

CATALYST

CAPACITY DEVELOPMENT FOR HAZARD RISK  
REDUCTION AND ADAPTATION

## BEFORE DISASTER STRIKES: TRANSFORMATIONS IN PRACTICE AND POLICY

Central  
America and  
the Caribbean  
Region





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## CATALYST

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## CATALYST

- *CATALYST was conceived to compile and disseminate the best knowledge currently available in the field of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA).*
- *CATALYST's added value lies in its Think Tank: more than 120 regional experts who supported the identification of best practices and policies that could transform a region's approach to DRR/CCA.*
- *CATALYST's regional and multi-regional workshops and virtual meetings have fuelled a productive exchange and circulation of ideas, suggestions and knowledge, leading to the development of four Best Practice Papers.*
- *CATALYST's Best Practice Papers are aimed at policymakers. Based on the knowledge of the Think Tank Members, they describe what the CATALYST project considers to be key practices that could lead to transformations in a region's capacity for DRR and CCA, and to improve the early planning of regional strategies to reduce risks resulting from natural hazards and climate change.*
- *To avoid a one-size-fits-all approach to DRR and CCA, CATALYST's Best Practice Papers have been specifically tailored to for extremely disaster-prone regions of the world – East and West Africa, Central America and the Caribbean, European Mediterranean and South and South-East Asia.*
- *This Best Practice Paper examines Central America and the Caribbean Region.*

# Contents

*Why CATALYST?* ..... 3

1. Living in a vulnerable place ..... 4

2. Central America and the Caribbean Region ..... 8

3. Paths are made by walking ..... 10

4. From goodwill to best practices ..... 14

*Take-home messages* ..... 24



## Why CATALYST?

We cannot avoid living in the shadow of natural hazards. But we can, indeed should, take adequate measures to reduce the risks that hydro-meteorological hazards – likely to become more intensified by climate change – and geological hazards pose to our lives, and mitigate the impact on people, assets, and the environment.

CATALYST – Capacity Development for Hazard Risk Reduction and Adaptation – is an EU FP7-funded project aimed at strengthening capacity development for Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA). The project has focused on four of the most disaster-prone areas in the world – East and West Africa, Central America and the Caribbean, the European Mediterranean, and South and South-East Asia, seeking to identify the best knowledge available in DRR and CCA.

CATALYST’s added value stems from a multi-regional Think Tank which is global in extent but regional in implementation: more than 120 experts from the four regions have analysed current regional DRR and CCA practices and identified some of the best approaches available today. The interdisciplinary nature of this group of experts, including representatives from intergovernmental and governmental organisations, NGOs, the scientific community and the private sector, has ensured the merging of diverse knowledge and the identification of key gaps in risk reduction measures. It has provided international networks of researchers, practitioners and policymakers with tools to strengthen existing activities, and may ultimately contribute to more focused and efficient action plans.



# 1.

## Living in a vulnerable place

*Planet Earth is a living system with natural equilibria and resilience. However, population growth, increased food demand, urbanisation, and activities with high impacts on ecosystems, are dramatically changing our world. At times, the Earth fails to cope with perturbations that challenge its balance, and the escalation in natural disasters observed worldwide during the last decades is a sign we should take into greater consideration.*



Natural disasters have always swept the Earth, prompting people to learn to live with some degree of risk. With time, prosperous communities have succeeded in setting up strategies to protect themselves. But vulnerable populations who rely on natural resources to make a living have often massively suffered from the fury of natural elements.

Today, the risk posed by natural disasters is oftentimes reinforced by systemic and human-induced climate change that alters both the frequency and the magnitude of extreme events. According to the Centre for

Research on the Epidemiology of Disasters (CRED, [www.cred.be](http://www.cred.be)) at the Université Catholique de Louvain, natural disasters increased by 233% from 2000 to 2009 compared with the period 1980 to 1989, and by 67% compared with the period 1990 to 1999 (see Table 1 for more details on disaster events). As the Food and Agriculture Organization notes (FAO, 2008)<sup>1</sup>, the expected frequency and intensity of extreme climate events is likely to worsen the scale of disasters, with

multiple side effects affecting agriculture production, food availability, human health, and a potential rise in social conflicts. Since the beginning of the 1970s, public-political awareness of how disasters evolve and the scientific understanding of their causes have grown in parallel. At that time, however, approaches to mitigate their impact on society were based on previous experience and were, in general, poorly coordinated.

Today, the approach to Disaster Risk Reduction is based on preparedness, response and mitigation and prevention. In addition, Disaster Risk Reduction principles are being adopted by international and government agencies, as well as research and humanitarian organisations.

*The risk posed by natural disasters is oftentimes reinforced by human-induced climate change that alters both the frequency and the magnitude of storms.*

<sup>1</sup> Climate Change and Disaster Risk Management. Technical Background Document from the Expert Consultation Held on 28 to 29 February 2008. FAO, Rome. [Online] Retrieved from: <http://bit.ly/164mMtl>

### NUMBER OF SIGNIFICANT DISASTERS

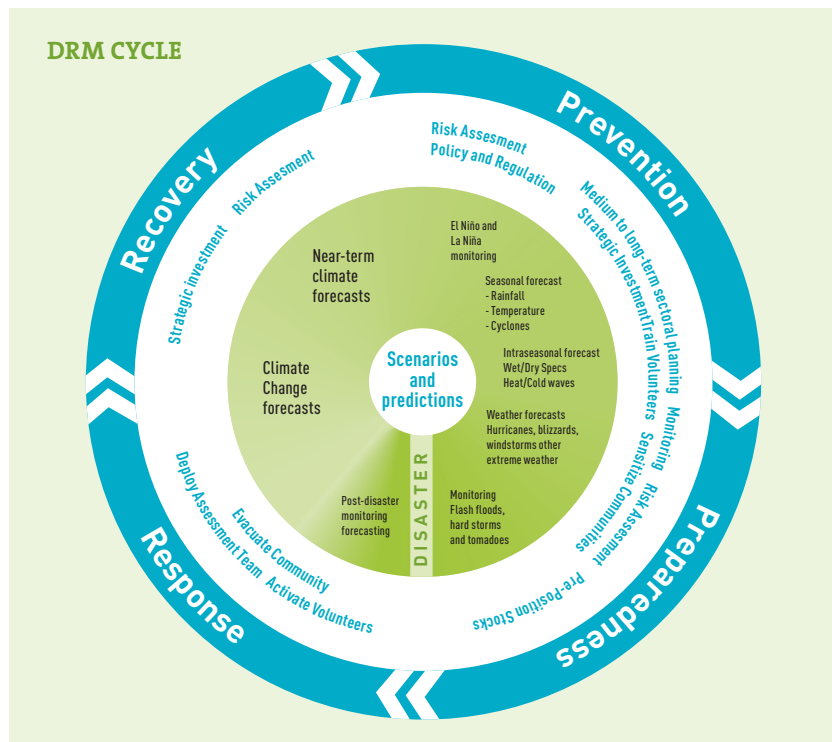
	Drought	Extreme temperature	Earthquake	Flood	Mass movement wet	Storm	Volcano	Wildfire
East Africa	58	-	14	191	12	56	5	2
Central America and Caribbean	21	9	24	155	16	198	7	5
West Africa	15	1	-	133	4	12	-	1
South East Asia	14	-	50	259	51	155	20	7
South Asia	13	43	63	273	37	97	-	1
European Mediterranean	4	38	31	110	-	46	1	28

**TABLE 1:** Numbers and categories of significant disasters that have plagued CATALYST's geographic sub-regions over the period 2000-2010 (based on CRED's Emergency Events Database EM-DAT, [www.emdat.be](http://www.emdat.be)).

## 1.1 From emergency response to DRR planning

Until the beginning of the 1990s, disaster management and emergency response were essentially identical activities. Experience has taught us that natural hazards can best be dealt with both from a Disaster Risk Reduction approach, as well as the conventional disaster management approach. Today, much emphasis is placed on prevention – on the outright avoidance of adverse impacts of hazards and disasters.

Emergency management refers to measures which are implemented once a calamity has hit a region, calling for resources and capacities to contain the damage and protect human lives. Addressing risks with the goal of reducing them denotes the existence of an *a priori* policy objective, and of strategic actions which must be put in place to anticipate future events, to reduce exposure and vulnerability, and to improve resilience. We are now witnessing the evolution of policies that include a requirement for disaster risk reduction planning. In parallel, rising awareness of the role of Climate Change Adaptations is fuelling coordinated efforts in these fields. For more details see “Climate data” into the Disaster Risk Management (DRM) Cycle.



## 1.2 One solution *does not* fit all

Reducing the risk of natural disasters and lowering the related social vulnerabilities requires a wide range of diversified actions. This calls for the identification of the drivers of disasters and of strategies to decrease their impact, through coordinated and systematic efforts. At the same time, it requires the implementation of measures that enhance safety and resilience of people and their goods; the adoption of political strategies aimed at a far-sighted use of land and territory; the enhancement of preparedness and recovery, and well-devised communication plans at all levels. Today, effective strategies to reduce natural risks must consider that Climate Change Adaptation also plays an important role in Disaster Risk Reduction, as highlighted in, for example, the Hyogo Framework for Action (see QR code).

Equally important is the fact that different regions of the world have specific biophysical and socioeconomic characteristics, for example, the difference in vulnerability patterns that rural and urban communities exhibit. Rural areas have a sound heritage of traditional knowledge that often goes underestimated. It is important to keep these differences in mind and to promote their strengths through policy and planning mechanisms, to maximize benefits coming from both environments and experiences.



### THREE LEVELS OF ACTION

Actions aimed at disaster risk reduction should unfold at three different levels, merging the needs of smaller communities, with policies at the international stage. If properly coordinated, these actions ensure that interventions have a continuum and develop the capacity of a country.

- **Community-level approach** – Small communities react to disasters on the bases of local concerns and priorities. Successful risk reduction measures should build upon local strategies, and promote the

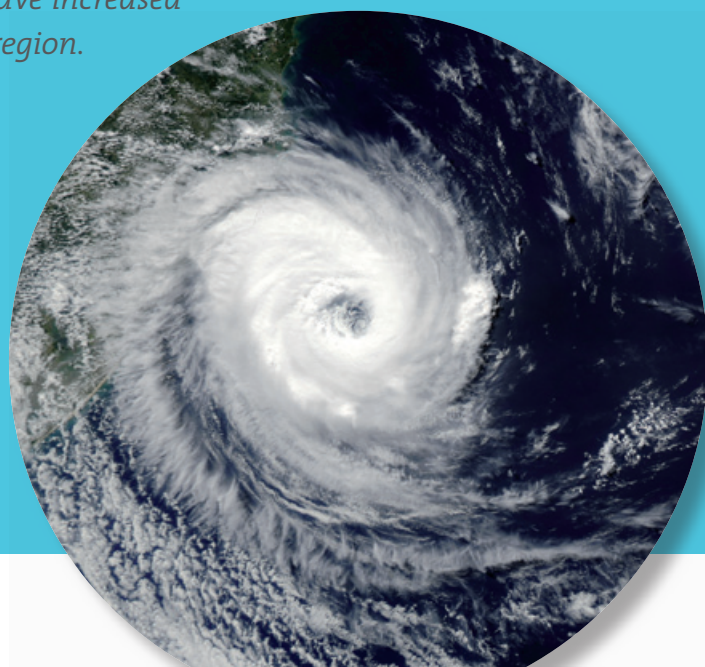
development of early-warning systems, policy changes and communication strategies aimed at protecting the most vulnerable groups.

- **National-level approach** – Comprehensive actions and coordination among ministries are desirable, along with *ad hoc* legislation and nationally adapted plans of action.
- **International-level approach** – It is important to identify the existing knowledge – approaches and strategies – promoting cross-cutting coordination, and securing, at the same time, political commitment and financial resources.

# 2.

## Central America and the Caribbean Region

Central America and the Caribbean – with a surface of 2714 km<sup>2</sup> and more than 198 million people – is the second most disaster-prone area in the world. From 1975 to 2011 it has suffered about 885 natural disasters, due to geological activity – earthquakes and volcanic eruptions – and hydro-meteorological activity – hurricanes, landslides, tropical storms and floods. Its sustained demographic growth, and a quick rise in population density, have increased the vulnerability of the region.



### 2.1 Key vulnerabilities

In Central America and the Caribbean, the massive population growth combined with migration flows towards vulnerable zones – coastal, urban and marginal lands – has worsened the responsiveness of coastal cities to weather-related events such as hurricanes and tropical storms.

The US National Hurricane Centre database reports 985 Atlantic hurricanes and storms from 1886 to 1996, and 701 Pacific storms from 1949 to 1996. Natural disasters occurred from 1975 to 2011 are listed in Table 2. Hurricane Ivan (2004), the 10<sup>th</sup> most intense Atlantic hurricane ever monitored, caused 64 deaths but heavy financial damages (US\$ 1177 million) in Grenada, Jamaica and the Cayman Islands.

In this region, a conspicuous part of the Gross Domestic Product (GDP) is generated by tourism, fishery, export industries, and maritime trade – carried out along coastal regions, where overcrowded cities shape the local economy with industries, tourism, shipping, and transportation.

Equally critical are housing quality, inadequate urban planning and scarce investments in infrastructures. It's easy to see that natural hazards can affect food and water availability, worsening health conditions and fuelling rampant poverty, with 18.8% of the population living on less than one dollar per day.

Environmental degradation, which is experiencing a quick and irreversible worsening, is another weak point of this region. Heavy deforestation accounts for soil erosion, which contributes to hazards such as landslides. Removal of trees makes slopes less stable and more susceptible to flash floods, and degraded soil is less able to absorb heavy rainfalls. Haiti, for example, is particularly vulnerable to floods and mudslides, mainly because of massive deforestation caused by the use of wood as domestic fuel.

*In recent times, economic losses associated with hurricanes, droughts and floods are growing rapidly - up to four times the rate of GDP's growth.*

#### NUMBER OF NATURAL DISASTERS

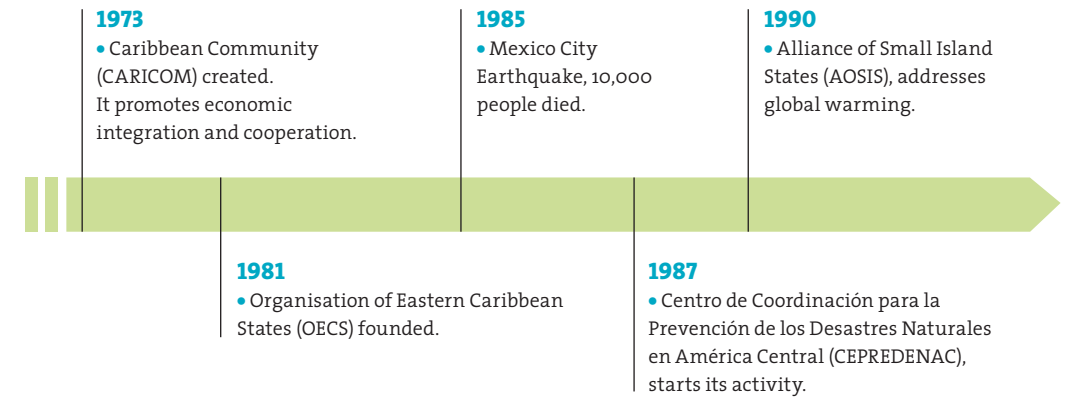
	Drought	Earthquake	Extreme temperature	Flood	Dry landslides	Wet landslides	Storm	Volcano	Wildfire	TOTAL
Central America	29	61	19	178	3	21	152	26	11	500
Caribbean	19	10	N.A	110	N.A	5	230	7	4	385
TOTAL	48	71	19	288	3	26	382	33	15	885

TABLE 2: Number of natural disasters by category in Central America and the Caribbean for the period 1975-2011. Source: EM-DAT: The OFDA/CRED International Disaster Database <http://www.emdat.be> – Université Catholique de Louvain.

# 3.

## Paths are made by walking

*The increased frequency and intensity of extreme events makes Central America and the Caribbean a high-risk area. Recurrent, deadly natural calamities – hurricanes, floods, storms, landslides and earthquakes in particular – impact on the region’s weak economy. This has prompted many countries to adopt proactive approaches to reduce their exposure to catastrophes.*



Timeline of major milestones in DRR and CCA since 1973

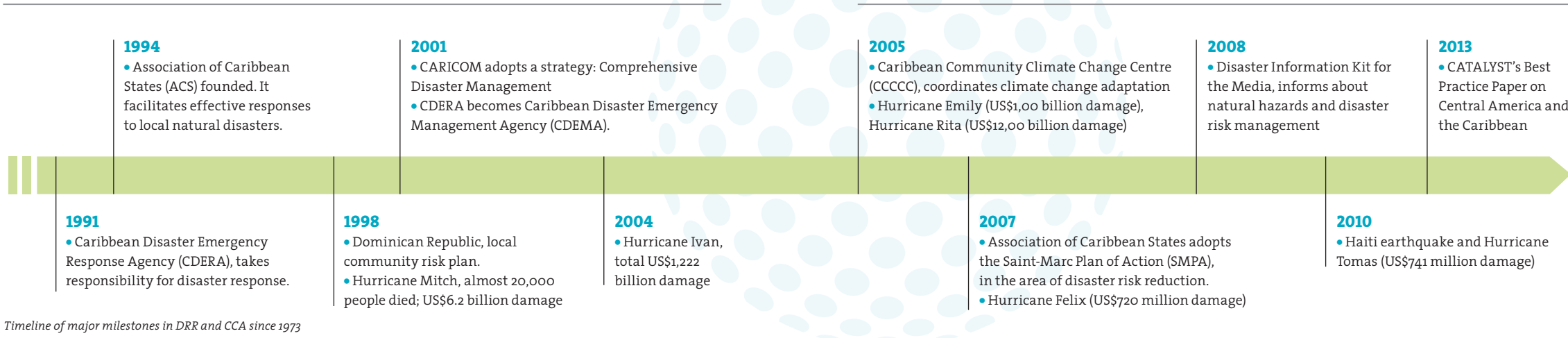
### 3.1 Progress in governance

Tourism, agriculture, hydropower and fisheries are major sources of income for Central America and the Caribbean. Unfortunately, they are all vulnerable to natural disasters. From 1975 to 2011, this region experienced some 885 natural events, with damages of about US\$94 million and more than 302,000 deaths. Hurricanes are at the top of the list also because of their increased frequency: from 1970 to 1979, this area was hit by 15 category 3, 4 and 5 events; 25 casualties occurred from 1990 to 1999,

while 29 severe hurricanes hit the region from 2000-2008. Two devastating hurricanes – Hugo (1989), which caused US\$40 million losses in the small British Virgin Islands alone, and Mitch (1998), which caused US\$6 billion losses in the whole Central America – became the catalyzers for a gradual shift, from after-the-fact response and recovery strategy, to a more comprehensive approach to Disaster Risk Management, and a more focused and efficient governance.

Governance shapes the way in which all parties – governments, public servants, the media, the private sector, and organisations – coordinate their actions to manage, reduce, and adapt to the risks related to natural hazards and climate change. Dealing with disasters and climate change requires a multi-level governance approach. As a consequence of increased awareness, many governments are now recruiting disaster management professionals, who produce environmental, as well as hazard risk assessments, promoting new standards and laws, both in land use and housebuilding.

*To tackle climate change issues, nations gradually strengthened the institutional capacity, by establishing Climate Change Units, Directorates, Climate Programmes and Inter-Ministerial Committees.*



Timeline of major milestones in DRR and CCA since 1973

### 3.2 Step by step

Until recently, construction was so expensive that few builders from government agencies took measures to reduce the risk from natural disasters, in Central America and the Caribbean. The most common structural measures, such as adoption of sea defenses, protective dunes and riprap revetments, provided modest relief. In recent years, however, in response to the violence of hurricane Ivan, in 2004, some Caribbean countries – including Anguilla, Antigua and Barbuda, Barbados, Dominica, Jamaica, Trinidad and Tobago – fostered non-structural measures. By setting higher standards for building codes, they increased resilience to hydro-meteorological events and hurricanes.

A successful example of non-structural measure is the Central American Probabilistic Assessment (CAPRA), an initiative led by the Central American Coordination Centre for Disaster Prevention (CEPRENAC). CAPRA is a platform for risk analysis based on Geographic Information System, which employs probabilistic techniques in the analysis of earthquakes, tsunamis, hurricanes and other disasters. The project was launched in 2008 by Nicaragua and Costa Rica and has been extended to other countries.

As far as floods are concerned, many Caribbean and Central American countries still lack comprehensive prevention and management plans. The need to stabilize insecure slopes triggered changes in policy and practice. Community-oriented, cost-effective measures were successfully applied. The project Management of Slope Stability in Communities (MoSSaiC) was devised to promote com-



munity participatory planning and management of landslide risk. The output was a set of maps that identify landslide-triggering mechanisms.

*Disaster risk reduction may be achieved through reducing vulnerability, capacity development, better information, institutional strengthening, and investments in prevention and mitigation.*

Public involvement and consultation of local communities have gradually become a common tool in the decision-making process aimed at disaster risk-reduction. Indigenous knowledge, coping mechanisms, traditional warning systems and community capacities represent vital tools that governments and decision-makers start taking into account.

A pilot project carried out in Trinidad focused on building awareness of climate change at the community level. Another pilot project launched in Saint Lucia and replicated in Tobago asked the communi-

ties to identify local measures put in place to restrain the effects of climate change, along with other measures deemed necessary.

However, in light of the most recent scientific knowledge, the need to foster capacity development and public awareness – not only in the aftermath of a disaster – has become an urgent priority.

Many organizations and institutions in the Central America and Caribbean region have organized courses and workshops, targeted at DRR professionals, students, community leaders and individuals (see QR code for a list of available courses). CATALYST has identified and surveyed about 60, among training courses, seminars, workshops held between 2011 and 2012. These educational events covered the full range of natural disasters that may hit this region, as well as topics like food security, telecommunications, risk assessment methods and strategies to enhance resilience and train the trainers.





# 4.

## From goodwill to best practices

CATALYST's Think Tank Members (TTMs) have discussed the state-of-the-art measures and actions employed by people in Central America and the Caribbean to reduce risks associated with natural disasters and cope with climate change. The following pages provide a selection of the best practices recommended to promote the transformative process that, building on local experience, may be further enhanced by scientific knowledge.



### 4.1 BP 1: impacting on social vulnerability

Tackling the causes of social vulnerability is one of the thematic priorities of the Central America and the Caribbean region. It covers both the sensitivity of a population to natural hazards, and its ability to recover from the hazards' impact (resilience). Marginalized groups like children, women, people with disabilities or chronic disease, and indigenous communities exhibit higher vulnerability, often worsened by their age, health, race and income, and by the urban or rural environment.

The "Terra Coco" initiative, promoted by the Comunidades Cristianas de Apoyo in the community of Escuintla, in southern Guatemala, is a holistic approach that addresses poverty eradication, social inclusion, environmental and Disaster Risk Reduction concerns. The initiative seeks to transform coconut husks, which are usually discarded and litter



the city, in useful objects like *land nets* and shoes, creating the opportunity to improve the living condition of the local community, and building the resilience to natural hazards.

Food insecurity stemming from recurrent natural disasters, environmental degradation, inadequate agricultural infrastructures and poor agricultural policies is a serious threat in Guatemala. And small rural families in Escuintla face frequent floods that pose serious threats to food reserves. On the one hand, the project strengthens the livelihood base of marginalized sectors of the society, like women and unemployed youngsters. On the other hand the *land nets* derived from husks

lessen the exposure of the community to landslides.

#### The procedure

Coconut husks are collected from the garbage by unemployed youngsters and then ground to extract the fibres. Women from the community use these fibres to produce handcrafts (sandals and vases), or plait them to create long nets that are then employed to stabilize the slopes of the hills nearby. These *land nets* additionally contribute to halt soil erosion and recover soil moisture and fertility, thus reducing the risk of land-

*The Hyogo Framework for Action 2005-2015 recognizes the role of community-based approaches to disaster risk reduction. But effective support to the communities at the forefront of managing hazards is easier said than done.*

slides. Comunidades Cristianas de Apoyo is a member of the Networks for the management of risk and adaptation to climate change (Redes de Gestión de Riesgos y Adaptación al Cambio Climático). Info on the project can be obtained by Mr. Francisco Toledo: moi5o6@yahoo.com

### Applicability of the practice

The cultural and institutional context plays a crucial role in the applicability of an action. The unique characteristics and needs of each community must be taken into consideration. Interventions, at this level, should seek to recognize and protect each community's unique characteristics, and incorporate traditional or indigenous knowledge, when possible. This approach helps build a sense of ownership and participation, ensuring continuity to the intervention. Local and national authorities must play a supportive role. For more info on Terra Coco see QR code.



## 4.2 BP 2: ecosystem services for Disaster Risk Reduction

Ecosystems offer a practical contribution to disaster risk reduction, as they sustain the livelihood of communities and reduce their physical exposure to natural hazards. They produce services as food, medicine, fuel and building materials. Wetlands, forests and coastal reefs serve as natural protective barriers and mitigate the impacts of storms, landslides, floods and droughts. If well-managed, they represent a cost-effective way to mitigate climate change effects, compared with human-made alternatives such as dykes and concrete walls (ProAct Network, 2010)<sup>2</sup>. Hence, ecosystems should be regarded as a plausible option for communities with limited financial resources.

Quantifying the role of ecosystems services is thus the first step to provide evidence of their role in reducing the risks of disasters. The Risk and Vulnerability Assessment Methodology Development Project (RiVAMP) aims at quantifying the role of ecosystems for DRR and CCA, with a specific focus on Small Island Developing States (SIDS) and highly vulnerable coastal areas exposed to tropical cyclones and related hazards and to accelerated sea level rise. This methodology helps local and national decision-makers to choose

*Investing in sustainable ecosystem management offers cost-effective solutions to reduce communities' vulnerability to disasters. Healthy ecosystems not only shelter from natural hazards, they also provide social and economic welfare.*

<sup>2</sup> ProAct Network, 2010, Maximising Ecosystem Services for Disaster Risk Reduction, Briefing Note, Nyon, Switzerland

best options advisedly. The risk and vulnerability assessment framework measures four components, consisting of ten indicators. The four areas assessed are:

- ecosystems and ecosystem services;
- environmental change, from human activities and climate change;
- local livelihoods and vulnerability; and
- environmental governance.

Jamaica was selected as the first country for the RiVAMP pilot project because of its high vulnerability to tropical cyclones and sea level rise; its richness in ecosystems and biodiversity, which are under pressure due to population growth, economic development and a strong international tourism industry; high-level government commitment to hazard mitigation; and Climate Change Adaptation.

### The procedure

RiVAMP employs science and stakeholder consultations and interviews to identify local knowledge and threats to local ecosystems. The scientific contribution comes from satellite imagery analysis, and other remote sensing techniques (e.g. use of aerial photographs), geographic information system mapping and analysis, statistical analysis and modelling of the buffering effects of coastal ecosystems, under conditions of sea level rise and storm surges.

Stakeholder consultations were held at the local level involving experts and citizens in order to: i) identify local knowledge on ecosystem services; ii) identify threats to the ecosystems; iii) understand historical processes which led to the decline of the ecosystems.

### ROLE OF ECOSYSTEMS

Jamaica is a hotspot of biodiversity, with 800 flowering species, 500 land snails, more than 50 amphibians and reptiles, 28 bird species and 19 butterfly species. Five different ecosystems can be identified: coral reefs, sea grasses, mangroves, forests and wetlands (peatlands). Each of them is under threat

due to high-impact human activities. Wetlands, forests and coral reefs, in particular, are natural protective barriers against storm surges, but their buffering role is often underestimated. Coral reefs, in particular, provide coastal stability and shoreline protection. They are the habitat for many species, and nurseries for fish and shellfish, and these natural resources, when protected, promote tourism.

A pilot testing was undertaken in 2009, in two communities of Negril (Jamaica): Whitehall and Little Bay. As a follow-up, the Government of Jamaica asked the United Nations Environment Programme (UNEP) to carry out a national-level training on the methodology, which was conducted on the basis of a free open-source software.

RiVAMP is a UNEP joint initiative of the Division of Environmental Policy Implementation/Post-Conflict and Disaster Management Branch and the Division of Early Warning and Assessment-GRID Europe, in consultation with the Caribbean Environment Programme based in Kingston and the Regional Office for Latin America and the Caribbean. Info on the project can be obtained from Mr. Christopher Corbin (cjc@cep.unep.org), and Ms. Sanya Wedemier-Graham (sw@cep.unep.org).

### Applicability of the practice

The RIVAMP methodology has been developed for Small Island Developing States and other highly vulnerable coastal areas that are exposed to tropical cyclones and to sudden sea level rise. It can therefore serve as a useful tool, suitable for replication in those areas with similar characteristics. The training material, data and software page can be downloaded from the project website (see QR code).



## 4.3 BP 3: Disaster Risk Reduction as a political priority

The Hyogo Framework for Action (HFA) recognizes the central role of governance in reducing risks from natural hazards, and emphasizes the need of governments' commitment to develop a sound policy, combined with legislative and institutional frameworks. A key challenge for a post-2015 framework will be the integration of Climate Change Adaptation in the global blueprint for disaster risk reduction, and the recognition that Disaster Risk Reduction and Climate Change Adaptation play a synergistic role in reducing the communities' vulnerability, strengthening their resilience and thus achieving sustainable development. Policy and decision-makers' commitment is mandatory: devoting appropriate, or even limited, resources to the implementation of this strategic goal is central in setting off a virtuous circle that may prompt governments to align, bringing sound results and beneficial outcomes for all the nations. Cuba's capacity to implement effective DRR strategies actions despite limited financial resources is a virtuous example. The country's legal risk management framework is one of its key assets in disaster risk

<sup>3</sup> Thompson M., Gaviria I., 2004, Cuba. Weathering the Storm: lessons in risk reduction from Cuba. Oxfam America Boston, USA.

reduction: Cuba has enacted 3 laws, 7 decree laws, 13 decrees, 21 ministerial resolutions and one directive on Disaster Risk Mitigation, coupled to a very clear set of roles and responsibilities within the Civil

Defence system. Cuba relies on a centralized decision-making structure, and a decentralized implementation process that involves county and municipal authorities, along with all sectors of the civil society, in risk prevention, mitigation and in the emergency response phases. Participation of civil society is strongly promoted through training activities and education. As for education, disaster preparedness, prevention and response are part of the curriculum at many schools and universities. As a result, both research and local anecdotal information are considered in decision-making.



*“Building a culture of prevention is not easy. While the costs of prevention have to be paid in the present, their benefits lie in a distant future. Moreover, the benefits are not tangible; they are the disasters that did not happen.”*  
Kofi Annan

### THE CUBAN MODEL

The so-called Cuban risk reduction model builds its success on the simultaneous implementation of six key actions, proving that each one enhances the others: social and economic development; climate change adaptation; disaster mitigation; disaster preparedness; disaster response; disaster recovery.<sup>3</sup> Specialists in risk reduction have thoroughly analysed how different forms of governance affect risk reduction and disaster preparedness, and they have come up with the “golden dozen”, twelve key features

of good governance in risk reduction: social cohesion and solidarity; trust between authorities and civil society; political commitment to risk reduction; good coordination, information-sharing and cooperation among institutions; attention to the most vulnerable population; attention to lifeline structures; investments in human development; effective risk communication system; investments in economic development; in social capital; in institutional capital. (For the complete report see QR code)



### The procedure

Cuba has historically been hit by hurricanes and tropical storms, and has learned to mobilize resources to mitigate risks and reduce dangers. METEORO is a national simulation exercise carried out during the third week in May each year to rehearse response strategies and procedures before the hurricane season.

The two-day training is carried out at the national, county, municipal and community level. The first day is dedicated to provide information on the steps taken in an emergency event, and to carry out simulations aimed at assessing disaster response strategies and procedures. Day two is devoted to practical preparatory actions, like checking reservoir walls, cutting tree branches, and identifying places where to evacuate animals.

### Applicability of the practice

Each country has unique governance features that shape the way Disaster Risk Reduction can be mainstreamed into developing practices. Nevertheless, the Cuban experience shows that effective Disaster Risk Reduction is possible even in countries with limited financial resources, but where the political will is strong enough to set policy priorities and mobilize resources (UNDP, 2010).<sup>4</sup>



It is worth noting that Central America and Caribbean countries may rely on regional organizations supporting their efforts in developing policies and legislative/institutional frameworks for DRR.

For instance, the Caribbean Disaster Emergency Management Agency provided its member states with a model “National Disaster Management Bill and Regulations”, which presents a comprehensive approach and analysis of all the legislative requirements to adopt a Comprehensive Disaster Management framework (see QR code).

## 4.4 BP 4: risk-transfer mechanisms

In Central America and the Caribbean, the risk-transfer mechanism needs to be further developed. Attention should be drawn to the development and mainstreaming of insurance schemes for disaster risk in the rural environment. This would provide communities with prompt access to funds for recovery, in case of a sudden disaster. It is worth noting, however, that risk-transfer mechanisms alone do not reduce the vulnerability of a given community. Therefore, they should always be applied in support of broader disaster risk-reduction strategies. Droughts and cyclones pose a serious threat to the agricultural sector in Mexico. Droughts, in particular, account for approximately 80%<sup>5</sup> of the risks to agriculture and may exert harmful effects especially to small and low-income farmers with little or no access to insurance programmes.



### The procedure

Mexico still has a limited presence of private insurers in agriculture, due to the intrinsically high catastrophic risk associated with the sector, and the high financial and operational costs. Therefore, when natural disasters wreak havoc, small farmers rely on monetary transfer from national and local governments, which puts the federal budget under considerable pressure. Therefore, the Mexican government developed an alternative and more efficient mechanism to help low-income farmers to reduce their risk.

### OUTREACH STRATEGIES

Strategies to communicate with the public, at all levels, should become part of risk-reduction policies. In the absence of national plans local organizations’ outreach plans should provide the population with useful tools for times of emergency.

Cuba’s three steps may become a lesson to replicate in other countries:

- keep information simple

- use easily accessible dissemination media
- exploit available communication resources

By providing emergency response plans to the public in areas at risk of hurricanes, earthquakes and other disasters, governments and other organizations can help maximize good outcomes after disaster strikes. Building public participation and motivation, and using existing knowledge and logistics, can help strengthen community resilience.

<sup>4</sup> UNDP, 2010, Disaster Risk Reduction, Governance & Mainstreaming, United Nations Development Programme, New York, USA

<sup>5</sup> Gonzalez A., 2009, Index Insurance Applied to Agriculture: The Mexican Case. Focus 17 brief 15 International Food Policy research institute, Washington, USA



AGROASEMEX, the national insurance institution created to protect the estates and the production capabilities of the rural sector, found the Catastrophic Agricultural Insurance to insure maize and sorghum against drought. This approach is original and innovative: instead of taking out a policy against crop failure, quite a common procedure in the traditional agricultural insurance contracts, the new contracts are signed against an index that describes the relationship between lack of rainfall and crop failure. If rainfall levels drop below the agreed trigger points during key stages of crop growth, farmers receive payouts (IFAD: 2011).<sup>6</sup>

#### Applicability of the practice

Index insurances like CAI can play an effective role in building the resilience of rural communities to natural hazards and climate change. In principle, they show wide applicability. The mechanism, in fact, provides quite consistent protection against poverty, and gives farmers a chance to improve their livelihoods, thus enhancing their economic resilience. Moreover, such mechanisms might fit into a more comprehensive strategy to reduce vulnerability and risk: insurance coverage, for instance, could be conditional to the adoption of drought-tolerant crop varieties or micro-irrigation and harvesting of rainwater.

A limiting factor to the replication of this practice, however, is the need for extensive and consistent historical climate data and infrastructure to measure weather changes in real time, in order to link crop failure to the level of rainfall. Moreover, farmers could still suffer damages to their crops and thus losses, but not receive any payouts if rainfall doesn't fall below agreed trigger points during key stages of crop growth. For more info about CAI see QR code.

*Some agricultural risks may not be commercially insurable because of their characteristics: the presence of correlated or systemic risks, related to extreme weather phenomena; the probability of extreme events with large expected losses difficult to quantify; agriculture's high costs of operation.*



## 4.5 BP 5: data availability

A primary factor inhibiting research and practice in the Central America and Caribbean region is the lack of up-to-date and accurate data. The main challenges include the lack of historical baseline data, the high costs of generation of new data sets and the difficulties in data sharing, with the latter being often costly, prohibited or inhibited by the lack of data-sharing agreements.

In Jamaica and the Cayman Islands, data sharing is quite problematic even among government organizations (Carby, 2011)<sup>7</sup>. Similarly, in El Salvador the exchange of disaster risk data among relevant bodies is still challenging, even though mandated as compulsory by the Civil Protection Law (GFDRR, 2010)<sup>8</sup>.

#### The procedure

In 2012, with support of the World Bank, Saint Lucia launched its first data-sharing and management platform: Saint Lucia Integrated National GeoNode. Its aim is to provide a medium for agencies and institutions for sharing the spatial data they use through open-source software.

National ministries and agencies are then able to add, catalogue, view and share data on the platform, and thus inform planning and decision-making on the basis of more complete and coherent information. Other Caribbean countries, like Grenada, Saint Vincent and the Grenadines, Belize and the also University of West Indies, are now using GEONODE for land management and risk assessment in the region.

#### Applicability of the practice

The generation of new knowledge can be expensive, and appropriate human and monetary resources might not be available in countries with competing development priorities and needs. A more cost-effective alternative is to share and exchange existing data and knowledge between agencies and institutions, through appropriate collaboration agreements.



<sup>6</sup> IFAD, 2011. Addressing Climate Change in Latin America and the Caribbean. [Online] Retrieved from: <http://www.ifad.org/operations/projects/regions/pl/pub/climate.pdf>

<sup>7</sup> Carby B, et al., 2011. The Caribbean implementation of the Hyogo Framework for action HFA: midterm review. University of West Indies and United Nations Development Programme, Barbados

<sup>8</sup> GFDRR, 2010. Disaster Risk Management in Central America: GFDRR Country Notes. [Online] Retrieved from: [http://www.gfdr.org/sites/gfdr.org/files/DRM\\_CENTRAL\\_AMERICA.pdf](http://www.gfdr.org/sites/gfdr.org/files/DRM_CENTRAL_AMERICA.pdf)

# Take home messages

Years of experience “on the ground” in Disaster Risk Reduction and Climate Change Adaptation confirm that these two fields, require conceptual overlaps in planning and management. CATALYST has analysed most of the recent existing knowledge in these sectors and extracted the recommendations that should be adopted to obtain effective results, while minimizing risks and damages to people and property.

- **Reducing social vulnerability is critical** – Social vulnerability to natural hazards is shaped by health, age, gender, race and income and reflects the geography of a region. Efforts must enhance local resilience by stimulating people’s engagement and by making use of their traditional knowledge combined with state-of-the-art scientific knowledge.
- **Ecosystems must be protected** – The role of ecosystems needs to be safeguarded and protected. The environment and its resources are a common estate with social value that provides the populations with direct and indirect benefits. They have an intrinsic worth that concurs to a nation’s welfare, much alike roads and communication systems.
- **Governance must be re-oriented** – Disaster Risk Reduction and Climate Change Adaptation must enter the international agendas and become governments’ priorities. Scientific knowledge and experience need to be integrated at international, national and local levels, and long-term plans must be supported even when little financial aid is available.
- **Specific insurance schemes should be devised** – The presence of private insurers in agriculture is still very limited, due to the intrinsic high risk associated to the sector and the high financial and operational costs. New contract agreements should be conceived, to help building the resilience of rural communities to natural hazards and climate change. Contracts should rely on specific indexes describing the relationship between a natural noxious event and crop failure.
- **Data availability must be implemented** – The lack of up-to-date and accurate data is still a critical gap in the Central America and the Caribbean. Despite some recent efforts (the Caribbean Risk Atlas in the field of risk mapping), this region is lacking historical information and it is encumbered by high costs for the generation of new datasets and their dissemination.

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