support Programme with emphasis on Rehabilitation of Nutmeg and Cocoa Fields and the Establishment of Fruit orchards.

A range of approaches to address loss and damage associated with climate change impacts at the national level

Goal of Approach: DALA capacity building/ PICRAFI

The Pacific region is presently subject to extensive hydro meteorological hazards which are likely to be impacted by climate change. Assessment of climate change related hydrometeorological events is therefore critical to ongoing monitoring, and planning to increase resilience as well as support development.

Presently, the focus of the SOPAC Division of SPC is to increase the consistency and comprehensiveness of damage and loss assessment of natural hazard related disaster events. In so doing, SOPAC is presently at Phase II of funding application for the GFDRR to establish a regional pool of expertise in DALA for post disaster needs. The work should provide a consistent means to track disaster impacts economically and should provide a strong foundation for CC-related DALA.

In the meanwhile, economic assessment of adaptation solutions is conducted by SOPAC Division to inform the design of approaches as well as advocate for investment in disaster risk reduction. Since this information relies on effectiveness baseline data, the economic analysis of adaptation responses will be greatly assisted by the DALA work, should this ultimately be supported.

Input provided by: Paula Holland, SPC-SOPAC

Main elements of the implementation strategy

The DALA proposal before the GFDRR aims to improve disaster risk reduction in the Pacific by increasing the accuracy of damage, loss and needs assessments via the establishment of a regional pool of personally trained in the application of DALA to inform PDNA. This framework for disaster assessment has been in used by Caribbean/Latin American for around 40 years and – with ongoing refinement – is now used entirely in these areas. The framework is the economic assessment framework for disasters preferred by the UN, EU and World Bank.

The proposal to extend DALA capacity for natural hazard related disasters is intended for funding over 2013-2015 and targets:

- The establishment of a regional pool of experts in DALA/PDNA application (preparation of Pacific-relevant training, training of sector experts, deployment in the field to apply learning)
- Knowledge sharing (development of Pacific-specific guidance materials such as a manual, finalised training package, protocols etc.)
- Sustainability (training of trainers).

The development of the proposal results from a committee of stakeholders led by the SOPAC Division of SPC. The committee includes international organizations (UNDP, ISDR) as well as national agencies. Since its development, consultation with Pacific island governments (via their NDMOs) has secured Pacific island buy-in to the proposal, with it being championed by three of the region's most hazard prone countries – Samoa, Cook islands and Vanuatu.

The work is consistent with requests from Pacific island countries to increase national expertise in the economic assessment of disasters (eg., Palau) as well as recommendations under:

- the Hyogo Framework for Action (Theme 1: Core indicator 1 – Develop new and strengthen guidelines, tools and training programmes to assist national governments to mainstream disaster risk reduction; Theme 2: Knowledge, Information, Public Awareness and Education: Core indicator 7 – support countries to develop capacity to conduct comprehensive disaster impact assessments and cost benefit

analysis of disaster risk reduction and disaster management measures; Theme 4: Planning for effective preparedness, Response and Recovery: Core indicator 4 – support the development and/or strengthening of appropriate regional mechanisms in conjunction with key stakeholders to respond to humanitarian needs at the request of Pacific island nations); and

- the Regional Framework of Action for Disaster Risk Reduction and Disaster Management (Theme 1: Develop new and strengthen existing guidelines, tools and training programs to assist national governments to mainstream disaster risk reduction and disaster management.

Targeted beneficiaries

Pacific island countries will benefit from improved accuracy in disaster assessment and more targeted and strategic identification of post disaster needs. Donors will have access to more comprehensive and systematic assessments of disasters and post disaster needs enabling more targeted assistance.

Any significant lessons learned

- No lessons yet regarding DALA

Resource requirements

- Yet to learn!

Potential for replication or scaling-up

- Significant for the DALA framework. We would wish to see this work form part of a comprehensive capacity building programme of systematic capacity development that runs into the medium term, starting with the establishment of a pool of experts and ultimately extending to whole-of-government capacity building.

Any additional information

SOPAC conducts economic assessments of climate change adaptation options. Major constraints are the lack of baseline information (and the need for this to be built into project design), uncertainty of the impact of climate change (although there have been substantial developments nevertheless, eg, projections of climate change impact on Pacific island nations generated by the Government of Australia under its PASAP programme) and uncertainty about the likely impact of interventions of key parameters.

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

Together with the USAID, the U.S. National Oceanic and Atmospheric Administration will help governments, regional and local institutions, and communities in the Pacific SIDS develop their capacity to understand, forecast, and use climate information to strengthen the adaptive capacity of key sectors, including coastal zones, water resources, agriculture, health and fisheries.
This program will strengthen end-to-end climate services (i.e., supporting climate information and knowledge exchange between scientists, service providers, and user communities and packaging and disseminating climate information products) and adaptation capabilities, with a view toward reducing loss and damage associated with the adverse effects of climate change.

Input provided by: United States (USAID/Barbados)

Main elements of the implementation strategy

The program will provide an "end-to-end" system of climate products and services to Pacific SIDS with a view to strengthening food security, water security and ecosystem resilience and reducing loss and damage to the adverse effects of climate change. Main elements include:

- Extending the Pacific Climate Information System (PaCIS) – an organizational framework that supports climate information and knowledge exchange between scientists, service providers, and user communities and is currently available to U.S. Pacific territories – into the Pacific SIDS.
- Facilitating and/or providing technical assistance to conduct community-based climate risk and vulnerability assessments on an ongoing basis, including through the incorporation of current climate science and the consideration of user needs to ensure that science and services are appropriate and effective.
- Developing and/or providing technical assistance for the development of targeted, locally applicable products and services, such as guidance, training workshops/seminars, and tools, to help users in the region translate and apply climate information.
- Developing partnerships with regional organizations as well as with universities and extension services to leverage sector-specific technical expertise and to build sustainable capacity for adaptation in the region.
- Packaging and disseminating climate information products through the creation and expansion of regional websites, such as the Pan-Pacific Education and Communication Experiments by Satellite (PEACESAT) site with support from the Asia-Pacific Data Research Center, and the provision of reliable data and communications through the PEACESAT facility to support climate adaptation activities in the region.

Targeted beneficiaries

Decision-makers at all levels in the Pacific SIDS.

Any significant lessons learned

Resource requirements

$1.9 million over two years

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

Tool: Risk Insurance through the Caribbean Catastrophe Risk Insurance Facility (CCRIF).

The main objective of CCRIF is to address disaster risk reduction (DRR) through the fiscal measure of insurance for extreme weather events, in particular, hurricanes.

Input provided by: Multilateral Environmental Agreements Unit, Ministry of the Environment and Water Resources, Government of Trinidad and Tobago

Main elements of the implementation strategy

The strategy comprises of parametric insurance to limit the financial impacts of catastrophic hurricanes through the provision of short-term liquidity for the following associated events:

- wind
- storm surge
- extreme rainfall (from 2012-2013 insurance year)

Parametric insurance policies use modeled hazard parameters as a basis for loss estimation and very rapid payment as there is no need to estimate damage after an event, providing the Government with liquidity to help with immediate post-disaster recovery as well as medium term rebuilding efforts.

Payouts for tropical cyclones are made on the basis of exceeding a pre-established trigger event calculated in a model in which hazard inputs are generated using from independently-provided input data such as storm data from the National Hurricane Center under the US-based National Oceanic and Atmospheric Administration (NOAA) and parameters fixed within the loss estimation model used to underpin CCRIF's policies. The model calculates the level of wind and ocean hazards, such as storm surge, encountered across the affected area and uses the pre-fixed value and distribution of government exposures to those hazards to calculate a loss. Each individual country chooses its own coverage options in terms of the attachment point (deductible), exhaustion point (coverage limit), and premium. The amount of the premium then dictates how much of the risk between the attachment and exhaustion points they are actually covered for. Payouts above the trigger level increase with the level of modeled loss, up to a pre-defined coverage limit.

Strong financial support is provided to CCRIF by a number of key developed countries and leading financial institutions including the European Union, who recently joined CCRIF's member governments, Canada, the World Bank, the United Kingdom, France, the Caribbean Development Bank, Ireland and Bermuda in contributing to the Facility's claims-paying capacity.

CCRIF has demonstrated an ability to work closely with existing regional and national institutions such as the Office of Disaster Preparedness Management (ODPM) in highlighting the critical role of risk management and transfer and integrating these disciplines into a broader comprehensive disaster management framework being implemented by the Caribbean Disaster and Emergency Management Agency (CDEMA).

The ODPM, formerly the National Emergency Management Agency (NEMA), is a Division of the Ministry of National Security which has shifted from a response-centric approach to an approach which focuses more on mitigation and preparedness. As such, the ODPM seeks to build national Disaster Risk Management and Climate Change Adaptation capabilities with its partners and coordinate response and recovery operations in order to protect the people, environment and economy and ensure a disaster resilient nation. Trinidad and Tobago, as a member of CDEMA, adopted a Comprehensive Disaster Management (CDM) Strategy in 2001, and drafted a CDM Policy Framework in 2010, which guides the activities of the ODPM. CDM includes attention to all phases of the disaster management cycle - prevention, mitigation, preparedness, and response, recovery and rehabilitation. Its emphasis on risk reduction reflects the global trend in disaster management. The ODPM therefore, places strong emphasis on risk reduction as follows:

- **Prevention** - The outright avoidance of adverse impacts of hazards and related disasters.
- **Mitigation** - The lessening or limitation of the adverse impacts of hazards and related disasters.
- **Preparedness** - The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions.
- **Response** - The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.
- **Recovery** - The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.
- **Critical facilities** - The primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency.
- **Critical Facilities Protection** - The use of risk management strategies, plans and procedures to reduce the risk of and enhance resilience to the impact of natural and man-made hazards on Critical Facilities.
- **Disaster Risk Reduction** - The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Targeted beneficiaries

Residents within vulnerable communities, including coastal areas, upon disaster impact.

Any significant lessons learned

- There is the increased and urgent need for independent input data, not only from the National Hurricane Centre

Resource requirements

Data needs: Storm data from the National Hurricane Center, NOAA.

Financial resources: Contributions from donor institutions and developed countries, as well as policy premiums from Government.

Potential for replication or scaling-up

Potential for replication in other SIDS and global regions vulnerable to hurricanes/monsoons, particularly South-East Asia.

Any additional information

CCRIF's Partners include fifteen (15) other Caribbean governments: Anguilla, Antigua & Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines and the Turks & Caicos Islands.

November 2010 marked three payouts to the Governments of Barbados, Saint Lucia and St. Vincent & the Grenadines following the passage of Tropical Cyclone Tomas which passed close to these islands on 30 and 31 October, 2010. CCRIF released to each country 50% of their payouts on 7 November, seven (7) days after the storm's passage – well before the end of the customary 14-day waiting period – to facilitate requests from the three countries. The Prime Minister of St Vincent & the Grenadines noted that this early payment would facilitate "urgent restoration of services and clearing of the affected areas."

The total payouts for the three countries were as follows: Barbados - US$8,560,247; Saint Lucia - US$3,241,613 and St Vincent & the Grenadines - US$1,090,388.

For further information, please see the supporting publication provided: Supporting publication: The Guidance Tool: A manual for mainstreaming climate change adaptation into the CDM country work programme.

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

The Caribbean Catastrophe Risk Insurance Facility (CCRIF) is a regional catastrophe fund for Caribbean governments designed to limit the financial impact of devastating hurricanes and earthquakes by quickly providing short term financial liquidity when a policy is triggered. CCRIF represents a cost-effective way to pre-finance short-term liquidity to begin recovery efforts for an individual government after a catastrophic event, thereby filling the gap between immediate response aid and long-term redevelopment. This is particularly important for Caribbean economies, which are highly exposed to adverse natural events, including hurricanes, earthquakes, and excess rainfall, where the capacity to absorb the financial impact of such disasters is limited. Established in 2007, the Facility is the first multi-country risk pool in the world, and is the first insurance instrument to successfully develop parametric policies backed by both traditional and capital markets; hence it provides Caribbean governments the unique opportunity to purchase earthquake and hurricane catastrophe coverage with lowest-possible pricing as against more costly alternatives such as self-retention or obtaining individual coverage on the international market.

Input provided by: Caribbean Risk Managers (Facility Supervisor of CCRIF)

Main elements of the implementation strategy

Initiated by the Caribbean Community and Common Market (CARICOM) Heads of State and implemented with the assistance of the World Bank, CCRIF was developed through funding from the Japanese Government, and was capitalised through contributions to a Multi-Donor Trust Fund by the Government of Canada, the European Union, the World Bank, the governments of the UK and France, the Caribbean Development Bank and the governments of Ireland and Bermuda, as well as through membership fees paid by the 16 participating governments. Linked to the Hyogo Framework for Action 2005 – 2015, priority to "promote the development of risk sharing mechanisms, particularly insurance and reinsurance against disasters", the CCRIF model represents an innovative risk transfer option for its members to hedge against losses associated with catastrophic events. The design of the Facility enables it to be efficient, flexible and responsive to clients' needs while providing financial and non-financial value through a diverse and expanding
product line. This is done through:

Risk pooling – CCRIF was designed to aggregate disaster risks across the Caribbean, achieving the kind of risk diversification and
spreading that its members are not able to attain on their own.

Affordability – Structuring CCRIF as a risk pool with a diversified portfolio enables it to offer insurance at affordable prices. At the time of appraisal, it was estimated that CCRIF insurance would cost 60 to 70 percent less than the members' cost of self-insurance through establishment of a reserve fund, and 45 to 50 percent less than the cost of coverage if they were able to obtain it individually in traditional markets.

Parametric facility – CCRIF was designed as a parametric insurer to pay claims based on the occurrence of a hurricane or earthquake of a pre-defined magnitude.

Timely and predictable payouts –CCRIF is able to make payouts within two weeks or less of a covered disaster.

Immediate liquidity – By making rapid payouts, CCRIF meets its members' requirements for an immediate injection of liquidity following a disaster to help them maintain essential government functions and jump-start recovery.

Flexible resources – CCRIF's policies were designed to provide payouts sufficient to help members finance their initial disaster response and maintain basic government functions while they mobilize the much larger amount of resources necessary to fund the longer-term recovery effort. CCRIF was not designed as a vehicle

for funding all or even a major part of the cost of the recovery effort, as financial risk transfer of such a magnitude would not be affordable. CCRIF payouts are not tied to specific, previously identified expenditures. Instead, member governments enjoy full flexibility in allocating the payouts to the priorities that they themselves identify.

Transparent payouts – Because covered events are defined in advance in accordance with objectively measurable parameters and because the events themselves are measured by independent scientific agencies which make the data publically available, payouts are not only rapid, but also transparent and subject to third-party verification.

Individualized coverage – CCRIF was designed to allow members to tailor their policies to their own risk profile and fiscal
requirements. The cost of coverage is a direct function of the amount of risk that the member chooses to transfer; thus, there is no cross subsidization from members transferring a low amount of risk to those transferring a high amount.

Since the inception of CCRIF, the Facility has made eight payouts totaling US$32,179,470 to seven member governments. All payouts were transferred to the respective governments within two weeks (and in some cases within a week) after each event. The Facility is continuously innovating and developing other sustainable products, services and tools to meet the needs of Caribbean governments and already well underway are the development of an excess rainfall product as well as he implementation of the Facility's Technical Assistance Programme. CCRIF is already playing and will continue to play a critical role in climate change adaptation across the Caribbean, bringing both the tools and expertise to assess and price climate risk and the innovative products required to assist countries to more cost-effectively manage that risk.

Targeted beneficiaries

The primary beneficiaries of CCRIF are 16 participating governments: Anguilla, Antigua & Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago and Turks & Caicos Islands. Among the main benefits (outlined in the previous section) are prompt pay-outs and cost savings for covered risks in comparison to self-retention and market options. Additionally, CCRIF has entered into partnership agreements for support to and collaborative work with several regional Organizations aimed at broadly supporting efforts of CCRIF members to strengthen their disaster risk management policies and practices. CCRIF also has in place a substantial Technical Assistance Programme which has involved extensive capacity building through support for scholarships, professional development training and executing a number of critical technical projects such as an Economics of Climate Adaption study for 8 Caribbean countries (here).

Any significant lessons learned

(i) Consultations with a wide range of experts and stakeholders are important in developing and successfully launching an innovative development instrument. In the case of CCRIF, consultations were essential to building understanding of the proposed facility, the risk modeling that would underpin its products, the nature of parametric insurance, etc. (ii) Donor support can be essential for an innovative and untested development instrument. The generous donor support for CCRIF to reimburse it for initial operating expenditures and pay claims within its risk retention greatly reduced the risks to its achieving financial sustainability. (iii) The private sector expertise and hands-on knowledge of relevant markets is vital to the success of a project that seeks to respond to a market failure (iv) When public funds support an independently and commercially managed entity, it is important that those managing the entity have experience with stewardship of public resources. (iv) On-going communications with clients and other stakeholders are essential in piloting successfully an innovative development solution. (v) A lean organizational structure can be very effective. CCRIF achieved considerable cost savings and avoided institutional rigidities by remaining a "virtual" organization and contracting externally

for professional services rather than acquiring a roster of direct employees.

Resource requirements

At the outset, a multi-donor trust fund (MDTF) was created to support CCRIF's establishment and initial operations. Donors' contributions totaled approximately US$67.4 million, with members paying a participation fee and an annual premium. The donor resources enabled CCRIF to build its risk bearing capacity more quickly than it could otherwise have done to a level sufficient to assure its financial sustainability as an independent entity over the long-term. A strong capital base also allows CCRIF to retain more of the risk through a pooled reserve thereby reducing the Facility's expenditures on reinsurance, increasing the financial security of the Facility, and decreasing the premium required to be charged to participants. As CCRIF is a financial instrument aimed at supporting enhanced resilience to natural disasters, it requires significant amount of data and technical expertise to inform the underlying model development and maintenance as well as an understanding of regional natural hazards, financial markets, reinsurance and regulatory requirements.

Potential for replication or scaling-up

Considerable potential for replication in other regions. Similar initiatives are currently being explored in the Pacific and Africa. The CCRIF is also exploring the possible role that it can play in making micro-insurance available to low income groups and highly exposed sectors such as the agricultural sector within its member countries.

Any additional information

For additional information and resources, please visit http://www.ccrif.org/

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

Caribbean Catastrophe Risk Insurance Facility (CCRIF) Economics of Climate Adaptation Study

Today, natural hazards already present a significant risk to people and economies in the Caribbean. Climate change has the
potential to worsen these risks and, thus, is one of the most serious threats to the development prospects of Caribbean states. Climate adaptation is thus an urgent priority for the custodians of national and local economies, such as finance ministers and mayors. Such decision-makers ask: What is the potential climate-related loss to our economies and societies over the coming decades? How much of that loss can we avert, with what measures? What investment will be required to fund those measures – and will the benefits of that investment outweigh the costs? Recognising that decision makers need a quantitative fact base to draw up sound adaptation strategies and business cases, the Caribbean Catastrophe Risk Insurance Facility (CCRIF) launched an Economics of Climate Adaptation (ECA) study for the Caribbean region in February 2010 (see here). The study is aimed at providing decision makers with facts and a common approach to assess and address any location's total climate risk in a cost-effective manner.

Input provided by: Caribbean Risk Managers (Facility Supervisors of CCRIF)

Main elements of the implementation strategy

The CCRIF ECA study aims to provide country and regional decision-makers with a fact-based risk management approach that national and local leaders can use to understand the impact of climate change on their economies – and identify actions to minimise that impact at the lowest cost to society. The framework poses five questions, each driving a core set of analyses:

1. Where and from what are we at risk?
2. What is the magnitude of the expected loss?
3. How could we respond?
4. How do we execute?
5. What are the outcomes and lessons?

The fact base is built around two elements:

A risk baseline, providing transparency on current and future expected losses from climate risks for three climate scenarios. The assessment of the future risk baseline is based on the concept of total climate risk, i.e., the total future risk that could arise from adding the effects of climate change and economic growth to the current risk level.

An assessment of adaptation measures that could be taken, including an analysis of the expected costs and benefits of risk
mitigation and transfer measures.

The methodology applied in this study is unique in its positioning across different knowledge sectors, spanning climate science, the financial industry and economic research. The analysis relies on four interconnected elements:

1. Climate change scenarios based on the most recent available scientific evidence
2. Hazard models forecasting the occurrence of hurricanes and other events with high damage potential

3. Economic damage functions linking the intensity of events to economic impact
4. Value distribution models describing each country‘s economic and population exposure to hazards in a precise, granular manner

The analysis focused on quantifying the potential impact of climate change on three relevant natural hazards: Hurricane-induced
wind damage Coastal flooding/storm surge Inland flooding due to both hurricanes and non-tropical systems.

The initiative is being implemented in three phases. In Phase 1, which has been completed, the study focused on eight pilot
countries: Anguilla, Antigua and Barbuda, Barbados, Bermuda, the Cayman Islands, Dominica, Jamaica, and St. Lucia.

Targeted beneficiaries

The targeted beneficiaries are the 16 CCRIF member countries: Anguilla, Antigua & Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago and Turks & Caicos Islands.

When the results have been finalised, they may be applied in several ways. A number of Caribbean countries have already started working on their National Adaptation Programmes of Action (NAPAs). The fact base provided by this study can augment the development and review of these national adaptation strategies. For example, the study prioritises areas and sectors at risk and provides clear inputs for building an economically viable portfolio of adaptation initiatives designed to increase each country’s resilience.

Additionally, the results of this study can be used by countries’ governments in multi-lateral and bilateral funding discussions for adaptation initiatives. Given the economic and political climate, the availability of such funds will not necessarily be permanent. Access to adaptation funding may therefore hinge on each country’s ability to support effective business cases with sound quantitative data in a timely manner.

Any significant lessons learned

Natural hazards already represent a significant risk to inhabitants and economies in the Caribbean. Annual expected losses from wind, storm surge and inland flooding amount to up to 6% of GDP in some countries. Climate change has the potential to greatly exacerbate these risks, and could increase expected loss by 1 - 3% of GDP by 2030. This economic damage is comparable in scale to the impact of a serious economic recession – but on an ongoing basis. Climate change thus poses one of the most serious threats to development prospects in the Caribbean.

Numerous adaptation measures are available to decision makers to respond to the growing threat of climate change. These can be organised by two main levers: risk mitigation and risk transfer. Depending on each country’s characteristics, risk mitigation initiatives can cost-effectively avert up to 90% of the expected loss in 2030 under a high climate change scenario. Risk transfer or insurance measures also play a key role in addressing the financial consequences of low-frequency, high-severity weather events such as once-in-100-year catastrophes.

Resource requirements

This study is carried out by the CCRIF, working closely with national and regional partners including the Caribbean Community Climate Change Centre and the UN Economic Commission for Latin America and the Caribbean, and with support from Swiss Re and Caribbean Risk Managers Ltd. McKinsey & Company has provided analytical support to the study. The study leverages the findings of the Economics of Climate Adaptation Working Group, a partnership between the Global Environment Facility, McKinsey & Company,

Swiss Re, the Rockefeller Foundation, ClimateWorks Foundation, the European Commission, and Standard Chartered Bank (here).

Potential for replication or scaling-up

The study provides decision makers with a systematic and common approach to assess and address any location's total climate risk and is therefore easily replicated at various scales and across countries.

Any additional information

The CCRIF is the first multi-country risk pool in the world, and is also the first insurance instrument to successfully develop parametric policies backed by both traditional and capital markets. It is a regional catastrophe fund for Caribbean governments designed to limit the financial impact of devastating hurricanes and earthquakes by quickly providing financial liquidity when a policy is triggered. For additional information and resources, please visit http://www.ccrif.org/

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

Caribbean Catastrophe Risk Insurance Facility (CCRIF) and Swiss Re Excess Rainfall Coverage for Caribbean Countries: An Economics of Climate Adaptation (ECA) Study in the Caribbean led by CCRIF in collaboration with other partners revealed that natural hazards already represent a significant risk to inhabitants and economies in the Caribbean. Annual expected losses from wind, storm surge and inland flooding amount to up to 6% of GDP in some countries. Climate change has the potential to greatly exacerbate these risks, and could increase expected losses by 1 - 3% of GDP by 2030. These losses may triple by 2030 due to climate change. It is expected that climate change will have an impact on local sea levels, hurricane intensity, precipitation and temperature patterns. Since early 2010, CCRIF has been engaged in research towards the development of an excess rainfall product for the Region. This has been in direct response to the interest expressed by many CCRIF participating countries and stakeholder partners in making available catastrophe flood coverage, as most of the countries are significantly exposed to the impacts of heavy rain. In collaboration with Swiss Re, CCRIF has now designed and structured an Excess Rainfall (XSR) Product that could be used as an effective risk transfer solution. The product is aimed primarily at extreme high rainfall events of short duration (a few days).

Input provided by: Caribbean Risk Managers Limited (Facility Supervisors of CCRIF)

Main elements of the implementation strategy

As stated previously, the excess rainfall model was developed after CCRIF participating countries and stakeholders expressed a strong interest in purchasing catastrophic flood coverage.

CCRIF and Swiss Re's partnership for the development and launch of the parametric excess rain cover broadens coverage options for the region as countries seek to manage their financial exposures as climate change effects become tangible. As a result of this partnership between CCRIF and Swiss Re, countries did not incur any product development fees and Swiss Re's participation as reinsurer ensures the availability of risk transfer.

About the product:

The CCRIF/Swiss Re XSR model is based on data from the Tropical Rainfall Measurement Mission (TRMM), a research initiative undertaken by the US National Aeronautics and Space Agency (NASA) and the Japan Aerospace Exploration Agency (JAXA). TRMM provides a satellite-based estimate of aggregate rainfall at quarter-degree (~25km) resolution every 3 hours.

TRMM was selected as the rainfall data source as it provides an independent, real-time source which, while not generally as accurate as a ground-based measurement, does provide consistency across the Caribbean region in terms of data quality, and a very high degree of dependability as it is sourced directly from NASA.

The XSR model uses the TRMM data to compile a 5-day running aggregate of rainfall measurements at all of the TRMM grid nodes across a country. As used in other CCRIF products, the Multi-Peril Risk Estimation System (MPRES) exposure database is utilised to map exposures across a country at 30arcsecond (~1km) resolution.

Remote sensing data, economic and demographic statistics for 2010 were used to generate the exposure database. The database is designed to provide acceptable estimates for losses to physical assets from

hydrometeorological and geophysical hazards.

Since the TRMM nodes are at ~25km resolution, the 1km MPRES exposure data is mapped onto the TRMM grid. This provides a distribution of the total MPRES values between the rainfall measurement points covering each country. For scaling purposes, 1% of the total MPRES exposure value is used as the base XSR exposure.

Calculating Index Losses

To calculate index losses for both historical and real-time analyses, a 5-day aggregate rainfall is calculated for each TRMM grid node using a moving window, which ensures that peak measurements are captured. A rainfall event occurs when the 5-day aggregate exceeds 50mm and ends on the day before rainfall next falls below 50mm. Events are logged for each TRMM measuring point. For each event at each TRMM grid node, the single highest 5-day aggregate rainfall measurement for that event is used to calculate the index loss rate via a vulnerability curve which maps loss percentage to rainfall amounts.

The indemnity rate for each event is applied to the exposure value of the TRMM grid node, to give the individual index loss for the event for the grid node. To calculate the national index loss, the individual index losses at each grid node are added together each day. National-level events are defined as continuous periods where there is an ongoing event at one or more TRMM grid nodes. Therefore, once an event occurs at one or more of the TRMM grid nodes, a national loss is assigned to it with the date of the last day of the event as the event identifier. National losses are also aggregated on an annual basis, thus allowing coverage to be offered on a per-event or on an annual aggregate basis at the national level.

Targeted beneficiaries

The primary beneficiaries of this product are countries within the Caribbean which are significantly exposed to the impacts if rainfall. These include the 16 participating governments of CCRIF (Anguilla, Antigua & Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago and Turks & Caicos Islands) and countries which are not yet members of the facility i.e. Guyana and Suriname.

Any significant lessons learned

The impact of rainfall is extremely difficult to replicate in a numerical model, particularly in the Caribbean, where short-lived, high- rainfall events are the most damaging and where secondary effects such as flash flooding and landslides are both important and occur at very small scale.

Furthermore, baseline rain data to compile a representative rainfall history is generally both scarce and of poor quality (particularly in terms of the number of missing records).

Resource requirements

CCRIF's in-house efforts to build a rainfall hazard model (required due to the absence of sufficient historical rain gauge data and the scarcity of currently operating rain gauges which report in real time) required significant technical expertise and financial investment. It is essential to acquire reinsurance support for new innovative insurance products and this takes time. CCRIF partnered with a major reinsurer to develop a first-generation rainfall product based on satellite rainfall estimates produced by NASA. These rainfall estimates are converted to quantitative impact estimates through a relatively simple loss module.

Potential for replication or scaling-up

There is considerable potential for replication in other regions. The methodology developed can be shared and replicated with the broader industry and will spur greater innovation in risk management in the region.

Any additional information

For additional information and resources, please visit http://www.ccrif.org/

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

The overarching objective of the Climate Risk Adaptation and Insurance in the Caribbean is to overcome obstacles to the development of mid-level weather related-risk management; to link insurance solutions with DRR as a tool to incentivize sustainable adaptation measures; to support the development of public-private insurance solutions as well as to encourage public safety nets for at risk people, and to demonstrate the value of a regional facility in achieving these goals.

In the first phase, the project is working with local partners in Jamaica, St Lucia and Grenada and with the regional facility, the Caribbean Catastrophe Risk Insurance Facility.

Input provided by: MCII

Main elements of the implementation strategy

This development intervention seeks to demonstrate the value of parametric micro-insurance products as a viable tool for climate risk transfer among vulnerable communities. The target audience of this intervention in addition to the direct beneficiaries includes local insurers, financial services commissions (insurance regulators), social aggregators, etc.

Through pilots, the project would like to help the Caribbean partners in creating an enabling regulatory/legislative environment to encourage the growth of climate risk insurance products. The project has sought to align itself with national priorities in the area of social vulnerability, poverty reduction.

Although, the project is at a very nascent stage of its activities as of now but moving forward it seeks to strengthen its links to national disaster risk reduction policies and advisories and build partnerships to strengthen this initiative.

Targeted beneficiaries

The programme helps vulnerable farmers and day labourers in the Caribbean adapt to the impacts of weather-related extreme events by linking loss avoidance and reduction (such as adaptive agricultural techniques, building safer structures) with financial risk management tools.

The programme will significantly improve the security of families' and communities' livelihoods in the Caribbean, by helping farmers and day labourers adapt to the impacts of weather related extreme events. In this way the programme seeks to break the negative cycle of poverty experienced by many in the region.

Any significant lessons learned

The programme will share lessons learned with policy makers at the regional and international level. This will inform decision makers about designing approaches to loss avoidance and reduction, on expanding the access of vulnerable people to these schemes and on the potential services and value addition of a regional facility.

The Climate Risk Adaptation and Insurance in the Caribbean programme will demonstrate to leaders from Africa, the Pacific and Latin America whether such an approach would be relevant for risk management in their regions. The programme partners will work with delegates to the UNFCCC to determine what role the international community might play in catalysing similar regional approaches to adaptation, reduction of loss and damage, and insurance.

Resource requirements

Capacity needs to be developed within local insurers to develop and administer micro-insurance products
Regulatory frameworks in the partner countries might need to be examined as well
Weather data for designing trigger payouts for the insurance products could be further improved.

Potential for replication or scaling-up

This development initiative has strong potential for replication and scaling up.

Any additional information

The unique partnership facilitates access to new market segments. Its partners include a company specialising in matching local needs with tailored risk management products, a regional facility with understanding of the regulatory environment and ability to serve as a regional risk aggregator, and a leading reinsurer with expertise in modeling, product structuring, and international practice and policy. The unique composition of the partnership will enable the programme to showcase a new way of sustainably managing weather-related risks at a regional level, will allow a formerly uncovered proportion of the population to participate in the insurance market and may even foster the development of local insurance industry.

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

UNDP's approach in supporting the Barbados and the OECS countries is a two track one focused on reducing risk and loss and damage from extreme events; and examination of loss and damage resulting from slow onset events to identify strategies, options, international mechanisms and programmes, to increase resilience and reduce the vulnerability of SIDS.

Input provided by: UNDP Barbados

Main elements of the implementation strategy

To help reduce risk and loss and damage from extreme events, UNDP assists efforts at multi-hazard mapping and vulnerability assessments to inform planning and development; help strengthen capacities of National Emergency Management Organisations, including capacities for real-time use of hydrometeorological data as decision support systems; and enable the development of climate change models and application of forecasting tools; awareness and knowledge building. UNDP also supports the implementation of and capacity building in the post disaster damage and loss assessment (DaLA) and post-disaster needs assessment methodology.which incorporates human resource needs assessment and recovery planning to the DaLA. To implement these strategies and plans, UNDP works with national and regional DRR/DRM institutions, hydromet organisations, government counterparts, NGOs and CBOs to implement its strategies and programmes and relies on a very consultative process with all partners at each step in the process.

In helping to understand the area of slow onset events, UNDP undertakes studies that have identified the critical significance of SOEs and loss and damage in SIDS, convene informal meetings and dialogues as necessary to try to untangle issues and find a clearer path forward, and work with local and international scientific institutions to conduct the analyses. In addition, UNDP supports countries in addressing their national communications under the UNFCCC and Sustainable Land Management (SLM)and in this regard, addressed issues such as sea level rise, coastal zone management, landslide hazards and water resources management. Here too, UNDP undertakes a detailed consultative process with regional institutions and national governments and academia to drive and inform the analyses which inform planning and development.

Targeted beneficiaries

National and regional organisations, national policymakers and decision makers; public investment funds; national communities and subnational communities, including the business sector, through increased awareness and knowledge; and improved capacities to reduce and manage disaster and climate risks.

Any significant lessons learned

- A multi-sector, multi-hazard approach is essential for effective risk reduction, planning and development.
- Continuing urgent need for knowledge and awareness building across all government ministries of the implications of adverse effects of CC for economic and social development and to understand how to integrate CCA and DRR into their planning and actions.
- Where data exists, it is often not applied for effective planning and development and there is a need for protocols and arrangements to encourage and facilitate data sharing and use.

- A standing technical multi-disciplinary advisory team to support SIDS in negotiations, policy and proposal development given human and financial resource challenges was helpful to keep focus on the SIDS agenda.
- Urgent need to strengthen implementation capacity in SIDS to deal with DRR and CCA
- Mechanisms for South-South cooperation for transfer of technology, knowledge, approaches and tools are critical to SIDS making progress sin these areas

Resource requirements

- Technical capacities to collect, use, update data to undertake detailed analyses to inform evidence-based policies, strategies, plans and programmes for CCA and DRR
- Predictable and affordable financing to enable investments in DRR and CCA and mitigation.
- Mechanisms for South-South cooperation for transfer of knowledge, approaches and tools.
- Capacity development for policy and decision makers and for accessing finance for CCA and DRR
- A standing technical multi-disciplinary advisory team to support SIDS in negotiations, policy and proposal development given human and financial resource challenges

Potential for replication or scaling-up

Replication and scaling up potential of this work is high as it has applicability beyond the Caribbean to all SIDS; it offers opportunities for knowledge transfer and capacity development; and the actions take a building block approach that lead to the continual strengthening of national systems and regional mechanisms for analysis, integration into planning and development, and response.

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

In a region already characterized by high variability in the current climate, a changing climate represents an additional stress for society, economic sectors and natural environments. This changing risk profile will have an effect on the outcome of a wide range of decisions affecting individual, societal and economic well-being. In order to plan effectively for the future, decision-makers must assess and be aware of these changing risks.

As our understanding of climate change improves it is becoming possible to gain an increasing confidence about some of the expected changes, for example with regard to increasing temperatures. However, our knowledge of the climate system is not perfect, resulting in uncertainty around the precise extent of future climate change. Furthermore, we cannot know how future emissions of GHGs will change. Uncertainty also stems from our incomplete understanding of the impacts of future climate on society, the environment, and economies.

Despite these uncertainties and regardless of the effectiveness of emissions reductions efforts worldwide, Caribbean governments must continue to make decisions to plan for the future. The Regional Framework is founded upon the principle of using risk management processes and tools to aid decision-making. Decision-making based on subjective value judgments given the challenges and uncertainties we face, will compromise resilience building. Risk management assists in the selection of optimal cost-effective strategies for reducing vulnerability, using a systematic and transparent process. Policies or initiatives that aim to reduce this vulnerability can be designed to complement and support the goals of poverty reduction, sustainable development, disaster preparedness and environmental protection.

Input provided by: Caribbean Community Climate Change Centre (CCCCC)

Main elements of the implementation strategy

The Caribbean Community Climate Change Centre is spearheading a project that will:

1. Support climate compatible development in the Caribbean by enabling the implementation of key activities outlined in the Implementation Plan for the Regional Framework for Achieving Development Resilient to Climate Change.

2. Embed considerations of climate change across the Caribbean, through the development of regional approach to risk management and the creation of a risk ethic in decision making.

The Project will be executed in a phased approach. Phase 1 will be the development of a risk management, web-based tool to guide decision making. Phase 2 will provide in-depth training for country decision-makers. Phase 3 will undertake detailed risk assessments in selected countries. The overall objective is to embed risk assessment into decision-making and management systems across the region in finance and planning.

Apart from the web-based tool, the Project will also create an online stress tool.

Targeted beneficiaries

Managing risk becomes an increasingly important issue for Ministries of Finance and Planning allocating scarce resources, prioritising national budgets, delivering national development objectives and accessing climate finance within the context of a changing climate. The growing interest of the development banks in understanding project risks will place added pressure on countries to demonstrate that they have assessed the impacts of climate change within their proposals.

Any significant lessons learned

The Region has implemented several projects that are now being expanded for wider regional application. These include the CCRIF piloted micro-insurance scheme in Haiti, and the CCRIF wind trigger that is planned to be expanded as a wind trigger, with assistance from CIMH.

Resource requirements

- More scientific information to support the refining of the tool over time
- Resources to support this refinement

Potential for replication or scaling-up

The risk management tool is a singular mechanism to address a wide and varied issue. It is not intended to be the panacea to all potential risks the Region faces.

Adaptation alone in many cases will not be able to address the entire risk range. The question of how to deal with residual risk remains, and the insurance mechanisms necessary to address these are important.

Any additional information

Additional information can be found at:
www.caribbeanclimate.bz

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

The Enhancing Resilience to Reduce Vulnerability in the Caribbean (ERC) Project being implemented by the Caribbean Institute for Meteorology & Hydrology (CIMH) in partnership with the Executing Agency, the United Nations Development Programme (UNDP) Barbados and the OECS, focuses on enhancing regional and national capacities for disaster risk reduction with financial support from the Government of Italy. More specifically, the CIMH has been working with the CIMA Research Foundation regarding the development of a GIS disaster management platform (DEWETRA) that is capable of managing hazard related and exposure data for improved decision making. The DEWETRA platform is based on that used by the Italian Civil Defense and is being adapted for application to the Caribbean context and will be hosted at the CIMH in the near future. The main objective of this initiative is to strengthen national and regional disaster risk reduction mechanisms associated with natural, environmental and technological hazards, within the broader context of hydrometeorology and climate change; and for effective disaster recovery through capacity building for early warning systems and institutional collaboration for disaster management and response. The platform allows for the integration of a suite of multi-hazard products and provides a user-friendly online interface that is capable of merging hazard and exposure data.

Input provided by: Shawn Boyce (CIMH)

Main elements of the implementation strategy

Immediately after the January, 2010 earthquake in Haiti, the CIMH began producing high resolution precipitation forecasts superimposed on a watershed map for Haiti in support of disaster management activities on the ground. The approach enabled critical watersheds and at risk communities that were exposed to the forecasted events to be identified before the onset of the event. This strategy has evolved into fully operational flood hazard prediction products that are currently being hosted on the DEWETRA platform.

The platform is also capable of capturing impact specific data (loss, damages, injuries, etc.) directly attributable to the event. This information can be entered manually through a graphical user interface and will allow such impacts to be correlated with simulated and measured hazard data. All information is stored in a comprehensive database for immediate retrieval or for use at a later date. The CIMH will continue to encourage users to enter impact related data through the convenient interface during the project in addition to after the project has come to a close. It is envisioned that the archiving of hazard and loss data will support the furture development of loss curves needed for risk calculations especially if spatial information on property values and vulnerable groups become readily available in a format suitable for integration.

The CIMH has actively engaged disaster management personnel and hydrometeorological services in beneficiary countries regarding the use of the platform. Stakeholders have been providing data (hazard related and exposure) for use with the platform in addition to participating in training sessions. The addition of damage/loss data would greatly enhance the capabilities of the platform by supporting the development of risk related products. The platform has been accessed several times in support of decision making during the current hurricane season when an area of disturbance presents a risk to the Caribbean. The beneficiary countries are Barbados and Member States of the OECS. However, the GIS based platform covers the Caribbean. Hence, a number of the products are regional in nature (e.g. satellite products, NWP products etc). The goal of the implementation strategy is to encourage countries to include the use of the platform as part of their disaster management strategy through a common framework that allows users to access the same disaster related products in a GIS environment for improved decision making.

Targeted beneficiaries

The targeted beneficiaries are Barbados and Member States of the Organisation of Eastern Caribbean States (OECS). However, as previously stated, some regional data products are being produced. On average, the countries of the Caribbean continue to experience challenges related to efficient, sustainable data management. This is not unique to the Caribbean as the problem is a function of the human and financial resources available for such activities. The platform being implemented provides the opportunity for the management of risk related data sets in a pseudo real-time, geospatial environment. This allows potential impacts to be forecasted at regional, national and local levels. Another potential benefit will be realized should damage/loss data be made available as this will allow risk-based calculations within the platform.

Any significant lessons learned

- Disaster management officials need information specific to their needs (e.g. impacts on the ground) whereas information providers are sometimes too technical when providing hazard related information
- 'Buy in' from stakeholders is essential. The benefits of the initiative needs to be explained in clear terms
- Data availability for risk calculations is a challenge (e.g. loss data is generally not documented or archived)
- Implementation success and project sustainability is best achieved through exploring synergies and utilizing linkages with other regional initiatives (e.g. CADM II, RTFF)

Resource requirements

- The inclusion of weather radar data from the installations across the region would greatly enhance the platform
- An innovative methodology for the development of vulnerability (loss) curves may be required for some hazards. This may involve working with insurance companies to ascertain property values.
- Additional hydrometeorological equipment will be needed to improve the spatial representation of data being fed to the platform
- Knowledge transfer and capacity building within beneficiary countries among others especially as it relates to the development and mainstreaming of additional disaster management related products within the platform environment.
- Financial resources will continue to be required to improve the platform post ERC project
- Improved bandwidth for internet connections

Potential for replication or scaling-up

Scaling-up has already been occurring during project implementation. The platform has been developed with regional products albeit that the focal points for instrument installations and in situ data capture are located within Barbados and the OECS countries. Therefore, the region already benefits from some of the products on the platform. Decision making can be further improved should use of the platform be mainstreamed across the Caribbean. Countries outside of the listed beneficiaries have already indicated that they would be willing to support the initiative.

Any additional information

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach: PCRAFI

The Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) aims to provide the Pacific Island Countries (PICs) with disaster risk modeling and assessment tools. It also aims to engage in a dialogue with the PICs on integrated financial solutions for the reduction of their financial vulnerability to natural disasters and to climate change. The initiative is part of the broader agenda on disaster risk management and climate change adaptation in the Pacific region.

The ***Pacific Disaster Risk Assessment*** project provides 15 countries with disaster risk assessment tools to help them better understand, model, and assess their exposure to natural disasters. It builds on close collaborations between the Secretariat of the Pacific Community through its Applied Geoscience & Technology Division (SPC-SOPAC), WB and ADB, with technical inputs from GNS Science, Geoscience Australia, and AIR Worldwide.

The ***Pacific Disaster Risk Financing and Insurance*** (PDRFI) Program is one of the activities under Phase 3 of PCRAFI. This program provides the PICs with tailor-made advisory services to improve their macro-economic planning against natural disasters and develop a national disaster risk financing strategy as part of their broader disaster risk management and climate change adaptation agenda. In particular, this pilot aims to test the viability of catastrophe risk insurance in the Pacific by allowing the PICs to transfer catastrophe risk to the international reinsurance markets.

Input provided by: Samantha Cook, SPC-SOPAC

Main elements of the implementation strategy

The Tools:

- Regional historical hazard and loss database for major disasters which contains a historical earthquake catalogue covering approximately 115,000 events of magnitude 5 or greater that occurred in the region between 1768 and 2009 and a historical tropical cyclone catalogue includes 2,422 events from 1948 to 2008;
- The hazard models, which include earthquakes (both ground shaking and tsunamigenic) and tropical cyclones (wind, storm surge, and excess rainfall), have been peer-reviewed by Geoscience Australia who described them as "high standard, thorough and representative of best practice."
- The regional GIS exposure database contains components for buildings and infrastructure, agriculture, and population. For the building and infrastructure data set, more than 400,000 building footprints for structural classification were digitized from high-resolution satellite images.
- Country-specific catastrophe risk models have been developed for each country integrating data collected and produced through the risk modelling process and include maps showing the geographic distribution of hazards, assets at risk, and potential losses that can be used to prioritize DRM interventions.
- Pacific Risk Information System includes the data and information captured in the databases and makes them available in an on-line portal. It offers better risk information for smarter investments.

The Applications

Phase 3 of the Pacific Catastrophe Risk Assessment and Financing Initiative aims to provide further technical assistance to the PICs for the refinement of the Pacific disaster risk assessment tools and the applications of these tools.

Application 1. Pacific Disaster Risk Financing and Insurance. The programme provides the Ministries of Finance and Planning with tailor-made advisory services to help improve their macro-economic planning

against natural disasters and develop a national disaster risk financing strategy as part of their broader disaster risk management and climate change adaptation agenda.

It also helps the PICs develop an integrated disaster risk financing strategy, relying on an optimal combination of reserves, contingent credit, insurance, and donor grants.

Application 2. Mainstreaming risk information into urban and infrastructure planning. PacRIS ensures that disaster risk and climate change information and considerations form an integral part of the urban and infrastructure planning process.

Application 3. Rapid pre and post-disaster damage estimation. PacRIS provides disaster managers and first responders with tools and information to quickly gain an overview following a disaster on areas and population affected and the likely severity of the event in terms of potential fatalities, injuries and building, infrastructure and crop damage.

Targeted beneficiaries

Pacific island countries will benefit from disaster risk assessment tools and applications to help them better understand, model, and assess their exposure to natural disasters. The results from application 3 in particular can help, when combined with other domestic assessments to improve strategic identification of post disaster needs. Similarly application 1 will improve post disaster liquidity enabling the Governments to begin work on the identified needs and/or assessments required to declare a national state of emergency enabling donors to commence their assistance.

Any significant lessons learned

- The models were designed to develop national risk profiles, consequently this limits applications at the sub national level.
- The reliance of the proprietary risk models and its associated software is a challenge when taking the financial implications in to account.

Resource requirements

This type of initiative requires significant resources, both human and financial to acquire, collate and process the data.

Potential for replication or scaling-up

There are current opportunities to undertake an assessment of potential future tropical cyclone risk to critical assets in Pacific island countries with climate change by DCCEE's Pacific Climate Change Science Programme (PCCSP) this would combine both climate and disaster related risks.

In order to upscale such an initiative would require significant resources. If donors can coordinate their efforts to effectively identify and assess the risks posed to countries this will help inform future development across all of Government. Once the risks and subsequent vulnerabilities have been identified countries can then establish effective risk financing strategies to help mitigate the effects of climate change and disasters.

Any additional information

For further information please visit: www.pacris.sopac.org

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

The Caribbean Disaster Emergency Management Agency (CDEMA) is the Caribbean Community (CARICOM) organisation responsible for the harmonisation of work associated with disaster management. CDEMA has adopted several methodologies to plan and deliver Comprehensive Disaster Management (CDM) at the national level. Specifically, the Comprehensive Disaster Management Framework has been employed to rationalise all phases of the disaster management cycle, taking into account all peoples and sectors.

CDEMA as the broker of the Enhanced Comprehensive Disaster Management (CDM) Programme Framework (2007-2012), a roadmap for building resilience to hazards within CDEMA Participating States in collaboration with regional institutions and development partners, is strengthening, national and community level capacity for mitigation, management and coordinated response to natural and technological hazards and the effects of climate change in each of its eighteen Participating States.

The development of country work programmes by the CDEMA Participating States serves as an important tool for the implementation of CDM at the national level as well as a mechanism for effective monitoring, reporting and evaluation of the overall CDM strategy and larger global Hyogo Framework for Action.

CDEMA is therefore providing the necessary tools to its Participating States to ensure the incorporation of climate change adaptation through up-scaled and enhanced disaster risk management programming to cope with the impacts of climate change, and to ensure that regional and national sustainable development goals are achieved. The results-based nature of the CDM country work programme provides not only the entry points for mainstreaming climate change adaptation, but also ensures that the adaptation options that are mainstreamed are defined in results-based language, thus providing some degree of rigour for focused and action oriented adaptation measures.

The Mainstreaming Climate Change into Disaster Risk Management for the Caribbean Region Project, funded by the Austrian Development Agency, and executed by CDEMA, in collaboration with the Caribbean Community Climate Change Centre (CCCCC), and the Working Group on Climate Change and Disaster Management have developed the Guidance Tool for Mainstreaming Climate Change Adaptation into the CDM Country Work Programme (G Tool) to help CDEMA Participating States (PS) incorporate climate change adaptation (CCA) into national Disaster Risk Management (DRM) plans and strategies.

The G Tool presents a practical and participatory process of mainstreaming climate change adaptation measures into the CDM country work programme. It promotes planned adaptation that takes advantage of current national needs to respond to current and anticipated climate threats. It also takes advantage of opportunities provided by current institutional modalities to secure short and medium-term adaptation success, while maintaining a long-term adaptation perspective.

Input provided by: CDEMA Coordinating Unit

Main elements of the implementation strategy

The Goals of the G-Tool are:

1. To provide stakeholders with a comprehensive, common understanding of climate variability and climate change.
2. To introduce stakeholders to the ideas and language of natural disasters and adaptation to the natural hazards.
3. To provide detailed guidance on how to mainstream climate change adaptation into the CDM country work

programme .

The G Tool process includes the following key steps:

1. Scoping, stakeholder identification, and problem identification.
2. Review and assimilation of technical and socio-economic background information relevant to the identification and mainstreaming of adaptation options.
3. Analysis of factors affecting the mainstreaming of disaster risk reduction and climate change adaptation (using SWOT Analysis).
4. Preparation for a multi-stakeholder workshop (by participants and workshop facilitators).
5. Scenario development and the identification of climate change impacts, adaptation options and mainstreaming entry-points (prior to and during the workshop).
6. Implementation of workshop outputs (after the workshop).

Targeted beneficiaries

CDEMA eighteen (18) Participating States

Any significant lessons learned

Resource requirements

including information/data needs, capacity needs and financial resources

Potential for replication or scaling-up

The tool can be utilized by any country aiming to enhance linkages between DRR and CC programme. The tool is located at the link below:
http://www.cdema.org/ccdm/index.php?option=com_phocadownload&view=category&id=1:national-programming&Itemid=67

Any additional information

Contact CDEMA for any further information.
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Email: cdema@cdema.org
For further information, please see the supporting publication provided: Supporting publication: The Guidance Tool: A manual for mainstreaming climate change adaptation into the CDM country work programme

A range of approaches to address loss and damage associated with climate change impacts at regional/international level

Goal of Approach:

The Climate Smart Community Disaster Management (CSCDM) Programme is an initiative of the Caribbean Disaster Emergency Management Agency (CDEMA) to promote and build capacity for the inclusion of climate change considerations in community disaster management initiatives in the Caribbean. As such, it contributes to and complements the wider policy environment that guides climate change adaptation and disaster risk reduction in the region, including the United Nations *International Strategy for Disaster Reduction*; CDEMA's *Enhanced Comprehensive Disaster Management Strategy and Programme Framework 2007 – 2012*; and the, *Climate Change in the Caribbean: A Regional Framework for Achieving Development Resilient to Climate Change 2009-2015*, which is being implemented by the Caribbean Community Climate Change Centre (CCCCC).

The need to make DRR initiatives 'climate smart' is premised on the growing evidence that global climate change as a result of human activity is already affecting the Caribbean and is predicted to have even more serious consequences over the longer term. Climate change will disproportionately affect individuals and communities that are already vulnerable as a result of other factors, such as poverty or degraded environment. While the impacts of climate change on disaster risks are complex and still somewhat uncertain, it is clear that climate change tends to exacerbate disaster risk because it frequently compounds the existing vulnerabilities within a community. It is therefore critical that community members be engaged in, and provided with technical and financial support for, DRR and CCA initiatives designed to reduce the level of vulnerability. A participatory approach is therefore recommended at all stages of Programme implementation, recognising that community traditional knowledge and experience can bring new insights and useful capacities to the CSCDM Programme. Tips are also provided for making the CSCDM Programme gender sensitive and livelihoods oriented.

Input provided by: CDEMA Coordinating Unit

Main elements of the implementation strategy

The Programme document is divided into two parts: Part A, which considers the Programme context, rationale and enabling framework necessary for effective Programme implementation; and Part B, which outlines the seven key steps CDEMA recommends for implementing the Programme. Under each of these, there is an overview of the rationale for and scope of the step; a list of key tasks and responsibilities; a list of critical success factors; and a list of resources (including where possible examples of Caribbean CSCDM good practice though few have yet been identified).

The seven recommended steps for implementing a comprehensive CSCDM Programme at the regional and national level are:

1. Build capacity to deliver the Programme at the national level (i.e. in the NDOs and other DRR agencies.
2. Identify vulnerable communities in each country and prioritise where to act.
3. Conduct (or review existing) vulnerability and adaptive capacity assessment (VCA) in the selected community or communities.
4. Build community capacity for climate change adaptation (in particular through facilitation of CDEMA's CSCDM

Module and Handbooks).

5. Develop and implement a climate smart disaster management plan.

6. Promote and facilitate networking and information sharing at the regional, national and local levels.

7. Conduct participatory monitoring and evaluation.

Targeted beneficiaries

This CSCDM Programme document is designed primarily for use by National Disaster Offices (NDOs) and other national disaster risk reduction organisations involved in implementing disaster management initiatives at the community level in the Caribbean. It also contains material that will be of value to partner organisations at the community level. It is intended to build on and complement existing programmes and can be used both in situations where disaster risk reduction (DRR) efforts are already underway in a community and in cases where a new initiative is being designed.

Any significant lessons learned

The success of the CSCDM Programme will also depend on improving the enabling environment, including:

• development of a policy environment that actively promotes integrated DRR and CCA approaches and the opportunities these present for improving livelihoods;

• explicit integration of climate change into national disaster risk reduction programmes and vice-versa;

• an institutional mechanism to facilitate integrated implementation of the Programme by multiple departments and agencies, to share experiences and best practices, and to jointly monitor and evaluate outcomes;

• adequate funding to build the capacity of those charged with facilitating the CSCDM Programmes at the national level and resources to implement the Programme over a period of a minimum of three years in any given community (and possibly longer depending on the capacity at the outset and the scale of the problems). This is only likely to be feasible in practice if agencies are willing to pool resources.

•Because of the level of uncertainty surrounding climate change, it is also important that the organisations involved in CSCDM develop a culture of flexibility and adaptive capacity and apply this as the monitor and evaluate their CSCDM projects

Resource requirements

Potential for replication or scaling-up

The tool can be utilized by and country and is located at the link below:

http://www.cdema.org/ccdm/index.php?option=com_phocadownload&view=category&id=2:national-programming&Itemid=67

Any additional information

Contact CDEMA for any further information.

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For further information, please see the supporting publication provided: Supporting publication: Climate Smart Community Disaster Management Programme