CATALYST

CAPACITY DEVELOPMENT FOR HAZARD RISK REDUCTION AND ADAPTATION

A BEST PRACTICES NOTEBOOK FOR DISASTER RISK REDUCTION AND CLIMATE CHANGE ADAPTATION

Guidance and Insights for Policy and Practice from the CATALYST Project

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Title:
A Best Practices Notebook for Disaster Risk Reduction and Climate Change Adaptation: Guidance and Insights for Policy and Practice from the CATALYST Project

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This report is the popular version of CATALYST project's Deliverable 6.5 (Hare M., et. al. 2013. CATALYST Best Practices Policy Notebook). CATALYST, *Capacity Development for Hazard Risk Reduction and Adaptation*, is a project funded by the European Commission Seventh Framework Programme (FP7/2007-2013) under Grant Agreement No. 283177. The project's aim has been to bring together existing networks of researchers, policy and decision makers, members of non-governmental organisations, and small- and medium-sized enterprises to identify and share information about best practices and critical knowledge gaps.

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The essays in this report will be available from the CATALYST website in three languages: English, Spanish and Bengali.

A Best Practices Notebook for Disaster Risk Reduction and Climate Change Adaptation

Guidance and Insights for Policy and Practice from the CATALYST Project

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CAC CATALYST region Central America and Caribbean
CATALYST Capacity Development for Hazard Risk Reduction and Adaptation
CBA cost-benefit analysis or community-based adaptation
CBO community-based organisation
CCA climate change adaptation
CCRIF Caribbean Catastrophe Risk Insurance Facility
CDM Clean Development Mechanism
CSO civil society organisation
DFID Department for International Development (UK)
DRM disaster risk management
DRR disaster risk reduction
EBRD European Bank for Reconstruction and Development
EM-DAT Emergency Events Database
EUM CATALYST region European Mediterranean
EWA CATALYST region East and West Africa
EWS early warning system
FAO Food and Agriculture Organisation
GAR Global Assessment Report on Disaster Risk Reduction
GCM global climate model
GEC global environmental change
GFDRR Global Facility for Disaster Reduction and Recovery
GHG greenhouse gas
GIS geographic information system
HFA Hyogo Framework for Action
IADB Inter-American Development Bank
IAM integrated assessment model
ICT information and communication technology
ICZM integrated coastal zone management
IDNDR International Decade for Natural Disaster Reduction
IPCC International Panel on Climate Change
IWRM integrated water resource management
LDC least-developed country
LDRM local disaster risk management
MDGs Millennium Development Goals
MFI micro-finance institution
NAPA National Adaptation Programme of Action
NGO nongovernmental organisation
OECD Organisation for Economic Co-operation and Development
RCM regional climate model
REDD reduced carbon emissions from deforestation and forest degradation
SIDS small island developing states
SMEs small- and medium-sized enterprises
SRES Special Report on Emissions Scenarios
SSA CATALYST region South and South East Asia
TTM member of CATALYS Think Tank process
UN United Nations
UNDP United Nations Development Programme
UNFCCC United Nations Framework Convention on Climate Change
UNISDR United Nations International Strategy for Disaster Reduction
WHO World Health Organisation
WMO World Meteorological Organization

Executive summary

This publication, *A Best Practices Notebook for Disaster Risk Reduction and Climate Change Adaptation: Guidance and Insights for Policy and Practice from the CATALYST Project* is one of two main CATALYST knowledge products that focus on the transformative approaches and measures that can support Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA). It is complemented by the Best Practices Papers: *Before Disaster Strikes – Transformations in Practice and Policy* prepared for each of the four CATALYST regions (South and Southeast Asia, Mediterranean Europe, East and West Africa, and Central America and the Caribbean). While the previous publications present the practices considered by stakeholders to be among the most important in each region, this publication summarises the key results of the entire project from a multi-regional perspective. In doing so, it focuses on some of the most essential themes that have emerged from the CATALYST Think Tank over the last two years: ecosystems-based DRR/CCA; mainstreaming DRR/CCA; urban DRR; drought risk management for agriculture; climate risk insurance; small island developing states, and how the Hyogo Framework for Action should be followed up, as well as how to continue the CATALYST legacy.

After a brief review of the CATALYST Think Tank, which has along with DRR/CCA literature, been the source of much of the knowledge that has supported the development of the CATALYST knowledge products, eight essays written by project partner organisations as well as Think Tank Members are presented. This level of collaboration between the project and professionals working with us in the Think Tank, is an indicator of the success of the project.

The key messages of the first set of essays focusing on the international level are summarised below.

Despite international efforts, the trend in damage and losses as a result of natural disasters is increasing. As the Hyogo Framework for Action draws to a close in 2015, the DRR/CCA community is paying much attention to the nature of the new commitment needed for the next round of the HFA (HFA2) to make international efforts in disaster risk reduction more effective. Climate change and adaptation, as well as poverty reduction, inclusivity (of women, children, other disadvantaged sectors of society) and sustainable development have all been identified as vital considerations of such a new framework since these are inextricable elements of disaster risk reduction. While the CATALYST Think Tank Members echoed the importance of top-down activities such as HFA, they also stressed the importance of bottom-up disaster preparedness with the

focus on enhanced resilience at the community level, since this is the front line of disaster risk management. In this context, they also pointed to the vital role of education and training in DRR and adaptation and the need to institutionalize this. While the social and economic dimensions of disaster management are in the foreground, the socio-environmental dimension of vulnerability requires significantly more attention, as elaborated in the subsequent essay on the ecosystems approach to DRR and CCA. These are elements that need also be built into the new global blueprint for DRR (HFA2).

The promotion of ecosystems-based DRR and CCA has enormous potential for reducing losses and damage from natural hazards, and is a particularly important approach in the CATALYST region of Central America and the Caribbean. However, its promotion has value for disaster-prone regions throughout the world. A combination of international agreements, national regulations and planning, as well as local level capacity development will facilitate tremendously the adoption of ecosystems-based approaches and measures. Protection and enhancement of ecosystem services, such as those provided, for example, by (coastal) wetlands and mangroves, have tremendous value in protecting human lives and infrastructure against the effects of storms and sea surges. Urban and regional planning and natural resource management are just two important sectors that can play a central role in the enhancement of ecosystem services. Furthermore, the positive correlation between enhanced ecosystems and poverty reduction is just beginning to be appreciated. Given that the poor are frequently the most vulnerable to the effects of disasters, this link warrants more attention.

Small Island Developing States (SIDS), such those in the CATALYST region of Central America and the Caribbean region that are particularly vulnerable to climate change and natural disasters, would benefit in particular from ecosystems-based DRR and adaptation as well as integrated coastal zone management. One important mechanism for achieving this is to build these approaches into spatial planning. However, this cannot happen in the absence of more international attention to the specific development needs of these islands. A strengthening of the link between DRR/CCA and sustainable development, in the SIDS context, is the foundation stone of future support to these island states. At the regional level, risk reduction and adaptation in SIDS can also benefit tremendously from regional and multi-country networks and organisations such as the *Indian Ocean Commission* and the *Caribbean Disaster Emergency Management Agency* that provide effective platforms for stakeholder exchange and cooperation including assistance for those islands facing disasters. As an example of the latter, the *Caribbean Catastrophe Risk Insurance Facility* provides its members with access to affordable and effective coverage against natural disasters.

Following from this example of risk insurance, the subsequent essay focuses on the general topic of climate risk insurance. In many but not all cases, risk transfer mechanisms such as insurance provide a cushion against natural disaster losses. The creation of an enabling environment is needed in order to implement effective climate risk insurance. This includes a regulatory and supervisory framework; mobilising those advocates who can encourage a long term commitment from the public and private sector; reliable data for pricing risk and for understanding the different options for managing climate risks; securing cost-effective distribution channels; a "back-up" mechanisms such as reinsurance or a safety net to meet exceptionally high claims; and, investment in risk management education and responsible management of clients. It is important to note that the UN Framework Convention on Climate Change (UNFCCC) and the Hyogo Framework for Action encourage country-driven risk transfer and risk-sharing mechanisms. The international community needs to be sharing more information about good examples of risk transfer mechanisms that meet the needs and priorities of low-income and vulnerable people.

The subsequent set of essays focuses on key DRR/CCA themes from a country and local level perspective.

Much attention has been given at the international level to the importance of mainstreaming or cross-sectoral integration of DRR/CCA into national and regional policy making. This mainstreaming also recognises the fact that DRR and CCA are inextricably linked when it comes to meteorological hazards and secondary hazards that may be triggered by them. Mainstreaming can effectively be supported with a regulatory framework that prescribes the actions that governments should undertake at various governance levels and within various sectors in order to achieve DRR/CCA goals and objectives in national or sectoral planning. As demonstrated in examples from the CATALYST Think Tank, integrating DRR/CCA into national economic development plans encourages governments to take ownership of DRR/CCA planning so that aid efforts from donors can be better directed and managed. As the examples in this essay demonstrate, the effectiveness of these plans do however require sufficient allocation of budget, the high capacity level of the government staff involved, in large part

supported by investment in education and training, and a system of frequent reviews and planning revisions. Intergovernmental coordination, along with intergovernmental information sharing, is also key to effective DRR/CCA mainstreaming. The international community can also play an important role in encouraging national level mainstreaming by expanding National Adaptation Programmes for Action (NAPAs) to include DRR objectives. It is important to consider that there are also indirect methods of mainstreaming DRR/CCA into government policy that can be adopted by non-government actors, including targeted capacity development of key staff in government, supporting change agents within government, lobbying and embedding.

Focusing on specific hazard events, and local action, the next essay reviews the emerging approaches for addressing increasingly frequent and/or intense drought episodes under conditions of climate change. The implications of drought for water resources and agriculture are far-reaching. Drought impacts, unlike other disasters, are not always immediate, taking place over a period of months or years, and are more difficult to assess, making them more challenging to manage. As a result there has been an increased recognition of the importance of shifting from crisis management to a risk reduction approach when it comes to addressing water scarcity and drought, with a focus on reducing the vulnerability of the socio-ecological system. One of the most effective measures for drought DRR/CCA is the setting up of a comprehensive drought monitoring and early warning system, such as the European Drought Observatory, which involves cooperation among several drought monitoring systems across the region, to provide a more complete understanding of the drought risks and early warning of the onset and duration of events. At a practical level, adaptation measures are presented that are proving effective including, for example, innovative water pricing mechanisms that promote conservation and resource pooling, that is the joint use of resources that are held collectively during times of scarcity.

Moving away from hazards in rural areas, in the penultimate essay, a call is made for practitioners at all levels to pay more attention to urban disaster risk reduction. As more of the world's populations begin to live in urban areas, and informal settlements within large urban agglomerations grow, the vulnerability of human populations to hazard risks increases. But here lies a paradox: while being structurally vulnerable to disaster, urban areas can also act as the catalyst for transforming DRR/CCA in a country. The well-run city can be a bastion of good education, employment and high life expectancy, and can take the lead in reducing greenhouse gas emissions, as well as being armed with the widest range of options for reducing risks from extreme events. Given the high risk and the great potential, urban areas are arguably the best place for efforts in DRR and CCA tostart.

In the final essay, the follow-up to the CATALYST project is described. The *CATALYST-Local* Community of Practice (CoP) involves project partners, Think Tank members and other stakeholders in the tailoring of the knowledge gained in CATALYST to the institutional and cultural contexts of local rural and urban communities in different countries. The CoP will support the setting up of so-called CATALYST-Local projects in the four CATALYST regions, and will facilitate knowledge exchange between its members, in order to share lessons learned from downscaling DRR/CCA knowledge to the local level, and improve local implementation of DRR/CCA strategies. The CATALYST-Local projects currently in planning are also mentioned, including the ones in Mexico, Indonesia, India, Italy, and Bangladesh.

The *Best Practice Policy Notebook* concludes with an annotated bibliography of all CATALYST knowledge products, and a list of CATALYST Think Tank Members, without whose support this project would not have been possible.

Introduction

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This publication is the final in a series of knowledge products that have been developed by the CATALYST project, *Capacity Development for Hazard Risk Reduction and Adaptation,* which has been funded by the European Commission under the Framework Programme 7. CATALYST has been a different type of project in many ways. First of all, it is not a research project; rather it is a capacity development project. This means that CATALYST has not endeavoured to create new knowledge, but rather it has compiled, synthesised and disseminated existing knowledge on Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA). As such it responds to the IPCC's recent SREX report, *Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (IPCC, 2012) which sends the clear message according to the report's co-author, Chris Field, that "we know enough to make good decisions about managing the risks ... Sometimes we take advantage of this knowledge, but many times we do not." CATALYST seeks to increase the likelihood that that knowledge is fully taken advantage of in the ever-expanding community of professionals who need to know about both DRR and CCA for their work.

Secondly, CATALYST is a different type of project since it primarily gathers its knowledge from professionals working in DRR/CCA . During the course of the project, 130 experts have been brought together in the CATALYST *Think Tank* to help generate our knowledge products. The CATALYST stakeholders include practitioners, policy advisers and academics from diverse sectors and countries in four regions: East and West Africa, Central America and the Caribbean, the European Mediterranean and South and South East Asia. Over the course of the past two years, these professionals, working voluntarily and in a personal capacity, have provided their views on various DRR/CCA themes, supporting the identification of practices and measures that they consider to be vital to adopt, as well as the identification of gaps in scientific knowledge, gaps in networks and recommendations for fostering capacity development in the CATALYST regions.

The purpose of this notebook

The final task given to the CATALYST project has been to summarise the key results of the project in an accessible format for a wide variety of readers, from DRR/CCA profes-

sionals, to policy-makers and academics, as well as the interested general public. This best practices policy notebook has been developed to do this. This best practices policy notebook has been developed to do this, and is being published in a report format consistent with the CATALYST Best Practice Papers (D64).

The notebook complements but does not replicate the set of best practice papers that have been produced for each of the four regions (insert references). Rather, it presents from a multiple regional perspective some of the most essential themes that have emerged from the CATALYST Think Tank over the last two years, e.g. ecosystems-based DRR/CCA; mainstreaming DRR/CCA; urban DRR; drought risk management for agriculture and, importantly, how the Hyogo Framework for Action should be followed up, as well as how to continue the CATALYST work beyond the duration of the project.

Our primary audience

This notebook is neither an expert manual nor a textbook presenting an exhaustive array of practices for DRR/CCA. Nor is it a scientific report complete with comparative analyses and objective assessments of various practices and measures. Moreover, it is not intended for the multi-sectoral DRR/CCA expert who has committed his or her career to understanding all there is to know about the two fields.

This notebook is primarily aimed at, and indeed dedicated to, the legion of sectoral experts and policy-makers who, as the Essays 1 and 5 in this notebook point out, are increasingly being asked to include, in their expertise and mandates, knowledge of DRR/CCA practices and measures that can both support their sector and help their sector to support DRR/CCA objectives. Indeed, according to one TTM[1], in countries where government officials are frequently replaced, having readily available knowledge on the most important developments in DRR/CCA, such as this notebook provides, is a necessity for new government staff. Additionally, it has been pointed out that with climate change comes new situations for professionals to deal with, thus "we need to learn from others about the new situation we find ourselves in"[2]. For all these policy- and operational-level professionals, as well as the interested reader, a selection of the most important themes arising from the CATALYST Think Tank are presented in the form of short essays, which provide an overview of themes and a guide to sources of further in-depth information for those who wish to learn more.

An overview of the essay themes

The first set of essays (1-4) focus on the role of international agreements and actions for the promotion and maintenance of best practices in DRR and CCA.

Essay 1 focuses on the Hyogo Framework Agreement (HFA) (2005-2015), which has promoted five priority actions to be taken by governments and other actors to improve national efforts to build disaster resilience, and how the HFA should be followed up, highlighting recommendations from the international community as well the CATALYST Think Tank.

Essay 2 presents one of the themes of importance for any post-HFA agreement: promoting ecosystems-based DRR and CCA. It describes how international agreements are being used to encourage and speed up the adoption of such approaches, and provides important cases of ecosystems-based DRR identified during the CATALYST Think Tank consultations.

Essay 3 focuses on an issue that was highlighted in the Central American and Caribbean region, but is of worldwide importance: Small Island Developing States (SIDS), and how to reduce the risk of disasters in such vulnerable countries, as part of the development agenda (thus highlighting the vital link between DRR and sustainable development, another key theme of the CATALYST Think Tank). Once again, this essay begins with a review of international agreements supporting SIDS and concludes with CATALYST recommendations on how the specific development needs of SIDS should be incorporated in the post 2015 international development, climate change and disaster risk reduction agenda.

Essay 4 continues, where the previous essay ends, with the issue of climate risk insurance. The need to promote risk transfer mechanisms, such as insurance, through capacity development activities was expressed by the CATALYST Think Tank members. This essay highlights climate risk insurance with several examples from around the world, and explains why it is so important for these schemes to have the right enabling environment created for them by governments if they are to thrive. The essay concludes by describing how the international community can support the successful creation of such schemes.

The next suite of essays (5-7) focuses on key DRR/CCA themes from a country and local level perspective.

Essay 5 considers examples of how countries from the CATALYST regions have sought to mainstream DRR/CCA into national and regional policy making. It provides an overview of why mainstreaming of DRR/CCA is being promoted by the international communi-

ty, and how regulatory frameworks are being used to ensure that DRR/CCA objectives are taken into account in various national and regional sectoral planning activities within a country.

Essay 6 considers the adaptive measures and institutional arrangements that countries and farmers can adopt to reduce the risk of disaster for agricultural systems as a result of drought. It focuses on measures proposed by the CATALYST Think Tank Members such as improved data and knowledge sharing and early warning systems; greater investment in education and extension work; improved policy frameworks; and a movement away from monocultures towards local, drought-resistant crops.

Essay 7 highlights the importance of paying special attention to urban disaster risk management. It explains why urban areas are hotspots of vulnerability as well as being potential catalysts for action. The essay concludes with a description of approaches for improving DRR in urban areas, and looks at international initiatives supporting this goal.

Essay 8 presents the CATALYST-Local Community of Practice, the follow up to the CATALYST project aimed at maintaining the CATALYST Think Tank by working together with Think Tank Members to tailor knowledge of best practices to the institutional, cultural and linguistic contexts of local rural and urban communities, large or small.

About the authors of the Essays

In the spirit of collaboration that has been a hallmark of the work of the CATALYST project, these essays have been contributed by the CATALYST partner organisations, and, in two cases, have been co-authored by Think Tank Members. The Think Tank members have contributed in different ways to the development of all CATALYST knowledge products.

About the other contents of this notebook

At the end of the notebook, an annotated bibliography of CATALYST knowledge products is presented, along with information on to how to obtain copies, as well as the most recent list of Think Tank Members and our thanks for their support, large and small, during the project.

In the next section, before beginning the essays, the Think Tank consultation process is briefly described, since the CATALYST Think Tank has been a key component of the process that has resulted in the development of this and other knowledge products. This section also includes the lessons learned from implementing such a process, which will be of use to those who would consider replicating the CATALYST approach in the future.

1 See the 2nd CATALYST Global Virtual Meeting minutes, in M. Hare, C. Van Bers. CATALYST Virtual Meeting Report (CATALYST Deliverable D4.4, 2013)

2 Ibid

A source for CATALYST knowledge products: the CATALYST Think Tank

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The Think Tank[3]

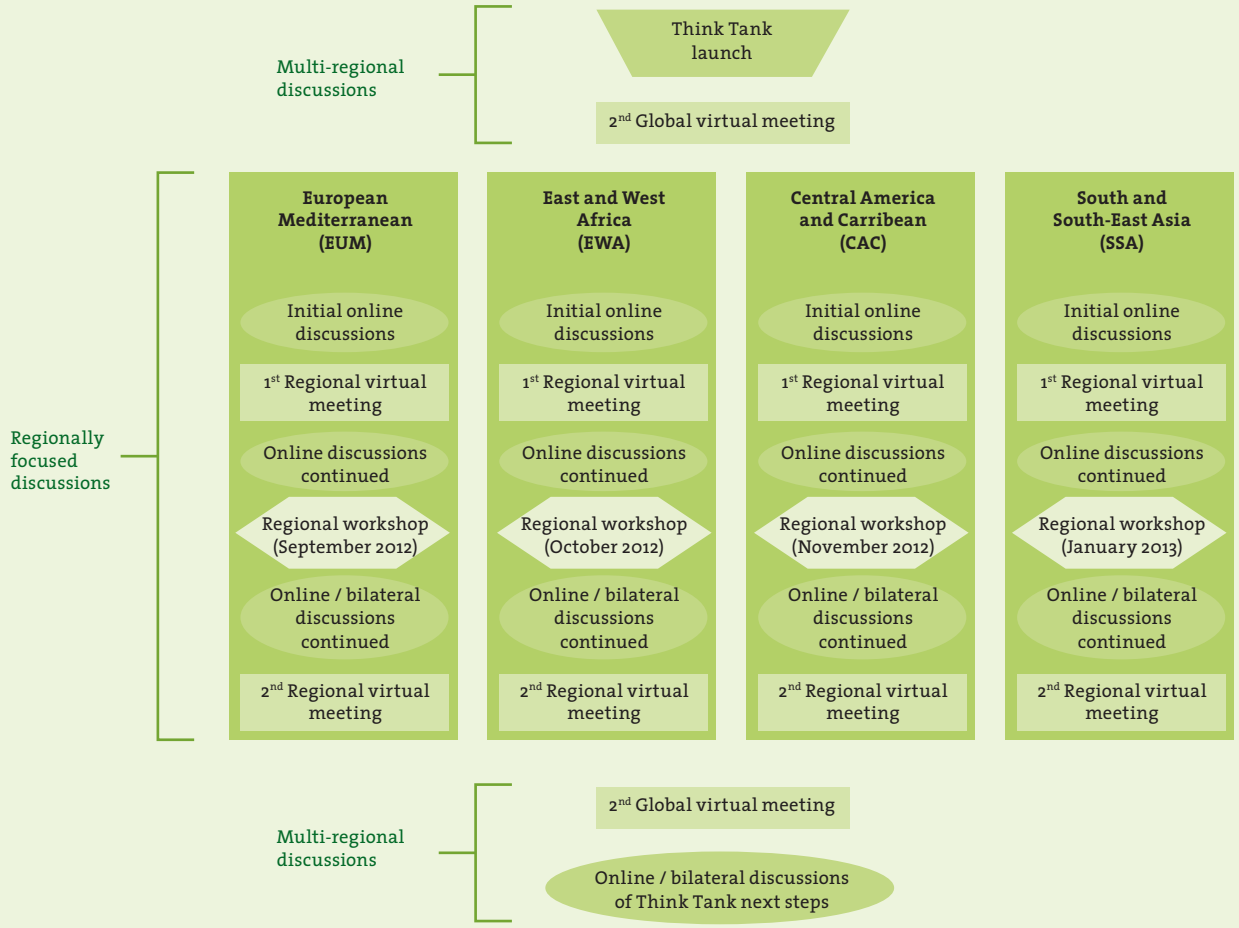
"CATALYST has surprised me in that the Think Tank has not been too lofty and has addressed the grassroots level, producing material of real use"[4]

It is important before presenting the essays that are highlighting key themes from the CATALYST project, to briefly review a major source of knowledge for this and other CATALYST knowledge products: The CATALYST Think Tank. It is indisputable that the added value of the CATALYST project has been its Think Tank, which is now composed of around 130 regional experts from the four CATALYST regions. These regional experts (so-called Think Tank Members) are from inter-governmental, governmental and non-governmental organisations, the scientific community and the private sector (see *Think Tank Member List* at end of this notebook). They have worked together with the CATALYST project partners to support the latter in developing the key knowledge products and, by doing so, ensure that the project's knowledge products are useful to their own work, and that of others in these regions. Additionally, many of the Think Tank Members are involved in capacity development, and it is through supporting their work that CATALYST can achieve a significant multiplier effect. The CATALYST Think Tank process has been overseen by the Stakeholder Advisory Board, a 6-strong group of 5 Think Tank Members from each region and the EU project officer.

The CATALYST Think Tank is global in extent but regional in implementation. It has not been the intention of the project to provide a "one-size-fits-all" set of knowledge products, nor to promote a Euro-centric view of what other regions of the world may need in terms of DRR and CCA capacity development; rather the intention has been to allow regional experts to define the needs and best practices of their own region – a process for the regions, by the regions. However, the Think Tank has also sought to catalyse inter-regional exchange of knowledge and ideas from all regions, for the benefit of each one. As a result, the Think Tank process – see Figure 1– has had both multi-regional (Think Tank members from all regions) and regional discussion processes (members work with their regional colleagues).

Whether regionally or multi-regionally, the Think Tank members in CATALYST were able to discuss issues with each other and the partners via:

FIGURE 1: SCHEMATIC OF THE THINK TANK PROCESS



- *Online discussions* – this took the form of asynchronous text-based messaging among members in anonline forum established on the project's extranet.
- *Regional and multi-regional virtual meetings* – facilitated meetings of 1-2 hours' duration, carried out online in a virtual meeting "room".
- *Regional workshops* - facilitated face to face meetings of members over 2-3 days.
- *Bilateral meetings/interviews* – meetings between one or more partners and one or more TTM, either online or at international conferences.

After interviews with selected TTM to begin to identify key issues within the four regions, the CATALYST Think Tank was launched by a virtual "kick-off" meeting of the multi-regional Think Tank, in Spring 2012, permitting members to exchange first experiences, and to clarify the goals of the project and their role in the Think Tank. The process then divided into four regional sub-processes for each of the project regions (see Figure 1). Each regional sub-process began with online discussions to confirm the key thematic issues of importance to the region and to identify initial perspectives on gaps in knowledge. In the European Mediterranean region, the key themes were flood, drought and earthquake risk management; in the Central America and the Caribbean, the emphasis was on ecosystems-based DRR/CCA, social vulnerability, and the follow-up to the Hyogo Framework for Action; in the South and South-east Asian region the key themes included floods, earthquake and tsunami risk management; in the East and West Africa region, the main thematic focus was on urban disaster risk reduction, including floods.

These discussions were swiftly followed by regional virtual meetings to permit the Think Tank members to discuss these thematic issues and therefore to prepare the thematic discussions to be held at the regional workshops. Prior to the regional workshops, two knowledge products were developed: a *report on issues, gaps and opportunities in the regions*, and a *report on capaci-*

ty development for disaster risk reduction and adaptation (see *Annotated Bibliography of CATALYST Knowledge Products* in this volume, for more information on these products). These reports were fed into regional worshops on best practices and knowledge gaps that took place between September 2012 and January 2013 in Italy, Ethiopia, Jamaica and Thailand.

Based on the results of these workshops, the regional processes concluded with a second set of regional virtual meetings and bilateral meetings at international conferences, such as the UNISDR Global Platform, the Asia Pacific Water Summit in Chiang-Mai, and the 5th Delft Symposium on Water Sector Capacity Development, in the Netherlands, to confirm the findings of the workshops and thereby support the development of i) the *CATALYST regional workshops reports*, ii) a *synthesis report on best practices, research gaps and recommendations for fostering capacity development in the regions*, and iii) a set of *best practice papers* focussed on each region.

The final part of the Think Tank process has involved a final multi-regional virtual meeting to present results, gain feedback from TTM, and discuss the follow up to CATALYST. In addition, interviews have taken place with selected members to gather their personal views on how policy should be adapted to support their sector's work in DRR/CCA, thus contributing to the *special report on stakeholder advice to policy makers*.

Lessons learned[5]

As can be expected from any collaborative project of this scale (i.e. international in scope and involving seven partners and dozens of stakeholders), many lessons have been learned that can benefit those planning similar projects in the future centred on the establishment of a multi-stakeholder Think Tank. These lessons are summarized below with the intention of providing insights for those undertaking similar stakeholder processes in the future.

Knowledge products are not the only valuable outputs of CATALYST

The membership of the CATALYST Think Tank rose from around 50, in March 2012, to 130 members by September 2013. This increase in membership is testament to the growing awareness among stakeholders of the value of joining the Think Tank. Membership numbers alone is not enough as an indicator of this, however, for members need to be active in order for a Think Tank to work. Something that has been particularly important to the success of CATALYST is the fact that TTM have continued to collaborate with the CATALYST partners, up until the end of the project, in the development of knowledge products, by providing feedback on them, as well as providing text and further background information, and even going so far as to co-author essays contained in this notebook. One could say CATALYST has provided a learning alliance or community of practice among regional and global TTMs and the CATALYST partner organisations and researchers. As one TTM put it, the project has enabled her to meet professionals in her own region involved in DRR/CCA that she did not know about, and that, together with the knowledge products, will enable her and her (new) colleagues to make a positive impact on their region[6]. In any case, an enduring output of the CATALYST project is the network of professionals that has been created; professionals who want the CATALYST Think Tank to continue.

Each tool for communication and exchange has a different role to play

Although virtual meetings between Think Tank Members (TTM) were not so effective for eliciting expansive knowledge, they were irreplaceable as a means of maintaining stakeholder interest in the Think Tank and for keeping up information exchange, during phases in which there were no workshops. In the CATALYST project, it was found that online discussions could not, as originally intended, play this role that was finally taken up by virtual meetings, and went largely unused by the TTM shortly after launch. Such discussions were replaced by the convening of more virtual meetings with the TTM. An online discussion forum needs both ongoing facilitation and a great deal of stakeholder motivation in order to be maintained. The CATALYST TTM were all volunteers working on their own time, and simultaneously, very busy in the professional work. This precluded the maintenance of such a forum. More research is needed on the conditions for a successful online discussion forum. In the final virtual meeting of the CATALYST Think Tank, a TTM suggested that moving away from a website-based forum to an email-based one, or one with instant social media messaging to alert TTM of new discussion threads and inputs, might have improved the use of the forum[7].

Finally, it is very important to make use of interviews and bilateral meetings with TTM, in order to get in-depth information and expertise from stakeholders, that are not able to be elicited from workshops or vir-

tual meetings. The amount of rich information that one can elicit from interviews is demonstrated in the Special Report on Stakeholder Advice to Policy Makers[8].

There is no replacement for meeting in person

Whilst there is a temptation to rely on virtual communication for developing and maintaining networks, there can be no substitute for creating opportunities for allowing network members to meet in person, e.g. through workshops. Such meetings create trust, mutual bonds, and support the sharing of knowledge. As a means of eliciting substantive information from groups, they are second to none. The CATALYST project organised just one workshop per region, at the midpoint of the project, whilst making use of virtual meetings, online discussions, bilateral talks, and other events to create and maintain the Think Tank. In future projects, those involved in this project recommend that an additional workshop is organised in each region at the beginning of the project in order to get to know the stakeholders better and to create bonds and trust between the members at an earlier stage.

Multi-regional virtual meetings are a great idea, but hard to implement

It is difficult to organise a common time for a virtual meeting that includes stakeholders from Central America, Europe, Africa and Asia. The different time zones do not permit it. For CATALYST, it was therefore best to organise virtual meetings regionally.

More time for stakeholder analysis

The project devoted two of its 24 months to stakeholder analysis, to identify potential stakeholders and understand their needs, before selecting them to join the Think Tank. Given the central role that stakeholders have had in this type of project, this phase of the project has to be longer in order to build up even stronger network of stakeholders and to better understand their potential needs and requirements. Additionally, CATALYST should have made use of conference visits early on in the project (rather than at the end, as was the case) to support stakeholder analysis.

Making use of non-research related EU connections to acquire TTM

To support stakeholder analysis and the recruitment of TTM, CATALYST would have benefited from obtaining more contacts via the various EU delegations (E.g. the African Union) and directorates outside research such as the European Directorate General for Humanitarian Aid (DG-ECHO). Finally, to be able to "open doors" to certain large stakeholder organisations, CATALYST would have needed a stronger EU-backed identity, that went beyond just being an EU project.

Starting locally and working up to the regions

It has been an issue since the beginning of the project, as mentioned by TTM and project partners, that working at the regional level[9] was not going to provide knowledge products of immediate use at the local level[10]. If replanning this project, with the goal of providing regional exchange of best practices, then CATALYST would probably start at the national level, by first working with experts from one country, gathering the state of the art and best practices there, and then selecting and working in another. Once enough country-level insights could be collected, then regional exchange and synthesis could begin.

The TTM cannot be considered to be fully representative of all practitioners, but this is not a problem

Whilst members of other networks (e.g. UNISDR national platforms) are paid for their work, there were no funds available to pay TTM for their collaboration in the project. Hence, CATALYST relied on goodwill and volunteerism to build up and maintain active membership. This had two effects: first of all, it meant that the project had to keep generating results or carrying out activities that were of benefit to the TTM to prevent them from leaving the network. The fact that our membership kept rising through the project, and that some members joined in multiple activities, were a sign in this case, that we were doing something right. Secondly, voluntary membership means that members are self-selecting and not necessarily representative of the entire practitioner community. This fact, however, does not negate the views and expertise of the TTM practitioners. The general results of the project need simply to be qualified in these terms.

Defining best practices

Since CATALYST is not a research project, it was never in the position to carry out a formal analysis of practices to determine which were "best" and which were not. Instead, it based its selections on the opinions of TTM, who themselves may or may not have carried out a formal analysis to decide what they considered to be a best practice. As such the project can be seen not as a replacement for work done by organisations such as UNISDR on analytically identifying best practices

through their formal network nodes, but as another perspective on the issue, from a group of practitioners.

In fact, bearing in mind the paucity of approaches for and applications of post-implementation evaluation tools for capacity development activities in DRR/CCA, it is probably safe to assume no formal analysis was carried out by the TTM. Nevertheless, much more work at the beginning of the project should have been carried out to agree and define basic qualitative metrics for identifying a "best practice" in particular regions. This would have saved a time lost in the middle and latter phases of the project due to different approaches to the issue in the four regions.

3 The subsection "The Think Tank" is an extended and updated version of the Think Tank description in M.Hare, C. van Bers, P. van der Keur, H. J. Henriksen, J. Luther, C. Kuhlicke, F. Jaspers, C. Terwisscha van Scheltinga, J. Mysiak, E. Calliari, K. Warner, H. Daniel, J. Coppola, P. F. McGrath. Brief Communication: CATALYST – a multi-stakeholder Think Tank for fostering capacity development in disaster risk reduction and climate change adaptation. *Nat. Hazards Earth Syst. Sci. Discuss.* 1, 3919-3934 (2013)

4 A quote from the contribution of Hans-Jakob Hausmann in M. Hare, Ed., Special report on stakeholder advice to policy makers (CATALYST Deliverable D4.4, 2013)

5 This subsection is based on the CATALYST partner meeting discussion on the same topic (10/09/13) involving, Caroline van Bers, Hans Jorgen Henriksen, Elisa Calliari, Jochen Luther, Peter van der Keur, Daniel Schweigatz, Fons Jaspers, Cristina Serra, Humaira Daniel, Matt Hare, and Caroline van Bers.

6 See the 2nd CATALYST Global Virtual Meeting minutes, in M. Hare, C. Van Bers. op cit.

7 Ibid

8 M. Hare, op cit.

9 In the CATALYST context, "regional" refers to regions of the world

10 See M. Hare, *Localising CATALYST*. (in this volume)

1.

Renewed international commitment for Disaster Risk Reduction

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Global social and environmental changes, which include but are not limited to population growth and aging[11], rising urban population[12], increasing social and economic disparities[13], depletion of natural resources[14], loss of biodiversity and deterioration of environmental quality, and global climate change are amplifying human and environmental vulnerability to natural hazards and are generating new vulnerabilities[15]. In a globalised world, the spill-over effects of hazard exposure and vulnerability are unavoidable and necessitate a determined commitment to an international response. While the Hyogo Framework for Action (HFA) is drawing to an end[16], having spurred some progress but unable to stop the rising trend of disaster losses and associated hardship, a renewed commitment is needed to drive international efforts in disaster risk reduction.

Why coordinated international efforts are needed

Natural hazards do not respect political, administrative, racial, cultural and other socially constructed boundaries. Hazards generated in one location (may) have sizeable direct and/or indirect effects in other locations[17], and effective prevention of disasters may require cooperation with so-called "upstream" countries. The increasing freedom of movement of people, goods, services and business make it insufficient to protect citizens or markets only at home[18]. The recent economic, financial and social crises have demonstrated how quickly local crises and shocks may become an international matter. The protection of valuable pristine ecosystems[19], planetary boundaries[20], biodiversity hotspots and world heritage sites[21] have enormous collective environmental and ultimately social benefits and warrant international care.

Early international action

In 1989, the UN General Assembly proclaimed the 1990s as the *International Decade for Natural Disaster Reduction*, making a shift away from a reactive emergency and relief approach to proactive prevention and mitigation of and preparedness for disasters.

In 1994, the "Yokohama Strategy and Plan for Action for a Safer Word", endorsed at the *First World Conference on Natural Disaster Reduction*, acknowledged *social liability*[22] of rising risk and vulnerability.

The *International Strategy for Disaster Reduction* (ISDR) was adopted in 1999 to give continuity to the efforts of the United Nations system to develop disaster-resilient communities.

In 2004, the UN General Assembly convened the *Second World Conference on Natural Disaster Reduction*, to track the progress made since Yokohama and define the subsequent steps for the years 2005 to 2015. Held in Kobe, the Conference led to the adoption of the Hyogo Framework for Action 2005-2015 (HFA) *Building the Resilience of Nations and Communities to Disasters*. Signed by 168 countries, it is the first internationally accepted framework for DRR, although it is not legally binding.

The HYOGO Framework for Action (HFA)

The HFA called for a *substantial* reduction in disaster losses in terms of human lives and social, economic and environmental damage. This objective was to become a guiding principle for governments, civil society, international financial institutions and the private sector, in the joint effort to build disaster resilience.

The HFA specified five Priorities for Action (PFA): 1) Ensuring that disaster risk reduction (DRR) is a national and a local priority with a strong institutional basis for implementation; 2) Identifying, assessing and monitoring disaster risks and enhancing early warning; 3) Using knowledge, innovation and education to build a culture of safety and resilience at all levels; 4) Reducing the underlying risk factors; 5) Strengthening disaster preparedness for effective response at all levels.

The framework also emphasized the need to monitor and review the progress in DRR at the national, subnational and regional levels. Responsibility for monitoring is assigned mainly to governments, but it is also identified as a responsibility for regional organizations and institutions, international organizations and partners of UNISDR.

As highlighted by its Mid-Term Review 2010-2011[23], the HFA prompted considerable progress towards a more proactive and holistic approach to DRR. Nonetheless, achievements are patchy across regions and unevenly distributed among the five priorities for action. The main achievements refer to the PFA1 and PFA5, indicating improvements at the institutional level and increased capacity in strengthening preparedness and response. Limited progress is reported in tackling the underlying causes of risk (PFA4), and in general integrating DRR in sustainable development policies and planning as well as in implementing the framework at the local level, with a special focus on the most vulnerable sectors of society.

Towards a renewed international commitment beyond 2015 (HFA2)

With the HFA coming to an end in 2015, the *Third World Conference on Disaster Risk Reduction* will be held in March 2015 in Sendai, Japan. The *new global blueprint for DRR* (HFA2) will have to be closely coordinated with international action in the field of climate change, in particular adaptation to *unavoidable* climate change (CCA), and with the renewed commitment to the eradication of poverty and the promotion of sustainable development.

During the Rio+20 Conference held last year, UN Member States agreed to develop a set of Sustainable

Development Goals (SDG), to be positioned at the heart of the new post-2015 global development agenda[24].

As stressed by the high-level panel convened by Secretary-General Ban Ki-moon, the SDG should build on the success of the Millennium Development Goals (MDG) but also have the potential to exceed these goals. In particular, the new targets should focus more on the poorest and more excluded populations, as well as focus on the effects of conflicts and violence on development, on the need to promote good governance and to explicitly integrate the social, economic and environmental pillars of sustainable development.[25]

The issues the SDG will have to address include the challenges posed to the HFA2. This makes it even more clear how disaster risk reduction intersects all the dimensions of sustainable development and the importance of its explicit inclusion in the future sustainable development agenda.

The consultations process promoted by the UNISDR on the HFA2 emphasised the need for it to embrace a *more inclusive* approach, capable of strengthening the role of women, youth and people with disabilities; a more effective interplay of science, policy and practice in support of DRR; an enhanced focus on local government and community organizations that are on the frontline of building resilience; and the opportunity to better reflect on the role of private sector engagement[26]. Although these issues had been already captured by the HFA, their actual implementation has been weak.

The HFA2 should revise its monitoring system, now based on processes like the establishment of National Platforms, and introduce easily measurable outcomes.[27] Setting precise targets is essential for enhancing accountability and advancing the implementation of the HFA2.

A key challenge for HFA2 will be the integration of climate change issues, thus recognizing the common goals of DRR and CCA in reducing the vulnerability of communities and achieving sustainable development. The various financial mechanisms supporting both CCA and DRR must be managed in a coordinated way.

The funds established under the United Nations Framework Convention on Climate Change (UNFCCC), like the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), as well as the Adaptation Fund under the Kyoto Protocol, are already financing some DRR activities, for example in the field of flood risk management and coastal protection. Nevertheless, similar mechanisms under the current HFA are missing, as the framework does not foresee any type of financial transfer among signatories to support DRR initiatives. Adding complexity to this picture, is the fact that the MDGs – the attainment of which is essential for reducing vulnerability both to climate change and natural hazards-are financed through other sources, mainly in the form of Official Development Assistance (ODA).

Source: Shutterstock

Therefore, a challenge for the post-2015 development agenda will be to enhance coherence, if not to combine all of these different funding instruments, so as to streamline their common goals towards sustainable development.

The CATALYST consultations

The CATALYST Think Tank consultation, carried out between March 2012 and September 2013, provided valuable insights and important considerations on what the HFA2 should include.

Bottom-up disaster preparedness

The local communities are on the front line of disasters, and are most in need of resilience enhancement. Yet, community-based DRR is still more of a buzzword than a reality. In member countries, the HFA has rarely been implemented from the bottom up, or has prompted sub-

stantial empowerment of local citizens. More emphasis has to be placed on marginalised segments of society, including people at risk of social exclusion and poverty, the under-educated, and people with disabilities or chronic diseases.

Capacity development

The HFA highlights the importance of education in promoting and enabling DRR, and calls for school curricula, educat ion material and training to include disaster risk reduction and recovery concepts and practices. Nevertheless, this has been only partially achieved, as a result of the underestimation of the importance of capacity development. Indeed, the awareness and funds for this are usually raised after a disaster strikes and then tend to decrease over time. Capacity development activities for DRR should therefore be institutionalized, and courses incorporated in existing educational programmes.

Recognizing the role of indigenous knowledge

The CATALYST consultation has called for the further integration of scientific and indigenous or local knowledge. Local knowledge is fundamental to recording and compiling knowledge of small recurring disaster events which, although not of national consequence, may severely affect the community and result in destruction and loss of lives. The implementation of risk reduction strategies would also benefit from this local knowledge, as interventions incorporating traditional or indigenous knowledge are more likely to be accepted and perceived as reliable.[28]*Protection of healthy ecosystems as a cornerstone of DRR strategies*: The project consultations have stressed that disaster risk reduction interventions tend to focus on reducing the social and economic causes of vulnerability, while the environmental dimension of vulnerability lags behind. Protecting the natural functioning of ecosystems can provide multiple benefits in strengthening the resilience of communities. Healthy ecosystems can both function as a natural buffer against common hazards and help tackle the root causes of the socio-economic vulnerability of communities, by strengthening their livelihoods through the provision of goods and services. Consideration for their role in DRR/CCA could encourage a more holistic approach, promoting socially, economically and environmentally resilient communities.

To sum up, the new global blueprint for DRR (HFA2) will need to put the local level at the heart of its strategy. This means making the most excluded and marginalised social groups a priority; empowering local communities; assessing community resources and capacities for adaptation, and facilitating their use of such capacities; engaging the private sector and making business more risk-sensitive. Moreover, the HFA2 will need to adopt a holistic approach towards the strengthening of resilience, better integrating the social, economic and, in particular, the environmental pillars that support risk reduction and adaptation. This point emerged very clearly during the CATALYST consultations, especially with regard to the need to further recognize the role played by ecosystem services for DRR.

In 2015, not only the HFA but also the MDGs and the Kyoto Protocol on Climate Change will be succeeded with new agreements and commitments. This shift provides a unique opportunity to enhance synergy and coherence as well as recognizing the mutually supportive objectives of such international instruments.

11 *Population Matters for Sustainable Development* (UNFPA, New York, 2012)

12 B. Cohen, *Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability*. Technology in Society 28, 63-80 (2006)

13 A. G. Berg and J. D. Ostry, *Inequality and Unsustainable Growth: Two Sides of the Same Coin?* (IMF staff discussion note, International Monetary Fund, Washington, 2011)

14 *Global Environment Outlook 5* (UNEP, Nairobi, 2012)

15 *Climate Change: Impacts, vulnerabilities and adaptation in developing countries* (UNFCCC, Bonn, 2007)

16 UNISDR HFA2 Consultations by Region: 2012 to 2015, Towards a new post-2015 framework for Disaster Risk Reduction http://www.preventionweb.net/posthfa/

17 Communication from the Commission to the Council and the European Parliament EU Strategy for Supporting Disaster Risk Reduction in Developing Countries, COM(2009) 84 final

18 L. Ye and A. Masato,. *The impacts of natural disasters on global supply chains*. ARTNeT Working Paper 115, ESCAP, Bangkok, 2012. Available from www.artnetontrade.org.

19 Anton D.K. and Shelton D.L., *Environmental Protection and human rights* (Cambridge University Press, New York, 2011)

20 J. Rockström et al., *A safe operating space for humanity*, NATURE 461, 472-475 (2009)

21 *Vision and Strategic Action Plan for the Implementation of the World Heritage Convention 2012-2022* (UNESCO, 18th General Assembly of States Parties, 2011)

22 The *Yokohama Strategy* specifically called for a shift from a techno-centric approach to the inclusion of socio-economic considerations in effective disaster prevention, recognizing them as important factors that drive vulnerability.

23 *Hyogo Framework for Action 2005-2015 mid-term review* (United Nations International Strategy for Disaster Reduction, Geneva, 2011)

24 A/RES/66/288

25 United Nations, *A new global partnership: eradicate poverty and transform economies through sustainable development* (United Nations Publications, New York, 2013; http://www.post2015hlp.org/wp-content/uploads/2013/05/UN-Report.pdf)

26 UNISDR, *Synthesis Report: Consultations on a Post-2015 Framework on Disaster Risk Reduction (HFA2)*. UNISDR, Geneva, 2013; http://www.preventionweb.net/files/ 32535_hfasynthesisreportfinal.pdf)

27 Oxfam International, *The post Hyogo Framework: What's next for disaster risk reduction?* (Oxfam GB, Oxford, 2013; http://www.preventionweb.net/files/30769_oxfamonhfa2jan2013.pdf)

28 R. Shaw et al., *Indigenous knowledge and disaster risk reduction: from practice to policy* (NOVA, Hauppauge, NY, 2009)

2.

Ecosystems-based Disaster Risk Reduction

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The preservation of ecosystem integrity and biodiversity stands out as a cross-domain policy goal, contributing directly or indirectly to poverty reduction and sustainable livelihood, disaster risk reduction, climate change mitigation and adaptation. The international efforts to stop degradation of ecosystems and the services they provide to humankind have been driven by the Rio Conventions[29], especially the Convention on Biological Diversity (CBD). The CBD did not meet its 2010 target aimed at a significant reduction of biodiversity losses. Arguably, the 2020 goals are even more aspirational but specific enough and measurable. The post 2015 development agenda and the renewed international commitment to disaster risk reduction (DRR) will have to build upon and secure fulfilment of these targets.

Importance and value of ecosystem services

Ecosystems[30] are constituting components of the natural and semi-natural environment, and a source of vital services, benefits and goods to humankind[31]. *Ecosystem services* (ES) – *provisioning, cultural, supporting* and *regulating*[32] - embody the '*benefits people obtain from ecosystems*'[33] that are eventually translated into valuable goods.

The regulatory services include *natural hazard* mitigation. For example, coastal wetlands increase energy dissipation of storm surges, dampen wind-driven surface waves, modify wind fields, and help to protect people and physical assets in the hinterlands[34]. The economic value of the regulatory services they provide reaches up to Int.$30,000 per hectare per year in the case of coral reefs or Int.$130,000 per hectare per year in the case of mangrove forests[35].

Other *regulatory* and *provisioning* services contribute effectively to tackling the drivers of social and economic vulnerability to natural hazards. In addition, preservation and/or restoration of vital ecosystem services are often a more cost-effective way of dealing with climate extremes than '*hard infrastructure engineering solution*'[36].

ES have an economic value but no price. The failure to account for their true social value leads to market distortion and, ultimately, an insufficient level of protection with lasting, in some cases irreversible, damage.

Globally, the annual loss from land-based ecosystems alone has been estimated to 50 billion Euro[37].

State of the ecosystems' health and future prospects

The global and regional assessment studies have meticulously documented the decline of ecosystem integrity and health. The *Millennium Ecosystem Assessment* (MEA)[38] illustrated evidence of an unprecedented speed of human-induced ecosystem changes, with '*substantial and largely irreversible loss in the diversity*'. Some 60 per cent (15 out of 24) of the ecosystem services examined were found to be degraded or used unsustainably. The degradation of ES is disproportionately felt by the poor, and is in some cases a principal cause of poverty.

The 2010 Global Forest Resources Assessment[39] (GFRA) estimated the net loss in forest area over the 2000s to be 5.2 million hectares per year, down from 8.3 million hectares per year during the 1990s. Globally, carbon storage of forest biomass decreased by 0.5 gigatonnes over the period 2005–2010. On the positive side, legally established protected areas cover an estimated 13 percent of the world's forests.

GEO5[40] found that the rate of exploitation of global groundwater stocks more than doubled between 1960 and 2000. Land conversion and degradation is a main cause of the up to 20 per cent of natural habit losses. Two thirds of the world's coral reefs are categorised as threatened[41].

For a baseline scenario, the OECD[42] projected a further loss of terrestrial biodiversity (10 per cent); mature, biodiversity-rich forests (13 per cent) by 2050. IPCC indicates climate change as the fastest growing driver of biodiversity loss[43].

International action to protect biodiversity and ecosystem services

Back in 1993, the *Convention on Biological Diversity* (CBD), one of the three Rio Conventions[1], had recognised the crucial role biological resources play for economic and social development, and adopted three objectives: *conservation of biological diversity, sustainable use of its components*, and a *fair and equitable sharing of benefits arising from genetic resources*[44]. In 2002, the Parties committed to a '*significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth*'. This target, incorporated also into the Millennium Development Goals (MDG), had not been achieved by 2010.

To keep the momentum, the Tenth Session of the Conference of Parties (COP10) launched the *Strategic Plan for Biodiversity* 2011-2020, embracing a set of 20 bold and measurable targets: the *Aichi Biodiversity Targets*[45]. The targets are comprised in five Strategic Goals[46], which aim, among other things, at halving the rate of natural habitat losses, conserving 17 per cent of terrestrial areas and 10 per cent of marine and coastal areas, and restoring at least 15 per cent of degraded ecosystems. To bolster the commitments, the decade 2011-2020 was declared the UN *Decade on Biodiversity*[47].

The *Aichi* targets are to be translated to national and regional commitments. The 2011 proposal of the European Commission includes six major *biodiversity targets* and 20 actions, building upon the efforts initiated by EU Birds and Habitats Directives, Marine Strategy

Framework Directive and Water Framework Directive, to mention but a few. The targets constitute the pillars of the *EU 2020 Biodiversity Strategy*, set to protect, value and restore EU biodiversity and ecosystem services[48].

Consistent with these international efforts, a new intergovernmental platform was established in 2012 - the *Intergovernmental Platform on Biodiversity and Ecosystem Services* (IPBES) - with the aim of assessing the state of the planet's biodiversity, its ecosystems and the services they provide to society[49].

Ecosystem services, Disaster Risk Reduction and Development

Environmental sustainability is one of the key elements of the Hyogo Framework for Action (HFA). The Priority 4 encourages "*sustainable use and management of ecosystems, including improved land use planning and development activities to reduce risk and vulnerabilities*" and calls for "*integrated environmental and natural resource management approaches that incorporate disaster risk reduction, including structural and non-structural measures, such as integrated flood management and appropriate management of fragile ecosystems*." Progress in this priority is reported to have been limited[50].

The Millennium Development Goals (MDG) recognize the role of ecosystem services for human wellbeing and call for preserving and restoring environmental integrity (MDG7)[51]. The CBD goal of significant reduction of biodiversity losses was included as a target. However, modest improvements have been registered in meeting these objectives, with the notable exception of guaranteeing safe drinking water. These threats to the availability of ecosystem goods and services pose serious challenges to the achievements of all the MDGs. Tackling environmental challenges will also be pivotal for implementing the future SDG, as emphasised by the High-Level Panel of Eminent Persons on the post-2015 development agenda. However, no precise targets and indicators have been proposed to this aim so far.

The link between poverty eradication and preservation of ecosystem services has been also recently recognized by the *Dehradun Recommendations,* elaborated in 2011 by the CBD's Expert Group on Biodiversity for Poverty Eradication and Development. The recommendations emphasise the need to integrate poverty and development concerns into the *National Biodiversity Strategies and Action Plans* (NBSAPs) and to integrate biodiversity and ecosystem services into national accounting systems and development plans.

The *International Strategy for Disaster Reduction - Partnership for Environment and Disaster Risk Reduction* (PEDRR) was formed to promote an integrated approach to disaster risk reduction, climate change adaptation, ecosystem management and livelihoods[52].

CATALYST Consultation

The CATALYST conducted expert consultation has revealed the high level of appreciation of the role of ES for sustainable livelihood and disaster risk reduction, but also the rather low permeation of the underlying attitudes into public and private decision making. All but a few examples described below are isolated '*lighthouses*' rather than common practices. The principles of *community-based natural* common-pool *resource management* (CBNRM) overlaps to a large extent with the *community-based disaster risk reduction* (CBDRR), especially when it refers to empowering local communities and building bottom-up governance structures.

Shielded crop cultivation

The traditional knowledge and farming practices of the Guarita village in Honduras proved essential for disaster resilience. Back in 1996 when hurricane Mitch made landfall, massive crop losses were avoided by using *quezunga*, a traditional farming method that consists of cultivating crops under old trees. This method conserves soil and forests which would have otherwise given way to agricultural fields[53].

Protection and livelihood in the context of small island developing states

Among the main objectives of the "*Climate Change adaptation and disaster risk reduction*" project in Jamaica[54] was to increase the resilience of coastal ecosystems to climate change impacts through the restoration of mangrove forests and sea grass beds and a better management of selected marine protected areas (MPAs). Drawing on an amended understanding of the economic value of services provided by coastal ecosystems, alternative livelihood options were promoted in selected communities.

Forest preservation

The ProParque project[55] in Honduras has effectively linked nature conservation efforts with tourism-based rural development opportunities tourism and disaster

risk reduction. Through a close collaboration with national authorities, the project assists in establishing and implementing *climate change mitigation policy* and strengthening the ability of vulnerable populations to adapt to climate change.

Cooperation

The *Ecosystem and Livelihoods Adaptation Network* (ELAN)[56] is a global partnership promoting an integrated ecosystem approach to climate change adaptation and disaster risk reduction, aimed at improving the resilience and livelihoods of the local communities. ELAN fosters sharing of science, knowledge and good practices, and capacity development. ELAN's activities are especially targeting countries in *East* and *Southern Africa*, *Mekong Delta*, and *Andes*.

Similarly, *Partners for Resilience Alliance* (PR5), an initiative of five international NGOs, is implementing a large resilience-enhancing development aid programme, *Climate-Proof Disaster Risk Reduction*. The programme sets to strengthen community resilience and civil society and foster a policy dialogue and advocacy for stronger disaster risk reduction and climate change adaptation. The programme aims at reducing the impact of natural hazards on the livelihoods of 750,000 to 1,000,000 vulnerable community members[57].

29 The three Rio Convention, resulting from the 1992 *Earth Summit*, were adopted to contribute to the sustainable development goals of Agenda 21. They include: the UN Convention on Biological Diversity (UNCBD), the UN Convention to Combat Desertification (UNCCD), and the UN Framework Convention on Climate Change (UNFCCC).

30 An ecosystem '*is a dynamic complex of plant, animal, and microorganism communities and the non-living environment interacting as a functional unit'.* [The Millennium Ecosystem Assessment. *Ecosystems and Human Well-being: Synthesis* (Island Press, Washington, DC, 2005)]

31 UK National Ecosystem Assessment, *Understanding nature's value to society: a synthesis report on key findings (*UNEP-WCMC, Cambridge, 2011)

32 *Provisioning services* include food, water, timber, and fiber; *regulating services* affect climate, floods, disease, wastes, and water quality; *cultural services* provide recreational, aesthetic, and spiritual benefits; and *supporting services* encompass soil formation, photosynthesis, and nutrient cycling. (The Millennium Ecosystem Assessment, see note 2)

33 *Ibidem*

34 *Ibidem*

35 D. Russi et al., *The Economics of Ecosystems and Biodiversity for Water and Wetlands* (IEEP, London and Brussels; Ramsar Secretariat, Gland, 2013)

36 IPCC, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, UK, and New York, NY, USA, 2012)

37 *The Cost of Policy Inaction: The case of not meeting the 2010 biodiversity target*, study conducted for the European Commission, DG Environment under contract: ENV.G.1/ETU/2007/0044.

38 The Millennium Ecosystem Assessment. Ecosystems and Human Well-being: Synthesis (Island Press, Washington, DC, 2005)

39 Food and Agriculture Organization of the United Nations, *Global Forest Resources Assessment 2010: Main report*. (FAO Forestry Paper 163, Rome, 2010)

40 *Global Environmental Outlook (GEO-5): Summary for Policy Makers* (UNEP, Nairobi, 2012)

41 *Reefs at Risk Revisited* (World Resources Institute, Washington DC, 2011)

42 K. Karousakis et al., Biodiversity", in OECD Environmental Outlook to 2050: The Consequences of Inaction (OECD Publishing, Paris, 2012)

43 IPCC, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (Cambridge University Press, Cambridge, UK, and New York, NY, USA, 2012)

44 Article 1 of the UN Convention on Biological Diversity (A/RES/64/203)

45 COP 10 Decision X/2: Strategic Plan for Biodiversity 2011-2020. Available at: http://www.cbd.int/decision/cop/?id=12268

46 The strategic goals are: A) address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society; B) reduce the direct pressures on biodiversity and promote sustainable use; C) improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity; D) Enhance the benefits to all from biodiversity and ecosystem services; E) enhance implementation through participatory planning, knowledge management and capacity building.

47 A/RES/65/161

48 *Our life insurance, our natural capital: an EU biodiversity strategy to 2020.* COM (2011) 244 final

49 http://www.ipbes.net/

50 See *Renewed International Commitment for Disaster Risk Reduction*. Calliari and Mysiak (in this volume)

51 In particular, MDG 7 requests to reverse the loss of environmental resources and biodiversity, halve the population without safe drinking water and sanitation, and improve the lives of slum dwellers.

52 http://www.pedrr.net/

53 K. Galloway-McLean, Advance Guard. *Climate Change Impacts, Adaptation, Mitigation and Indigenous Peoples. A Compendium of Case Studies*. (United Nations University - Institute of Advanced Studies Traditional Knowledge Initiative, Darwin, Australia, 2009).

54 http://www.gcca.eu/2010national-programmes/caribbean/gcca-jamaica

55 http://en.usaid-proparque.org/

56 http://elanadapt.net/

57 http://redcrosseth.org/cp_disaster_prepardness_climate.php

3.

Dwindling land: Small Island Developing States

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Small Island Developing States (SIDS) are 'undersized' in terms of land mass, population, and economic weight, but 'oversized' with respect to endemic biodiversity and indigenous bio-cultural heritage. The insularity and remoteness present sizeable constraints to international trade, economic integration, and development. In addition, SIDS are disproportionately exposed to natural hazard risk and emerging environmental issues, many of which are initiated or exacerbated by human-induced climate change. The international community has recognised the handicaps that the developing island states have to cope with and have agreed to deliver assistance but to-date international development aid has remained well below the amount pledged. The post 2015 disaster risk reduction, development and environmental agenda will (have to) include a firm and tangible commitment to assist the SIDS in their quest to pursue sustainable development paths.

About islands and island-ness

The Earth hosts nearly 200,000 islands. Less than 200 of them are home to a population greater than 100,000 (approximately 700 million residents or 11 per cent of the global population). Some of the most *populated* and/or *densely populated* islands include territories of developed (OECD) countries (e.g. *Hon-shū*, Japan; *Great Britain*, UK, *Manhattan*, US, *Île Saint-Louis*/France) but a substantial portion of the other islands are struggling to maintain the pace of their development.

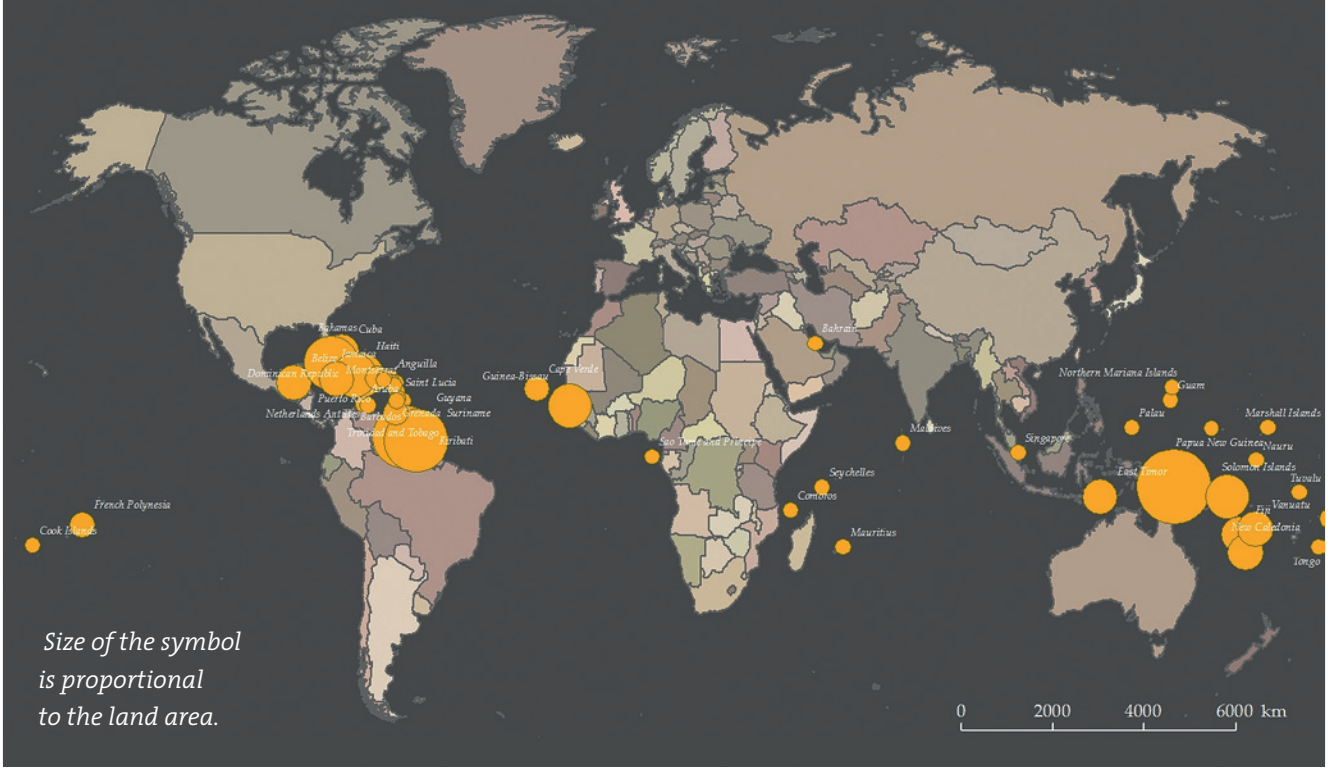
Small Island Developing States (SIDS) comprise 52 island states or territories, of which 43 are members of the United Nations General Assembly (see Figure 2). Nine among them belong to the *least developed countries* (LDC)[58], three to *low-income* (LI)[59] and fourteen to *high income* (HI) economies[60]. Together, SIDS embody less than one percent of Earth's land surface, world's population, and global GDP. Nonetheless, SIDS host a considerable portion of Earth's endemic biodiversity, and indigenous bio-cultural heritage.

SIDS are characterised by unique environmental, economic and social features that makes them vulnerable to natural hazards, external economic shocks, and climate change. These include:

- *small size and endowment with natural resources*; high intensity of land use and concentration of industrial assets, critical infrastructure and urban areas in low laying coastal zones (LCZ) prone to elevated risk;
- *insularity and remoteness* implying sizeable costs for international trade, dependence on few commodities as sources of foreign exchange earnings, small internal market, low economic diversification, barriers to innovation and technology transfer, low investment in research and technology with subsequent impacts on employment and economic growth, dependency on fossil fuel imports;
- *limited capacity* to cope with natural hazards and adapt to the likely impact of climate change, weak institutional capacity and environment, under-developed skills and know-how to deploy and service new technologies, and limited domestic financial resources;

> No man is an island, entire of itself; every man is a piece of the continent, a part of the main; if a clod be washed away by the sea, the world is the less, as well as if a promontory were, as well as if a manor of thy friends or of thine own were; any man's death diminishes me, because I am involved in mankind; and therefore never send to know for whom the bell tolls; it tolls for thee.
>
> *John Donne (1572-1631)*

FIGURE 2: GEOGRAPHIC LOCATION OF SIDS



Size of the symbol is proportional to the land area.

The devastating effects of natural hazards (notably extreme meteorological and climate events) can be seen in the example of Haiti. In 2004 the country faced a particularly harsh hurricane season, with torrential rains causing 1,660 deaths in May[61] and additional 3,000 when Hurricane Jeanne stroke in September causing extensive flooding[62]. Haiti's vulnerability is the result of over-exploitation of natural resources, political instability, failure of policies and social reforms and fledging civil protection system. All these factors undermine its capacity to prepare for and respond to natural hazards, as well as its capacity to develop strong risk reduction measures.

The emerging and SIDS-context specific challenges[63], including human induced climate change, may undo more than anywhere else the decades-long development efforts. Sea level rise will exacerbate coastal flood risk, increase erosion and saltwater intrusion, further straining the level of water security which is already challenged by altered patterns of precipitation and water availability. Increased sea surface temperature (SST) and ocean acidification will amplify coral bleaching, threatening the viability of commercial and subsistence fisheries, and the provision of vital ecosystem services including coastal defence.

More than anywhere else, climate change in the SIDS context will have (has) a discernible effect on environmental migration[64] and this effect may become more pronounced in the future. Though natural hazards and climate extremes are not the sole cause of migration[65], sea level rise in combination with other slow on-set processes[66] have already forced relocations or are forcing countries to the adoption of plans to do so[67].

International recognition of SIDS

The UN recognised the specific development challenges of *least development countries*, *small economies*, *landlocked* and *island developing countries* in the 1970s. The United Nations Conference on Environment and Development (*Earth Summit*, Rio de Janeiro, 1992) marked a more specific focus on *small island developing states* (SIDS), including a special section of the *Agenda 21*. The *Barbados Programme of Action*[68] (BPoA, Bridgetown, 1994) and *Mauritius Strategy of Implementation*[69] (MSI, Port Luis, 2005), and Rio+20 conference on sustainable development (*Future we want*, Rio de Janeiro, 2012) reinforced the international commitment and guidance towards sustainable development (SD). The latter has called for the *Third International Conference on SIDS* to be held in 2014 (Apia/Samoa, September 1-4).

The *Millennium Development Goals* (MDG), *Hyogo Framework for Action* (HFA, 2005), and the IPCC Reports, starting from the *Second Assessment Report* (SAR, 1995), addressed the specific situation of SIDS.

Although official development assistance has been declining in recent years (MDGs Report 2013), SIDS have managed to make significant steps with regard to health, education, gender equality and water and sanitation. However, less has been achieved in terms of poverty reduction, debt reduction, sustainability and environmental protection.

Patchy outcomes are also observed in the implementation of the HFA. Not all SIDS, however, are caught unprepared when disasters strike. About one half of them have engaged in the implementation of the internationally agreed to blueprint for disaster risk reduction with modest but encouraging results. Even more impacting is the fact that several of the Caribbean SIDS have implemented the Comprehensive Disaster Management (CDM) Strategy dating back to 2001 with an enhanced framework implemented from 2007-2012. Notably this enhanced framework has been mapped to the Global Agenda. The Caribbean has shown significant progress in the implementation of this CDM framework however significant work remains ahead.

International financial mechanism for climate adaptation

Under the UNFCCC framework, several financial mechanisms have been set up to support efforts to *mitigate* greenhouse gas (GHG) emissions and *adapt* to residual and unavoidable climate change, including the LDC Fund[70], Adaptation Fund[71] and Green Climate Fund[72]. According to the Alliance of Small Island States (AOSIS) and others[73], another instrument should address reparation of permanent loss and damage from climate change and facilitate better preparedness and response to climate-related disasters.

In 2010, the UNFCCC *Conference of Parties* (COP) 16 (Cancun, 2010) decided to establish a work programme to consider approaches to '*address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change*'[74] under the *Cancun Adaptation Framework*. The COP17 (Durban, 2011) extended the mandate[75] and COP18 (Doha, 2012) decided to establish '*institutional arrangements, such as an international*

mechanism' to address *loss and damage* in developing countries particularly vulnerable to the adverse effects of climate change.

Loss and damage (L&D) have been outlined rather broadly[76], without acknowledging the myriad of convoluted drivers of risk[77]. COP18 guidance on L&D offers three areas of action: e*nhancing knowledge and understanding of comprehensive risk management*; s*trengthening dialogue, coordination, coherence and synergies*; and e*nhancing action and support, including finance, technology and capacity building*. The tangible mechanisms explored in this context[78] include risk *reduction*, risk *retention*, and risk *transfer*.

Further guidance on these issues has been recently provided with the establishment of the "Warsaw international mechanism for loss and damage", inaugurated by COP 19 in November 2013.

CATALYST Consultations

CATALYST convened a regional workshop to coincide with the 7th *Caribbean Conference on Comprehensive Disaster Management: Building disaster resilience – A shared responsibility* (Montego Bay, December 3-7, 2012) and organised a side-event during the UNISDR *Global Platform* (GP) *for Disaster Risk Reduction* (DRR) in Geneva, May 19-23, 2013, dedicated to SIDS. These events, along with the CATALYST regional consultation process, made it possible to gain insights and draw recommendations on how the specific development needs of SIDS should be incorporated in the post 2015 international development, climate change and disaster risk reduction agenda.

The international community has to live up to the constant pledges and make available the promised financial aid to SIDS and LDC, recognizing the Rio principle of common but differentiated responsibility[79]. The multiple financial mechanisms have to be integrated with measurable, achievable and progress-monitored goals towards poverty reduction, sustainable development[80], disaster risk reduction[81], and nature preservation[82].

The North-South and South-South development and climate mitigation/ adaptation aid mechanisms should be constructed on the basis of principles of regional partnerships for capacity and institutional building, scientific/technical support, knowledge and technology transfer, debt relief, and market integration. DRR and CCA must be integrated into spatial planning and development, building upon the principles of ecosystem-based management and integrated coastal zone management[83].

Regional SIDS-targeted cooperation is supported through a number of networks and specific groups such as *Alliance of Small Island States* (AOSIS), *CARICOM*, *Global Islands Network* (GIN), *Indian Ocean Commission* (IOC) or *Pacific Islands Forum* (PIF)[84]. A close collaboration in the field of DRR is shown in the example of the *Caribbean Disaster Emergency Management Agency* (CDEMA). Established in 1991, CDEMA (formerly CDERA) is an inter-regional network of national disaster risk management offices which develop and manage national DRR programmes and provide assistance to member territories in case of adverse natural hazard events. In 2001, CARICOM adopted a *Strategy and Results Framework for Comprehensive Disaster Management*, linking disaster management to development decision making and planning. The strategy was developed through extensive dialogue among key stakeholders in the public and private sectors, donor and multilateral organisations, civil society, and multi-level financial institutions. It provides a benchmark for stakeholder cooperation and a platform for pro-actively addressing disaster reduction and climate change issues within the context of development planning.

The *Caribbean Catastrophe Risk Insurance Facility* (CCRIF) is the first ever multi-country pool, set up in 2007 to provide its members with access to affordable and effective coverage against natural disasters.[85] Operating as a mutual insurance company controlled by the participating countries, CCRIF allows its member governments to purchase liquidity coverage in the short-term, providing time to activate other resources for long term reconstruction needs. It is an index-based insurance, which means that payments are based on parametric triggers such as wind speed. CCRIF acts as a joint reserve mechanism, backed by the international reinsurance markets, and allows Caribbean governments to purchase catastrophe coverage at the lowest possible price. A similar mechanism is being tested for the Pacific Islands territories (Pacific Disaster Risk Financing and Insurance Program).

58 Based on the 2013 World Economic Situation and Prospects (United Nations, 2013), these include Comoros, Guinea Bissau, Haiti, Kiribati, Samoa, Sao Tome and Principe, Solomon Islands, Timor-Leste, Tuvalu, Vanuatu.

59 Low income SIDS include Comoros, Guinea-Bissau and Haiti (*Ibidem*).

60 The World Bank identifies 14 High Income (HI) countries among SIDS: Antigua and Barbuda, Aruba, Bahamas, Bahrain, Barbados, French Polynesia, Guam, Northern Mariana Islands, New Caledonia, Puerto Rico, St. Kitts and Nevis, Singapore, Trinidad and Tobago, US Virgin Islands (World Development Indicators 2013. (http://data.worldbank.org/about/ countryclassifica-tions/)

61 The New York Times, Flood Toll Rises to 1,950 in Haiti and Dominican Republic. Retrieved from: http://www.nytimes.com/2004/05/27/world/flood-toll-rises-to-1950-in-haiti-and-dominican-republic.html

62 Guyler Delva J., Haiti flood death toll passes 3,000. Reuters-AlertNet, 05 Oct 2004. Retrieved from: http://img.static.reliefweb.int/report/haiti/haiti-flood-death-toll-passes-3000

63 *Identifying Emerging Issues from the Perspective of the Small Island Developing States*. Expert Group Meeting co-hosted by United Nations Environment Program (UNEP) and the United Nations Department of Economic and Social Affairs (DESA) 14-16 May, 2013

64 E. Piguet, *The Migration/Climate Change Nexus: An Assessment*, paper presented at the International Conference "Rethinking Migration: Climate, Resource Conflicts and Migration in Europe", Berlin, 13 -14 October 2011;

65 M. Beine and C. Parsons. *Climatic factors as determinants of International Migration.* Institut de Recherches Économiques et Sociales de l'Université Catholique de Louvain, Discussion Paper 2 (2012)

66 Slow on-set processes include sea level rise, increasing temperatures, ocean acidification, glacial retreat and related impacts, salinization, land and forest degradation, loss of biodiversity and desertification

67 PSIDS (Pacific Small Island Developing States). *Views on the Possible Security Implications of Climate Change to be included in the report of the Secretary-General to the 64th Session of the United Nations General Assembly*. (Permanent Mission of the Republic of Nauru to the United Nations, New York, 2009; http://www.un.org/esa/dsd/resources/res_pdfs/ga-64/cc-inputs/PSIDS_CCIS.pdf)

68 The Barbados Declaration and the Programme of Action for the Sustainable Development of Small Island Developing States were adopted as a result of the first Global Conference on the Sustainable Development of Small Island Developing States held in Barbados (1994) under the auspices of the United Nations.

69 *Report of the International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, Port Louis, Mauritius, 10–14 January 2005*, chap. I, resolution 1, annex II (United Nations publication, New York)

70 The Least Developed Countries Fund (LDCF) was established to support Least Developed Country Parties (LDCs) to carry out the preparation and implementation of National Adaptation Programmes Of Action (NAPAs). More information is available at: https://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/4723.php

71 The Adaptation Fund finances adaptation projects and programmes in developing countries that are parties to the Kyoto Protocol and are particularly vulnerable to the adverse effects of climate change. More information is available at: https://www.adaptation-fund.org/

72 The Green Climate Fund is to support projects, programmes, policies and other activities in developing country Parties using thematic funding windows. More information is available at: http://gcfund.net/home.html

73 E. Calliari, *Loss and Damage: a step ahead for SIDS?*, International Climate Policy & Carbon Markets, ICCG, Bi-monthly Report 24 (2013)

74 Decision 1/COP 16, paragraph 25-29.

75 Decision 7/COP 17

76 '*Actual or potential manifestations of climate change impacts that negatively affect human and natural systems*'.

77 O.Smith, et al., *Problematizing Loss and Damage*, International Journal of Global Warming, in press.

78 A literature review on the topics in the context of thematic area 2 of the work programme on loss and damage: a range of approaches to address loss and damage associated with the adverse effects of climate change. UNFCCC secretariat note, 2012.

79 Principle 7 of the *Rio Declaration on Environment and Development* (A/CONF.151/26, Vol. I).

80 See also the Essay *Renewed international commitment for disaster risk reduction.* E. Calliari and J. Mysiak

81 See *Renewed international commitment for disaster risk reduction*. E. Calliari and J. Mysiak (this volume).

82 See *Ecosystem-based disaster risk reduction*. J. Mysiak, E. Calliari and A. Haque (this volume)

83 E. F. Granek et al., *Ecosystem Services as a Common Language for Coastal Ecosystem-Based Management*. Conservation Biology 24, 207–216 (2010)

CEM Working Paper No 7, 17pp.

84 *Vulnerability and adaptation to climate change in Small Island Developing States*. Background paper for the expert meeting on adaptation for small island developing States. Paper commissioned by the secretariat of the UNFCCC with input provided by Dr. Graham Sem.

85 F. Ghesquiere et al., *Caribbean Catastrophe Risk Insurance Facility: A solution to the short-term liquidity needs of small island states in the aftermath of natural disasters*, (2006) (available from www.aidandtrade.org, IAT03-13/3)

4.

Integrating climate risk insurance into a comprehensive climate risk management approach

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Munich Climate Insurance Initiative (MCII) hosted at United Nations University – Institute for Environmental and Human Security (UNU-EHS) [86]

This essay offers an examination of how insurance can be one integral part of a comprehensive climate risk management strategy by gathering lessons learned from existing efforts with weather-related insurance approaches, considering their limitations, challenges and opportunities. It also examines the enabling environment necessary to allow insurance to play a complementary role in managing climate risks.

Integrating climate risk insurance into a comprehensive climate risk management approach

The IPCC recently stated "Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes. This evidence for human influence has grown since the IPCC's Fourth Assessment Report. It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century"[87]. The IPCC Special Report on Extreme Events further noted that the frequency and severity of extreme weather events and natural catastrophes are on the rise worldwide as a result of climate change and socio-economic development[88]. This threatens to undermine the resilience of people to recover and absorb the losses to their livelihoods associated with climate events. At the forefront, the international climate change community has expressed interest in more knowledge and practical experience on the role of risk transfer tools such as insurance in reducing the immediate and long-term financial impact associated with extreme weather events. In addition, the need to promote risk transfer mechanisms through capacity development activities is also expressed by the Think Tank Members in the CATALYST project[89]. By gathering lessons learned from existing efforts with weather-related insurance approaches, it is recommended that policymakers should consider the design and implementation of insurance solutions as part of an integrated climate risk management approach. This approach combines ex-ante risk assessment to gather information and decisions on how to manage and finance these risks considering the opportunities, challenges and pre-conditions necessary to allow insurance to play a complementary role in managing climate risks.

Risk information, reduction, and transfer: Integrated climate risk management

Risk transfer instruments such as insurance are commonly used to manage risks that would be too large for countries, companies or individuals to cover on their own. By spreading losses across time and among people, insurance reduces catastrophic impacts of disasters and can support ex-ante measures to reduce vulnerability. In helping individuals cope with the burdens imposed by climate change, insurance can serve as an adaptation measure[90]. Moreover, a resilient climate risk management strategy involves a balanced mix of approaches[91] and insurance solutions should therefore be designed and implemented as part of an integrated climate risk management approach.

An integrated climate risk management approach comprises the following three elements (see also Figure 3):

- **Information and data collection** are the basis for properly assessing the underlying risk, informing the decision-making process on the most appropriate risk management strategy and increasing risk awareness. Necessary information and data requirements include the mapping and costing of risk based on historical data (on both the hazard itself and associated losses), risk modelling, vulnerability assessments and information on costs and benefits of different risk management options.
- **Risk prevention/reduction** measures are *ex-ante* risk management strategies, such as early warning systems, improving agricultural practices or investments in infrastructure, and should be taken as a first step towards effective risk management.
- **Risk transfer** instruments, such as insurance, transfer the risks that cannot be prevented or reduced.

There are already a number of examples of countries that are applying more comprehensive approaches to managing their risks by combining different risk management tools. For example:

- The Climate Risk Adaptation and Insurance in the Caribbean programme[92] employs an early warning system and risk reduction information in combination with weather-index-based insurance products.
- The Horn of Africa Risk Transfer for Adaptation (HARITA) program integrates insurance with both risk reduction and credit[93].
- The RIICE project in Asia collects data on rice areas and growth to support decision-making on measures for food security and to develop agricultural insurance products.[94]

Opportunities for and challenges of insurance solutions in the context of climate risk management

Insurance as a risk management tool provides benefits to stakeholders ranging from regions, national governments, to communities, households and individuals.

FIGURE 3: INTEGRATED CLIMATE RISK MANAGEMENT APPROACH[99]

For instance, promoting the use of insurance solutions can lead to increased risk management awareness at the stakeholders' level. This increased awareness has the potential to be translated into risk reduction activities by individuals, thereby strengthening national and community resilience. Insurance can also provide the necessary financial security ("peace of mind") to take on risky but productive investments[95]. Additionally, through the identification and pricing of risks, insurance can help create a degree of certainty within which investments and planning can be undertaken.

There are also many challenges in designing and implementing climate risk insurance such as the need for start-up investments that often need to be borne by the public sector[96], and the complexity of climate-related insurance products especially for low-income countries. Another limitation is that extensive and consistent historical climate data and infrastructure to measure weather changes in real time, to link for instance, crop failure to a weather index is not always available[97]. Noting the diversity of risk, livelihoods, geographies, and micro-climates in a given area, scaling-up small pilot initiatives over a large area can also be challenging and requires the establishment of an effective distribution channel and technical expertise to continually support the maintenance of the approach. For countries that are highly exposed to slow-onset climatic processes such as sea level rise, desertification, etc., traditional risk transfer approaches such as loss-based insurance may be unsuitable as they do not meet the 'insurability criteria.'[98]

Thus, risk transfer and risk retention alone would not likely be enough to address some of the dire effects of climate change pointing again for the need for an integrated approach for managing climate-related risks.

Enabling environment for applying insurance as a tool to address climate risk

Insurance can play a meaningful role in managing climate-related risks if certain preconditions are in place such as:

- **Appropriate regulatory environment and oversight:** An adequate regulatory and supervisory framework needs to be in place to ensure that insurance measures are financially viable and that consumers are protected.
- **Public champions and complimentary role of key actors:** Pro-active management of climate risks requires long-term commitment and a joint effort from the public and private sector to approach climate-risk management effectively.
- **Availability of data:** Reliable data is essential for pricing risk and for understanding the different options for managing climate risks (including insurance). Ideally, the data is of high quality, uninterrupted and open source for historical data sets (minimum 20-30 years), current weather data (ground and satellite) and future climate modelling.
- **Finding cost-effective distribution channels** by partnering with risk aggregators (e.g., banks, associations, credit unions, etc.) or actors with a wide network to keep transaction costs low and reach large numbers of clients at the same time and also taking advantage of technology such as the use of mobile phones.
- **Appropriate "back-up" mechanisms** such as reinsurance or a safety net to meet exceptionally high claims is important for the primary insurance provider. Often, the private sector reinsurance markets are involved in

covering some portion of the largest risks a country or sector may face from extreme weather events[100].

- **Investment in risk management education** and responsible management of clients is necessary to increase insurance literacy of both consumers and providers. This includes training in insurance approaches and risk reduction, financial risk management, as well as in the use of early warning systems.

Considerations on the role of international community in linking climate risk insurance into an integrated climate risk management approach.

The UNFCCC, which includes adaptation to the adverse effects of climate change, and the Hyogo Framework for Action (HFA), set-up to reduce disaster risk, are the two prominent processes for current risk management initiatives[101]. In this context, **there are options for the international community to support the design and implementation of country-driven comprehensive climate risk management strategies and approaches that incorporate risk transfer and risk-sharing mechanisms including the following activities:**

It is recommended that the international community engages in the following activities:

- Fostering a better understanding of a **combination of tools and approaches**: For instance, risk retention and risk transfer alone would be unlikely to sufficiently address some of the dire effects of climate change. Therefore more information is needed on combinations of existing approaches and innovations to manage loss and damage associated with extreme events and slow onset climatic processes.
- **Facilitating a regional and international dialogue** to advance policy coherence on integrated climate risk management, including risk transfer and risk sharing instruments: This can improve the conditions under which decision makers and regulators can develop appropriate regional and national financial risk management tools.
- Many innovative risk transfer mechanisms are currently being designed in a way that meets the needs and priorities of low-income and vulnerable people. The international community can help to **replicate good practices** across and between countries.
- **Financial support** to advance a climate insurance approach through existing adaptation programmes: Countries can consider including elements of a climate insurance approach in their concrete adaptation activities.
- Providing guidance on how to **overcome operational challenges** (such as lack of technical expertise) in setting up weather-based insurance in developing countries: This will require technical assistance to facilitate dialogue between and across countries on experiences in designing and implementing insurance instruments in combination with other tools to address the impacts of extreme weather events.

In conclusion, if insurance is appropriately embedded into an integrated risk management approach, insurance can play a significant role in reducing climate risks and advance adaption. This will require a stronger evidence base, greater political commitment and efforts to systematically support decision makers in their discussions leading up to the important international policy window in 2015 (i.e., Post-2015 Framework for Disaster Risk Reduction, Post-2015 Development Agenda, UNFCCC Climate Agreement).

86 The Munich Climate Insurance Initiative hosted at UNU-EHS (www.climate-insurance.org) contributing to the CATALYST project. The results featured in this essay are part of a project between the Munich Climate Insurance Initiative (MCII) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), which are collaborating on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) through its International Climate Initiative, to better assist policy makers and climate negotiators in finding ways to implement climate risk insurance solutions in an integrated climate risk management approach.

87 *Approved summary for policymakers: Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis Summary for Policymakers*. (IPCC, Geneva, 2013) (available at http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf)

88 IPCC, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (Cambridge University Press, Cambridge, UK, and New York, NY, USA, 2012)

89 H. Daniel, et al., eds., . CATALYST Synthesis Report of Best Practices, Networks, Research Gaps, and Recommendations for Fostering Capacity Development for Disaster Risk Reduction and Climate Change Adaptation. (CATALYST Deliverable 5.1/5.2/5.3, 2013)

90 K. Warner et al., *Insurance solutions in the context of climate change-related loss and damage: Needs, gaps, and roles of the Convention in addressing loss and damage*. Munich Climate Insurance Initiative (MCII) submission to the SBI Work Programme on Loss and Damage, October 2012. Policy Brief No. 6 (UNU, Bonn, 2012)

91 I.M. Godschalk, Urban hazard mitigation: Creating resilient cities. *Natural Hazards Review*, 4 (3),136-143 (2003)

92 The Climate Risk Adaptation and Insurance in the Caribbean project is developed and led by the Munich Climate Insurance Initiative (MCII) - hosted at UNU-EHS. The project is implemented by MCII together with its partners, CCRIF, Micro-Ensure and Munich Re. Funding for the project has been provided by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) under the International Climate Initiative.

93 *Horn of Africa Risk Transfer for Adaptation Quarterly Report: July 2011-September 2011* (Oxfam America,Boston, MA, 2011)

94 Project partners are sarmap SA, a Swiss-based technology company, the International Rice Research Institute, Allianz Re, GIZ, the German Development Cooperation – providing capacity building to local aggregators through the programme develoPPP.de on behalf of BMZ, and the Swiss Agency for Development and Cooperation as the main funder of the project.

95 S. Cutter, Set al.,. *Managing the risks from climate extremes at the local level*. In: C.B. Field et al., eds., Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC) (Cambridge University Press, Cambridge, UK, and New York, NY, 2012)

96 See for example the development of Mexico's catastrophic insurance scheme which tries to overcome the limited presence of private insurers in agriculture, due to the high financial and operational costs:Serra et al. (2013) Best Practice Papers – Central America and the Caribbean http://www.catalyst-project.eu/doc/dl_6-4_catalyst_bp_cac.pdf

97 E. Calliari et al., *The Central America and the Caribbean Region*. In: H. Daniel et al., eds,, CATALYST Synthesis Report of Best Practices, Networks, Research Gaps, and Recommendations for Fostering Capacity Development for Disaster Risk Reduction and Climate Change Adaptation (CATALYST Deliverable D5.1, D5.2, and D5.3, Bonn, 2013) (available at : http://www.catalyst-project.eu)

98 There are two pre-conditions for insurability for extreme weather events- unpredictability of a certain event and ability to spread risk over time and regions. See: UNFCCC. 2012. A literature review on the topics in the context of thematic area 2 of the work programme on loss and damage: a range of approaches to address loss and damage associated with the adverse effects of climate change. FCCC/SBI/2012/INF.14.

99 Source: Warner et al., forthcoming. *Innovative Insurance Solutions for Climate Change: How to integrate climate risk insurance into an integrated climate risk management approach*. UNU-EHS

100 See Warner et al., 2012 and Michel-Kerjan, E. and F. Morlaye .2008. Extreme Events, Global Warming, and Insurance-linked Securities: How to Trigger the "Tipping Point". *Geneva papers on Risk and Insurance – Issues and Practice*, vol. 33, No. 1, pp. 153-176.

101 I. Burton et al.,. Managing the risks: international level and integration across scales. In: C.B. Field et al., eds., *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC) (Cambridge University Press, Cambridge, UK, and New York, NY, 2012)

5.

Mainstreaming Disaster Risk Reduction and Climate Change Adaptation into policy making

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It is clear by now that climate change and natural disasters are inextricably intertwined because of the contribution of climate change to an intensification of and increased uncertainty surrounding hydro-meteorological hazards, and ultimately the socio-economic consequences of these disasters that we are all too familiar with. Furthermore, there has been a widespread call for the mainstreaming not only of natural disaster risk reduction into policymaking, but also the integration of DRR and CCA. Much consideration has been given to the approaches for achieving these. This awareness-raising essay presents how different countries from the CATALYST regions have approached the challenge.

The mainstreaming imperative

During the CATALYST Think Tank process, there have been many recommendations relating to the importance of mainstreaming Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) into policy at the national level[102, 103, 104]. Mainstreaming of DRR and CCA has also been heavily promoted by a multitude of international governmental and non-governmental organisations (e.g. OXFAM, UNDP, and the World Bank), as well as in international negotiations and agreements such as the Hyogo Framework for Action (HFA)[105,106]. Mainstreaming DRR and CCA refers to a cross-sectoral integration of both disaster risk reduction and climate change adaptation policies and measures into government actions and development programs to reduce vulnerability and promote sustainability[107].

Why mainstream DRR and CCA into policy?

As discussed in Essay 1, DRR and CCA are important to mainstream into national policy, since disasters and climate change both have a critical effect on a country's potential for economic and social development. Additionally, as highlighted by CATALYST Think Tank Members, development policies can have unintended consequences[108] affecting positively or negatively a country's capacity to adapt to climate change and reduce the risk of disasters. For these reasons, it is very important for policymakers to take DRR and CCA into account in their sectoral planning.

Why integrate DRR and CCA?

It is important to integrate DRR and CCA since they are inextricably linked when it comes to meteorological hazards and any secondary hazards triggered by them (e.g. landslides, infrastructure failure). Climate change is leading to an increase in the probability of extreme weather events[109] such as heatwaves, extreme precipitation, and storms, which in turn is increasing the risk of disaster resulting from such hazards as droughts and floods in vulnerable parts of the world. Long-term climate change adaptation processes in society can therefore support governments in reducing the risk of disaster.

Moreover, CCA can benefit from the lessons learned by DRR professionals during more than three decades of work in the field and, as such, avoid the duplication of effort and resources used on adaptation actions that have already been done as part of DRR, saving valuable time in gathering experience.

Unfortunately, often the responsibilities for implementing DRR and CCA are still fragmented between different groups of practitioners[110], which means that further important methodological synergies between the two fields are not exploited. For example, DRR can provide the CCA practitioner with tools on vulnerability and risk analysis. Conversely, CCA brings to the DRR practitioner the important tools and approaches for raising adaptive capacity in a society[111]; a capacity which can reduce the overall risk level of that society despite potentially high exposure to a hazard. In addition, the integration of DRR and CCA would double the strength of current actions to raise awareness and advocacy in both fields.[112]

Regulatory frameworks for mainstreaming DRR and CCA into policy making

The fundamental mechanism for mainstreaming DRR and CCA into policy making is via the creation of a suitable regulatory framework. The creation of regulatory frameworks for mainstreaming DRR/CCA prescribes actions government actors should undertake at different governance levels and sectors in order to achieve DRR/CCA goals and objectives in national or sectoral planning. The process of creating the regulatory framework usually begins with policy objectives for mainstreaming being specified, and these then being followed up by the creation of appropriate legislation to aid implementation.

There are a number of challenges involved in creating effective regulatory frameworks and different countries have opted for different solutions. These challenges include deciding:

- where to delegate DRR/CCA policy making responsibilities;
- how to integrate DRR/CCA goals and objectives into existing planning;
- how to coordinate government agencies to make sure DRR/CCA implementation is cross-sectorally and vertically coherent;
- how to budget and review DRR/CCA activities.

The rest of this essay presents a variety approaches from countries of the CATALYST regions, to deal with the challenges above. These country-level examples of ap-

proaches from Ethiopia, Cuba, Mexico, and Italy, constitute neither an exhaustive list nor a set of prescriptions for mainstreaming. Instead they reflect the examples provided by the practitioners and scientists consulted in the CATALYST Think Tank process. It is intended to provide an overview of these approaches, as well as to identify sources of further information about them.

Delegating Responsibility

Ethiopia[113]

Since 2007, Ethiopia has opted to place responsibility for DRR under a single ministry, in this case, the Ministry of Agriculture (MoA), under which the Disaster Risk Management and Food Security Sector (DRMFSS) unit was created. The DRMFSS itself is split into two directorates concerned with early warning and response, and food security coordination. The decision to place responsibility with the MoA was taken due to the important role of agriculture in economic development of the country and this sector's high level of vulnerability in the face of natural hazards[114], in addition to the high level of food aid in the country during disasters and to address chronic food insecurity. Regional and woreda level versions of the DRMFSS are being implemented in patches across the country[115].

A disadvantage of delegating responsibility to an existing ministry is the risk of creating a single-sector approach to DRR. DRR is a multi-sector responsibility, hence a sectoral ministry will often not have a coordination mandate[116]. The draft for the new National Policy and Strategy on Disaster Risk Management *(NPSDRM),* indeed, proposes to move the DRMFSS, and associated responsibilities, directly under the Prime Minister's office in order to increase the importance of the work done (and by implication its access to funding), as well as to increase the plurality of sectoral involvement in that work[117]. The NPSDRM has recently been endorsed by the federal Council of Ministers paving the way for a legislation to establish the federal coordination office on DRM, located in the Prime Minister's Office. The new federal DRM coordination office, besides providing policy guidelines and coordinating their implementation, would act as the secretariat to a federal DRM council that would be composed of all relevant sectoral ministries and statutory bodies.

Mexico

Mexico offers a third alternative approach to the two described above (placing responsibility under a single ministry or under the prime ministers' office). It spreads responsibility across all ministries. The Mexican government did so by creating the Special Programme on Climate Change 2009-2012[118]. This is a legally binding document that commits all ministries to taking action by integrating in their planning and budgeting activities diverse policy goals related to climate change.

In addition, advances are also being made in delegating responsibilities at the state level and below. For example, at the state level, many authorities have started their State Programmes for Climate Change Action (PEACC – Programas Estatales de Acción ante el Cambio Climático) which aims at "integrating appropiate and necessary actions in order to identify, implement, and develop GHG mitigation options; in order to identify vulnerable regions and sectors and, to identify adaptation options" (INE, 2011). Such actions are intended to link state initiatives with those at the municipal level.

At the municipal level, the "Safe Municipality" programme aims to involve the local population in developing early warning systems and capacities for coping with disasters. Similar schemes (such as SIAT-CT) have also been adopted by cities such as Acapulco, Tijuana, Tuxtla Gutierrez y Monterrey, while other cities such as Hermosillo (Sonora) and Villahermosa (Tabasco) are trying various strategies to manage water-related stresses, including floods and droughts. So far, however, just 5% of the municipalities have initiatives for either adaptation or mitigation (INE-SEMARNAT, 2009)

Cuba

Giving existing government agencies the mandate to develop DRR/CCA policy is a powerful mechanism for mainstreaming because it gives primary responsibility to an accountable authority that already has the potential power to coordinate DRR/CCA actions with its existing bodies at different levels. As such, this authority can help to break down institutional barriers and facilitate knowledge sharing[119]. A good example of this comes from Cuba[120], where existing government authorities at the provincial and municipal levels have been given authority for civil defence, with the leaders at this level thereby becoming civil defence directors. Cuban law also then makes these individuals responsible for all aspects of disaster risk management – from prevention to reconstruction. This approach avoids the costly creation of new bodies, and places the responsibility in the hands of administrative bodies that already have con-

siderable powers, and are familiar with and (hopefully) trusted by local residents.

Italy

An example of delegation, driven by international agreements, is Italy's National Action Programme to Combat Drought and Desertification[121]. This has the added strength of having been enacted within the legally binding context of the *United Nations Convention to Combat Desertification*. In principle, the programme creates a legal enabling environment for the generation of lower level Regional Action Plans through technical assistance and training activities[122]. A number of European member states have enacted similar National Action Plans but these have not been fully implemented.

Integration of DRR/CCA into existing planning activities

Ethiopia

The Business Process Reengineering undertaken by the Ministry of Agriculture and Rural Development in 2007 marked a paradigm shift in the country from a reactive crisis management approach towards a "proactive system based on long-term risk management"[123]. Since then, Ethiopia has introduced climate change adaptation and vulnerability reduction objectives into its national Growth and Transformation Plan, and DRM has been made one of four strategic objectives of its Agricultural Sector Policy and Investment Framework. Additionally, DRM is an important objective for the Climate Resilient Green Economy strategy[124]. The government is also in the process of developing a DRM Strategic Programme and Investment Framework that will seek to operationalize the NPSDRM, including through identification of key programmatic interventions and resource availability and gap.

Mexico

During the last administration (2006-2012) climate change and sustainability policy were linked through the National Development Plan 2007-2012, which included four strategy lines providing the foundations for further government actions on climate change adaptation in Mexico. These lines include: 1) designing and developing capacities for adaptation; 2) developing climate scenarios at regional scale; 3) assessing impacts, vulnerabilities and adaptation to climate change in various socio-economic sectors and ecological systems; and 4) promoting the divulgation, dissemination and sharing of information about those impacts, vulnerabilities, and adaptation measures[125]. Government initiatives corresponding to the National Development Plan were delivered through the National Strategy for Climate Change 2007-2012, which identified priorities in climate change adaptation research and capacity development at various levels of government and society[126]. At an operative level, thirteen different sectoral programmes are engaged with DRR and CCA actions, at various levels.

Other countries

It is worth noting that Bangladesh and Vietnam have also already integrated DRR and CCA into national development strategies[127]. In addition, Belize provides a further interesting example in its development of a risk management framework to enhance the "risk ethic" in government decision-making, and as such, Belize's government is succeeding in integrating different ministries and sectors into the central decision-making process on DRR/CCA[128]. It has also been recommended by a Think Tank Member from the NGO sector, that governments integrate DRR/CCA into poverty eradication planning activities, especially those in Africa where such planning is common[129], due to the close relationship between vulnerability and the poverty trap.

Coordinating government agencies

Ethiopia

DRR/CCA can also be mainstreamed into policy making across sectors by creating a platform for different government agencies to discuss, share information about, and coordinate their own planning activities in the area of DRR/CCA. Ethiopia has established a Disaster Risk Management Technical Working Group (DRMTWG) that works as the national platform on DRR. The DRMTWG brings together all relevant government and development partners (including donors, UN and NGOs) on a common platform for information exchange and joint and complementary actions. The DRMTWG has a core group and a set of sectorial task forces, including one on gender mainstreaming, each of which is co-led by government and a development partner.

In the planned NPSDRM, inter-ministerial coordination on issues of DRR/CCA will be the responsibility of the Federal DRM Council, a body including the prime minister and heads of ministries. This council will be reflected at regional and lower levels, with each level

of council having the authority to declare disaster emergencies at its own level[130].

Mexico

In 2005, Mexico created the Inter-Secretarial Commission on Climate Change (CICC – Comisión Inter-Secretarial de Cambio Climático) as a cross-sectoral government structure with a specific unit for adaptation (called GT-Adapt). The CICC currently involves eleven ministries, various technical counselling units, and their corresponding consultative bodies. It supports, among other things, "...the development of public policy and integration of adaptation actions into all sectors' processes"[131].

The example of Mexico shows how coordination activities can be a prelude to deeper inter-ministerial mainstreaming activities. In Mexico, ultimately, setting up liability across government agencies and programmes at various governance levels was possible thanks to an enabling environment previously built by the coordination action under the Inter-Secretarial Commission on Climate Change.

Other countries

In Africa, as many as 38 countries have a national platform or an equivalent coordinating mechanism for DRR.[132]

Budgeting and reviewing activities

Ethiopia

The Ethiopian government seeks to implement and budget the activities necessary to achieve the policy objectives of the National Policy and Strategy on Disaster Risk Management, by developing a Strategic Programme and Investment Framework. The framework identifies key activities that need to be implemented as per the NPSDRM guidelines, resource requirements and availability for each planned programme component and hence gap therein. This framework can then be used as a 'budget guide' for supporting donor agencies to know what to fund, and for how much, and for avoiding duplication of activities [133].

The role of international actions in mainstreaming DRR/CCA into national policy making

NAPAs

The international community has been supporting developing countries in the design of NAPAs since 2001 (based on agreements made at COP 7 in Marrakesh)[134]. CATALYST Think Tank Members recommended that the international community should encourage nations to expand National Adaptation Programmes of Action (NAPAs) to include DRR objectives[135]. By doing so, existing national efforts being invested in the development of NAPAs can be made use of for DRR policy planning as well. Through the implementation of NAPAs, Least Developed Countries can identify the most immediate and important activities and projects that are required to adapt to climate change. The development of a NAPA includes an inventory of available information, vulnerability assessment to both climate variability and extreme events, identification of the most important adaptation measures including criteria for prioritizing these, and a priority activity/project list[136]. NAPAs therefore provide an excellent existing national level CCA planning mechanism into which DRR planning can be integrated.

NAPs

In addition to NAPAs, the National Adaptation Plans (NAPs) recently agreed in the COP16 talks in Cancun[137], are intended to identify and address medium and long-term adaptation needs in Least Development Countries, plus other interested developing countries. Their goals are "to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience", and "to facilitate the integration of climate change adaptation into relevant new and existing policies, programmes and activities within all relevant sectors and at different levels"[138]. In addition, activities carried out as part of implementation strategies would prioritise work according to development needs and climate change vulnerability and risks.

Other international actions

An example for the creation of policy frameworks at the international level to support mainstreaming at the national level is the Regional Disaster Reduction Plan (PRRD) for Central America. This plan is intended to contribute to disaster reduction by promoting the incorporation of DRR in legislation and policies, as well as promoting the incorporation of disaster risk analysis in the design and implementation of prevention, mitigation, response, recovery and reconstruction in the countries of the region (PRRD 2006-2015). The UN is also integrating DRR into its climate change adaptation and development assistance framework at the country level (CCA/UNDAF)[139].

Indirect forms of mainstreaming

It was also pointed out by a Think Tank Member from the NGO sector[140] that there are indirect approaches to mainstreaming that can be adopted and promoted by organisations wanting their national governments to mainstream DRR/CCA. Adopting the principle of "follow the money", one approach is to focus on the donor. The "green the donors" strategy of Wetlands International, for example, involves organising meetings with donors (the Dutch government, and EU commissioners) to convince them to alter their key funding policies related to development aid by mainstreaming ecosystems-based DRR/CCA objectives into those policies.

A further indirect form of mainstreaming that may have potential can be found in *embedding* strategies. In this case, by mutual agreement, NGOs, CSOs or corporations might provide the government agency responsible for DRR/CCA policy a member of their own staff to support that agency's work. With the staff member in place inside the agency, there is a chance that that person can influence agency policy. Embedding is happening in other policy sectors already. The World Wildlife Fund, for example, seeks to influence Asian Development Bank policy by embedding its staff in the organisation[141]. Such processes of embedding "could change the governance structure of DRR/CCA, blurring the lines between government, corporations and civil society."[142] Obviously strict norms of transparency will be needed to avoid any loss of democratic accountability.

Finally, capacity development can be targeted at Civil Society Organisations (CSOs) to improve their effectiveness at lobbying government to realign their policies towards DRR/CCA objectives.

Some Caveats for Mainstreaming

Whichever approach is adopted, a common complaint in DRR/CCA circles is the lack of committed funding to DRR/CCA in government, particularly when the government changes. CATALYST Think Tank Members have urged the development of long-term funding mechanisms that can ensure adequate funding beyond government terms of office. Additionally, mainstreaming attempts will not be successful without skilled personnel working on a permanent basis to implement them. Mainstreaming activities therefore need to be done in tandem with investments in the further development of human resources, technical skills, and networks, as well as in the context of long-term investments in general education.

Finally**,** for mainstreaming to be adopted, more tools for allowing decision-makers to select the best approach to do so in their particular context, will be needed. An evaluation of the costs and benefits of each of the proposed approaches described here, as well as providing access to detailed information on case studies of the implementation of these approaches, via existing networks such as Preventionweb and UNISDR, would be highly beneficial.

102 C. Serra et al. *Best Practice Paper – Before Disaster Strikes: Transformations in Practice and Policy – European Mediterranean* (CATALYST Deliverable D6.4 (EUM), 2013)

103 C.Serra, E.Calliari. *Best Practice Paper – Before Disaster Strikes: Transformations in Practice and Policy – Central America and the Caribbean* (CATALYST Deliverable D6.4 (CAC), 2013)

104 M.Hare, C. van Bers, eds., *CATALYST Regional Workshop Reports* (CATALYST Deliverable D4.2 , 2013)

105 *Hyogo Framework for Action 2005 2015. Building the resilience of nations and communities to disasters. International Strategy for Disaster Reduction (UNISDR, Geneva, 2007)*

106 See *Renewed international commitment for disaster risk reduction*. E. Calliari and J. Mysiak (this volume)

107 S. Agrawala, M. van Aalst, *Bridging the gap between climate change and development. Bridge over Troubled Waters Linking Climate Change and Development*. in S. Agrawala, ed., Organisation for Economic Co operation and Development, (Paris, France, 2005).

108 M.Hare, et al, Brief Communication: CATALYST – a multi-stakeholder Think Tank for fostering capacity development in disaster risk reduction and climate change adaptation. *Nat. Hazards Earth Syst. Sci. Discuss.*, 1, 3919-3934 (2013)

109 IPCC (2012). C.B. Field et al., eds., *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC) (Cambridge University Press, Cambridge, UK, and New York, NY, 2012)

110 H. Daniel, et al., eds., . *CATALYST Synthesis Report of Best Practices, Networks, Research Gaps, and Recommendations for Fostering Capacity Development for Disaster Risk Reduction and Climate Change Adaptation*. (CATALYST Deliverable 5.1/5.2/5.3, 2013)

111 *Adaptive capacity* is the capacity of a society to adapt to climate stressors and natural hazards, in a positive way, so as to maintain key aspects of that society, Brooks and Adger. Assessing and enhancing adaptive capacity. in Lim, L.B. Adaptiation Policy Framework (UNDP, New York, 2007)

112 For further reasons for integrating DRR and CCA, see also Topic 3 "DRR and CCA" in Jaspers, F. et al. *Training Module: Disaster Risk Reduction and Climate Change Adaptation* (CATALYST Deliverable D5.4, 2013)

113 Acknowledgements go to Animesh Kumar for checking and adding to the information about Ethiopia

114 *Ethiopia: Country case study report: how law and regulations supports disaster risk reduction*. IFRC-UNDP Series on Legal Frameworks to Support DRR. Case Study 2. April (2013)

115 *Ethiopia: Country case study report: how law and regulations supports disaster risk reduction." Op cit*

116 Contribution of Animesh Kumar in M. Hare, Ed.,, Special report on stakeholder advice to policy makers (CATALYST Deliverable D4.4, v1.0, 2013)

117 *Ethiopia: Country case study report: how law and regulations supports disaster risk reduction. Op cit*

118 CICC. *Programa Especial de Cambio Climático 2009-2012* (CICC, 2009), http://www.semarnat.gob.mx/servicios/anteriores/cambioclimatico/Paginas/pecc.aspx)

119 M. Turnbull, et al. *Toward resilience: a guide to disaster risk reduction and climate change adaptation*. (UK: Practical Action. 2013) (available at http://www.ecb-project.org/downloads/ECB-toward-resilience-Disaster-risk-reduction-Climate-Change-Adaptation-guide-english.pdf)

120 M. Thompson, I. Gaviria, Cuba: *Weathering the Storm, lessons in risk reduction from Cuba* (Boston: Oxfam America. 2004)

121 Italian Committee to Combat Drought and Desertification - National Report on Implementation of UNCCD,(ICCDD, Italy, 2000)

122 For a further perspective on this, see also contribution of Raffaele Giordano in M. Hare, Ed., Special report on stakeholder advice to policy makers (CATALYST Deliverable D4.4, v1.0, 2013)

123 C.Serra, J. Luther. *Best Practice Paper – Before Disaster Strikes: Transformations in Practice and Policy – East and West Africa* (CATALYST Deliverable D6.4 (EWA), 2013)

124 *Ethiopia: Country case study report: how law and regulations supports disaster risk reduction." op cit*

125 *Plan Nacional de Desarrollo 2007-2012* (Presidencia de la República,. 2007, http://pnd.calderon.presidencia.gob.mx/sustentabilidad-ambiental.html)

126 *Estrategia Nacional de Cambio Climático 2007-2012*. (CICC. 2007. http://www.semarnat.gob.mx/SERVICIOS/ANTERIORES/CAMBIOCLIMATICO/Paginas/estrategia.aspx)

127 ESCAP/UNISDR, 2012

128 Calliari et al. *Central America and the Caribbean Regional Workshop*, in Hare M., van Bers, C. (Eds), *op cit*

129 Contribution of Frank van Weert in M. Hare, Ed.,, Special report on stakeholder advice to policy makers (CATALYST Deliverable D4.4, v1.0, 2013)

130 *Ethiopia: Country case study report: how law and regulations supports disaster risk reduction." op cit*

131 CICC. *Marco de Políticas de Adaptación de Mediano Plazo* (CICC 2010. http://www.cambioclimatico.gob.mx/images/stories/PDF/mpamp.pdf)

132 *Disaster Risk Reduction in Africa: Status Report on Implementation of Africa Regional Strategy and Hyogo Framework for Action, Executive Summary* (UNISDR, May, 2013).

133 See contribution of Animesh Kumar in M. Hare *op cit*

134 UNFCCC, 2001, *op cit*

135 M.Hare, et al, Brief Communication: CATALYST – a multi-stakeholder Think Tank for fostering capacity development in disaster risk reduction and climate change adaptation. *Nat. Hazards Earth Syst. Sci. Discuss.*, 1, 3919-3934 (2013)

136 The UNFCCC maintains a database of initiatives undertaken by the countries that have implemented NAPAs - see https://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/4583.php

137 UNFCCC, COP16, Decision 1/CP.16, The Cancun Agreements

138 UNFCCC, COP17, Decision 5/CP.17, Available at: unfccc.int/files/adaptation/cancun.../decision_5_cp_17.pdf

139 *Integrating Disaster Risk Reduction into the CCA and UNDAF – a guide for country teams* (UNDG,2009)

140 This subsection has been adapted from the contribution of Frank van Weert, in M.Hare. *op cit*

141 Ibid

142 Ibid: p21.

6.

Drought risk management in agriculture: institutional changes, adaptation in farming practices and education

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It is more difficult to detect the emergence of droughts compared with other natural hazards because of the unique characteristics of drought: its slow onset, the absence of a universally accepted definition for drought, and its non-structural impacts. In addition, it is more difficult to assess drought impacts in various sectors because the impacts can be regional or local. Furthermore, droughts may linger for a long time (a year or more), or just last for a very short time (several weeks). These characteristics hamper the adoption of appropriate drought risk management approaches. The international community has recognized the importance of shifting from crisis management toward a more risk-oriented approach. This requires a deep understanding of the full range of drought impacts and their main causes. Acting on the latter, drought risk management strategies should aim to reduce socio-ecological vulnerability.

Introduction

Although drought affects virtually all climatic regions, under the various scenarios generated by several climate models drought episodes are predicted to intensify both in frequency and duration especially in southern Europe and west Africa. Elsewhere (e.g. central North America and northwestern Australia) droughts have become less frequent, less intense, or shorter[144]. Drought impacts may be amplified by climate change and they affect all facets of society and the environment with strong implications for water resources and agriculture now and in the future[145]. The strengthening of the capacity to adapt to climate change in agriculture at different levels, and particularly at farm level, is at the core of this essay.

Drought originates from deficient precipitation. Different stages of drought are identified, i.e. meteorological drought characterized by a lack of rainfall and higher temperatures, hydrological drought which is the result of decreased surface and groundwater storage and lack of support for environmental flow requirements, and agricultural drought where the availability of soil water throughout the growing season is the critical factor[146]. As the primary user of water in mostcountries, agriculture is the first sector to experience the devastating effects of drought.

The essay discusses short-term risk reduction measures, the importance of seasonal or mid-term drought hazard information and long-term land and water planning and management solutions. As a part of this, institutional changes and adaptation measures in agriculture are also described.

The drawbacks in current drought risk management policies for agriculture

Recent studies on drought management approaches have shown that crisis management merely aims to reduce (or compensate) the damage resulting from drought impacts, whereas risk-based management proves to be more effective where it prevents that damage by reducing vulnerability to drought[147].

Managing drought risk requires a deep understanding of both direct impacts (e.g. a reduction of water availability, reduced crop, increased livestock and wildlife mortality rates, etc.) and indirect impacts, that is, the consequences of the direct impacts (e.g. lower nutrition levels, reduced income for farmers, increased prices for food, unemployment, etc.). Analysis of recent approaches revealed limited knowledge of the complex web of drought impacts and a lack of understanding of their main causes[148].

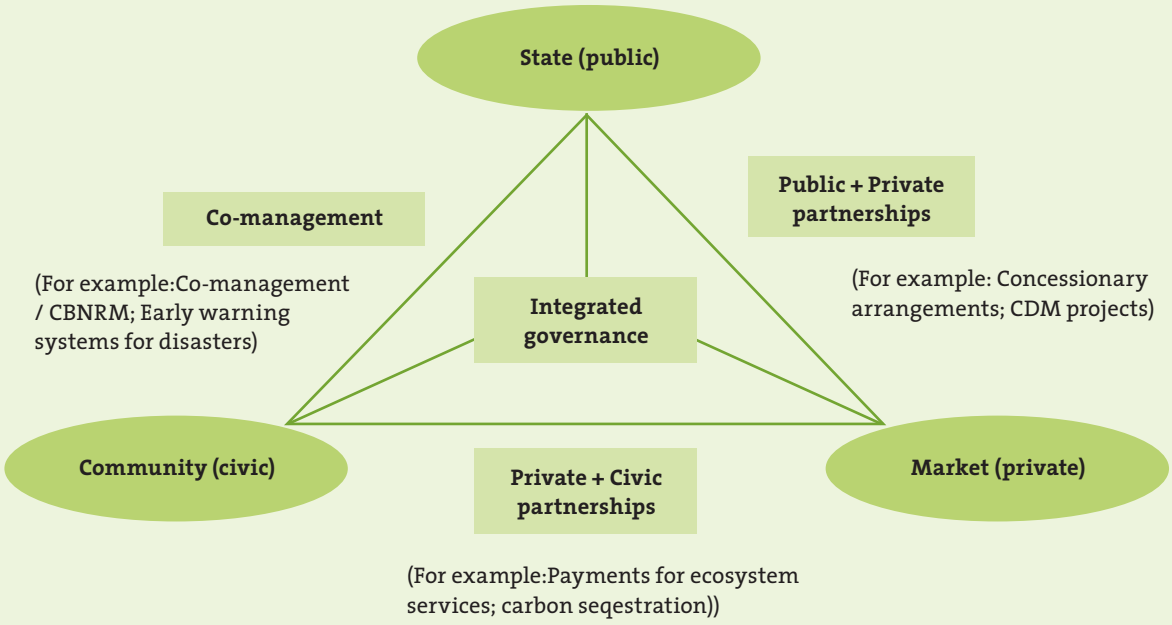
Data collection, management and communication have demonstrated several drawbacks. An increasing disjunction has been identified between drought monitoring and policy making[149]. Even when available, the scientific information is not fully incorporated into decision-making processes because of the lack of sufficient capacity in many drought-prone countries to use drought monitoring and related tools effectively in management practices. Communication barriers hamper the sharing of information among the various institutions involved in drought risk management, and between these institutional actors and the communities at risk, reducing the coping capability of these communities.

The fragmentation of responsibilities for actions taken in various aspects of drought management, and the insufficient coordination among various organizations and stakeholders concerned, often provoke conflicts between institutional actors, and between water authorities and end users, thus reducing the effectiveness of drought risk management policies, e.g. the implementation of the Apulia (Southern Italy) drought risk management plan[150]. Although there is an increasing awareness of the importance of stakeholder involvement, inadequate institutional arrangements impede participatory processes in planning and implementation of drought management and mitigation actions.

Although reducing water demand in irrigated agriculture is considered of utmost importance, many local actions aiming to foster the shift toward less water demanding crops and/or to enhance the re-use of treated wastewater failed to achieve this goal due to the neglect of socio-cultural barriers such as the lack of knowledge transfer and trust[151].

For rain-fed agriculture governments formulate national and regional plans and budget in administrative terms with a focus on compensation, with insufficient consideration of the needs and potential at the community level for the development of a drought-resistant farm system. Specific initiatives related to climate change impact for the farming communities is lacking such as more site- and time-specific predictions of the upcoming monsoon, support for local seed banks and, promotion of promising new crops. In contrast, the less resilient high yielding varieties are still heavily supported[152]. Because of the gradual impoverishment of rural communities due to increasing droughts, rural migration must also be taken seriously in regional

FIGURE 4: MULTI-PARTNER GOVERNANCE FOR DROUGHT RISK MANAGEMENT[154]



development plans if the growth of megacities is to be avoided.

Adaptation measures: solutions and best practices

Institutional and policy making adaptation to drought

Adaptation to drought does not occur in an institutional vacuum. Institutional arrangements influence risks and sensitivity to climate hazards, facilitate or impede individual and collective responses, and shape the outcomes of such responses. Institutional adaptation refers to the creation of new set of institutions or to long-term innovations within existing institutions in charge of planning and policy, and its capacity to develop, revise, and execute drought policies, strategies, programs and projects (e.g. institutions' ability to engage stakeholders in drought policy dialogue forums, to support decentralization initiatives, to introduce policy evaluation mechanisms aimed at promoting learning, collecting feedback and adjusting policies, etc.). Drought risk management committees have been created at the national and regional level in several EU countries and in other drought prone countries (e.g. Sri Lanka) in order to define responsibilities and facilitate cross-institutional collaboration and coordination among existing institutions. Comprehensive policy frameworks at both national and local levels to take preventive action against drought are needed. To this aim, multi-level drought management plans have been developed in many European-Mediterranean countries (e.g. Spain, Italy, France). Integrated governance frameworks (Figure 4) involving civic (community), public (state) and private (market) institutions are supported as crucial elements for fostering adaptation to drought conditions[153].

The UNFCCC[155] database demonstrates that public-private partnerships are the basis of adaptation measures that develop infrastructure to reduce drought risk over time by enhancing the water resources storage capacity. Innovative water price mechanisms that motivate farmers to conserve water are fostered by public-private partnerships as well. The diversification of the socio-economic system exposed to drought (i.e. through choices of crop, production technologies, and consumption choices) is mainly supported by public-civic partnership. Communal pooling adaptation measures, that is, the joint use of resources that are held collectively during times of scarcity, are also supported by these partnerships (e.g. community-based natural resources management, community-based drought monitoring)[156].

The ability to access, analyze and synthesize different sets of data and information, and to translate information into a decision is a crucial element of an institutions' capacity to cope with drought[157]. Specific

institutions have been created at the regional level to foster cooperation among different drought monitoring systems, in order to develop a comprehensive drought monitoring and early warning system capable of providing a complete understanding of the drought risks, early warning of a drought's onset and end, and to determine its severity, and deliver that information to a broad group of stakeholders in many climate- and water-sensitive sectors in a timely manner (e.g. the European Drought Observatory, http://edo.jrc.ec.europa.eu/).

Adaptation measures in rain-fed and irrigated agriculture

Farming is an environment-dependent sector and farmers are used to adapting to seasonal changes in temperature, rainfall and consequent changing river discharges for irrigation. Farmers tend to adapt their practices by switching to more drought resistant and short term growing crop varieties and repeated planting. They may even secure their (reduced) income by seasonal migration to neighbouring rural areas with seasonal jobs or to urban areas[158]. In irrigated areas, farmers often have less flexibility in case of mono crop oriented scheduling and disproportional water distribution during periods of water scarcity. Crop failure because of local drought remains a burden on the shoulder of the farmers. At best, it is compensated in next years' district budget like in Indonesia and India, whereas some NGO's pursue the government to provide resources to reduce vulnerability in the community up-front of disasters rather than as a compensation afterwards[159].

Confronted with longer-term climate change, however, more radical measures are needed to assure more water by water harvesting and additional sources of water, like storing water better in ponds, field and groundwater and by improving water use by optimization of field irrigation and mixed cropping[11]. Crop failure can be reduced by replacing monocultures of climate-sensitive high yielding varieties with local, more drought resistant varieties as in India and Zimbabwe[160]. Climate change even offers opportunities for the introduction of new crops which can open new markets[161]. A specific climate change effect is the salinization of groundwater and coastal water because of sea level rise. Apart from adaptation to salt-tolerant crops, fish and shrimps, time-selective pumping is a possibility.

Measures to enhance the effectiveness of irrigation techniques and to reduce water losses have been carried out in most of the European Mediterranean area and also in many of the Maghreb countries. The effectiveness of those actions strongly depends on the knowledge transfer process from irrigation technicians to farmers. Technical assistance in the field is of the utmost importance for supporting the implementation of deficit irrigation practices[162]. In the long term, alternative sources of water are required, e.g. the re-use of treated wastewater. Although the technical issues have largely been addressed, socio-cultural barriers in terms of institutions, language and financing also need ample attention[163].

Adaptation and agricultural education

Particularly in the context of less developed countries, adaptation in agriculture has to be based on low-cost techniques, with easily accessible and applicable knowledge. Organizations that offer agriculture and water management education, extension services that provide information on the latest developments including new products and technology, field technicians, and information exchange that reaches the community level are therefore important. Farmers look to past experience for answers to coping with changes and therefore local knowledge is important for climate-related adaptation. Scientific information is complementary to this and extension officers assigned to agriculture and irrigation can translate this information into practical and tailor-made information for communities and farmers. Weather information, such as three-month forecasts of precipitation and drought predictions, is extremely helpful to farmers in deciding what crops to plant and when to plant them, even though long-term forecasts are rather uncertain. Care should be taken that information is provided in a problem-oriented way, directly serving the needs of farmers.

A better educated farmer is able to absorb and process new information faster. Extension services as a type of informal education have been widely recognized and accepted in farm communities around the globe; and farmers can benefit from new insights and innovations through improvements in the education offered to extension officers. For extension services dealing with climate change, it is important to target the community as a whole, so that the community's decision-making reflects a sense of coherence and acceptance; for instance, the timing of the planting of rice, requires coordination among farmers to avoid water losses and pests. The implementation of adaptation measures often depends on cooperation among farmers so that knowledge sharing is improved and initia-

tives have a better chance of success. To sum up, the combination of local experience, science-based knowledge, and the formal and informal education system, can thus provide for more sustainable agriculture under a changing climate.

Strengthening adaptive capacity and drought risk management: key messages

Drought affects nearly every CATALYST regions across the globe and is aggravated by climate change. In this essay, several options for reducing drought risk or adaptation have been discussed among stakeholders and supplemented with knowledge from literature. Summarizing the lessons learned in CATALYST regional focus areas, adaptation to drought requires:

- Cooperation among different kinds of institutions adopting a multi-scale approach;
- Drought monitoring allowing seasonal rainfall predictions and early warning;
- The development of appropriate drought risk communication strategies to provide communities at risk with reliable, timely and understandable information. The key to successful climate change adaptation can be found in agricultural education and community action, that can be supported by NGO practitioners;
- Allocation of economic resources to reduce community vulnerability to drought instead of compensating the losses;
- Replacement of monocultures of climate-sensitive high yielding varieties with local, more drought resistant varieties;
- Locally-specific adaptation projects aimed at enhancing knowledge transfer to farmers in situations where special skills are needed.
- Consideration of rural migration in regional development plans in order to avoid the growth of megacities.

143 CNR, Water Research Institute, 5 Via F. De Blasio, 70132 Bari, Italy

144 In: C.B. Field et al., eds., *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC) (Cambridge University Press, Cambridge, UK, and New York, NY, 2012)

145 International Water Management Institute (IWMI), *Comprehensive assessment of water management and agriculture. Water for Food, Water for Life: A comprehensive assessment of Water Management in Agriculture*. (Earthscan, London, 2007)

146 *Drought Management Plan Report* (European Commission, Brussels, 2007) (available at http://ec.europa.eu/environment/water/quantity/pdf/dmp_report.pdf)

147 *Integrated Drought Management* (WMO-GWO, Geneva, 2011) (available at http://www.wmo.int/pages/prog/wcp/drought/idmp/)

148 D A. Wilhite et al., *Understanding the complex impacts of drought: A key to enhancing drought mitigation and preparedness* (Springer, 2007)

149 *Integrated Drought Management. op cit.*

150 P. van der Keur et al., *European Mediterranean Regional Workshop*. In M. Hare, C. van Bers, eds., (CATALYST Regional workshop reports, July 2013(available at http://www.catalyst-project.eu)

151 P. van der Keur and F. Jaspers, South and South-East Asia Regional Workshop. In M. Hare, C. van Bers, eds., (CATALYST Regional workshop reports, July 2013(available at http://www.catalyst-project.eu)

152 P. van der Keur, et al. *op cit.*

153 A. Agrawal, and M.C. Lemos, A Greener Revolution in the Making? Environmental Governance in the 21st Century. *Environment* 49 (5): 36–45 (2007)

154 Ibid

155 United Nations Framework Convention on Climate Change. http://unfccc.int/2860.php

156 A. Agrawal, *Local Institutions and Adaptation to Climate Change*. In R. Mearns, A. Norton, eds., Social Dimensions of Climate Change (World Bank, Washington, D.C., 2010)

157 *Basics of capacity development for disaster risk reduction* (Capacity for Disaster Reduction Initiative (CADRI), 2011)

158 A. Jaspers et al., *Capacity building Climate proofing Udaipur* (Alterra, Wageningen.2011)

159 *P. van der Keur & F. Jaspers. op cit.*

160 Busani Bafana, *Climate-hit Zimbabwe farmers opt for traditional crop varieties* (Thomson Reuters Foundation, 2013)

161 UNEP-RISO Centre, 2013, http://climatetechwiki.org/content/crop-diversification-and-new-varieties

162 *FAO Organization, operation and maintenance of irrigation schemes - FAO irrigation and drainage paper 40 chapter 7.*

163 P. van der Keur, et al. *op cit.*

7.

Some essentials of disaster and climate change risks and their management in urban areas

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It is often repeated that already more than half of the world's population is living in cities and urban settlements. This holds especially true for most of the population in industrialised, "developed" countries. But Asia is now the most rapidly urbanising continent, with Latin America and Africa quickly catching up. Population projections suggest that much of this growth will take place in low- and middle-income nations, and then predominantly in informal settlements, where housing conditions, service provision and protective infrastructures are often lacking. And it is mostly these growing vulnerable populations who settle or work in hazard-prone areas and are thus most at risk from natural disasters or human-induced accidents. In order to avoid this "urbanisation of disasters" and to acknowledge and reduce specifically urban risks, international as well as national efforts by the various governmental, non-governmental, and private actors need to pay much more attention to urban planning, urban disaster risk reduction and urban climate change mitigation and adaptation within holistic frameworks of sustainable, resilient urban development in the short and long term.

Why focus on urban disaster risk reduction and climate change adaptation?

Until recently, efforts in disaster risk reduction and climate change adaptation and in reducing the underlying risk factors have either focused on rural areas or at the national level. But crises from natural and technological disasters, conflicts or violence are most immediately felt at the local level – a household, village, borough, or city. With more than half of the world's population nowadays living in cities and urban settlements, these are the locations where disasters strike hardest[164]. Cities such as Port-au-Prince, Bangkok, or New Orleans provide the sad evidence for this and for the fragility of urban centres, and are examples of many other large and smaller disasters. Urban settlements are inherently complex and risky because of the large numbers of people, economic activities and assets that are concentrated in them.

But focussing on urban areas does not mean that urban and rural disasters should be considered separately – most disasters impact both rural and urban areas. There are too many links between both areas which are relevant to disasters – for instance, disasters in rural areas disrupt the supply of food, fuel, water or other goods to urban centres, while disasters in urban areas disrupt the suppliers of goods and services that farmers and rural populations depend on. However, because of many specific features that are discussed later on, urban areas need separate attention[165]. For example, in many low-income and most middle-income nations there is more "government" in urban than in rural areas, whose activities should ideally reduce disaster risk (although in reality they may often exacerbate it, or are absent)[166]. And many rural populations in high-income nations are also urbanised in that they no longer work in agriculture, and lead "urban" lifestyles and commute to urban areas.

Paradoxical situations

When studying the risk landscapes of cities and urban settlements, one is often confronted with paradoxical situations. For example, cities have been at the core of modern civilisations, driving development, prosperity, innovation, and creativity and implementing political imperatives. And since they concentrate people, power, wealth, and productivity, they have traditionally developed in locations relatively safe from natural hazards with sufficient access and supply to the resources needed for their development. Also, well-run cities can be among the best places for education, employment, healthcare, and life expectancy[167].

However, when cities fail, so may whole societies or at least large groups within such a city or society. Aside from political or armed conflicts and economic crises, natural and socio-technological hazards have severe impacts on a city's population, function, and structures, often leading to complete failure. So cities can also be the most dangerous places on earth for those who live in an urban environment where basic social services, authorities, food and water security, sewerage and building regulations are lacking – as centres of risk, exploitation, disease, unemployment, or poverty.

Another example of urban failure is that, although changes in farming and deforestation clearly impact climate dynamics, the concentration of economic power and households in cities, and their growing demand for products and resources from outside their borders, have caused most of the greenhouse gas emissions and much of the pressure on the ecosystems surrounding these cities. But cities also have the potential to reduce emissions most effectively by increasing the efficiency of urban transport, legislating for energy-efficient buildings, and adopting denser urbanisation patterns.

A third example is that, in theory, municipalities should have the resources required to provide protection from natural and human-induced hazards for vulnerable groups and assets. However, local governments often lack these resources and the detailed knowledge about the elements at risk, nor do they enjoy the trust of all societal groups. In contrast, civil society organisations (from international NGOs to community-based organisations) do possess such knowledge and are more likely to have the trust of the populations at risk. But if ideally local governments and CSOs should work in partnership, in reality there are many obstacles to this collaboration that need to be removed and incentives to be created in order to reduce vulnerabilities to disasters of a growing number of people.

Finally, cities will bear the brunt of the impacts of natural and human-induced hazards exacerbated by climate change and uncontrolled urbanisation. But urban centres offer at the same time the widest range of options for reducing risks from extreme events and climate change. So these are the locations where much of the efforts in disaster risk reduction and climate change adaptation should start and be focused.

What is "urban" risk?

Urban areas can be defined by their economic functions, i.e. when secondary or tertiary sectors dominate over the primary (i.e. agriculture, forestry, or mining) sectors found in rural areas, by population density or size, or simply by administrative criteria, where all land and activities lying within a metropolitan district become "urban."

If cities and urban settlements are complex, so are urban disasters, due to the interactions of environmental and technological events (changes in extremes) and more gradual changes (in mean averages), interwoven with often conflicting social vulnerabilities that occur at the intersection of nature and culture[168]. A wide range of hazards cause or contribute to urban risk which unfolds at different temporal and spatial scales and intensities.

First, and most visible in urban areas, there is the so-called continuum of risks from extensive to intensive risks, i.e. from common, everyday incidents killing or affecting few people, to relatively frequent events with higher tolls in terms of deaths, injuries and damages, to the rare but catastrophic events with many people killed and extremely high losses[169]. Many recent studies, especially in cities, have shown that the impacts of smaller-scale disasters are not reflected in international databases. An analysis by UNISDR[170] found that such disasters (mostly weather-related) accounted for only a small proportion of deaths but for a much larger share of damage to housing, infrastructure, and livelihood[171].

Second, these risks exhibit different time frames. So-called slow-onset hazards (e.g. drought) can develop over, and may last, for many months or years. Others, so-called rapid-onset disasters such as earthquakes or flash floods provide little time for warning and may cause significant destruction within minutes.

Third, risk accumulates and increases over time, as the frequency and intensity of disasters in urban areas are ever growing and urban centres expand without the required investments in infrastructure, services and land management within city limits and also the neighbouring areas. Population growth and urban sprawl reinforce existing and generate new patterns of risk - the convergence of assets and exposure in towns and cities tends to shorten the return periods of disasters. This means that efforts for recovery and long-term resilience are constantly undermined, because there is simply insufficient time between significant shocks.

Underlying factors – risk multipliers

"Urban" hazards, including those from natural events and from human activity, and visible vulnerabilities result in specific urban risk patterns, but there are many other, more underlying factors that shape these patterns and contribute as "risk multipliers". One is obviously urbanisation. More and more people live in urban settlements, in varying densities (e.g. in commercial and office areas, day-time population concentration is very high on working days, whereas this pattern switches to leisure time and recreational centres such as shopping malls or movie theatres on weekends). Whereas throughout the 20th century the growth of cities was largely fuelled by rural to urban migration, today it is attributed rather to "natural increase".

Also, a city's structure – horizontal and vertical expansion, its compactness, the built environment with specific safety features incorporated in the built mass with reference to particular hazards, etc. – influences the way in which hazards may turn into disasters.

Furthermore, there is the setting or location of an urban centre. Most densely populated areas of the world are near coastal areas, rivers, or seismically active zones. People are settled in productive floodplains or fertile volcanic slopes and where rivers offer transport routes and water supply. With increasing human vulnerability and climate change, these positive attributes are turning into places of multiple hazards.

Another aspect is urban primacy. As many cities concentrate in themselves the major functions of a region or nation, a hazardous event in such a city may lead to a complete disruption of a country's political, administrative and economic activities. This is especially the case for megacities, although one should not forget that there are relatively few of them, compared to the much larger proportion of people living in smaller, yet rapidly growing urban centres. This is also a reminder that many problems and disasters – may have their root causes on the other side of the globe.

Urban informal settlements are a key constituent of urban risk. Cities are also home to millions of poor people living in such settlements, often at high risk from various, complex, and often multiple or cascading hazards that are increasingly outside their experience and even more outside their capacity to manage. Even in cities that are very successful economically, such as Mumbai or Nairobi, around half the population lives in informal settlements.

Moreover, the counter-effects of urbanisation undermine the general conditions of urban dwellers and

therefore there coping and adaptive capacities – both because of their impact on the urban environment and because of the impacts of such a degraded urban environments on them.

A further problem is urban services. The bigger the city, the more complex the infrastructure service systems it has. Dependency on infrastructure is much higher in the developed world compared to developing nations. But whereas in the former, institutions and resources are in place to cope with possible failures, in the latter fires and other immediate hazards arising from the failure of water supply and sewage systems act as secondary disasters in many areas.

Whereas in high-income nations, the concentration of people and assets in cities is not generally associated with higher disaster risks (also because of economies of scale and a comprehensive web of infrastructure, services, and institutions that reduce disaster risks and impacts) and their urban populations take for granted that they will be protected from disasters, only a very small proportion of the population in urban centres in low- and middle-income nations have a comparably comfortable situation.

Urban planning, disaster risk reduction and climate change adaptation

Based the considerations described in the previous sections, it follows that urban management and planning are decisive for how catastrophic an event may be. Responses can be specifically targeted to reduce the risks of a certain hazard, or can be more general contributions to development and resilience building. In high-income countries, a web of accountable institutions, infrastructure, services and regulations reduces the risks from several disasters for almost all urban populations. In contrast to accumulated risks, this can be termed "accumulated resilience", an outcome of long-term social, political and infrastructural change with the aim of reducing the impacts of stresses and shocks. This includes investment in drainage, transportation, shelter, public health infrastructure and education; as well as the strengthening of citizen rights and social safety nets.

In most developing countries disaster risk reduction and climate change mitigation and adaptation measures are overshadowed by immediate development needs, such as housing provision, poverty reduction, resource access, health, transportation needs, water and food security, pollution, and waste management. Catastrophic events are already place a significant stress on development and urban planning, often reversing development gains and outpacing the capacities of authorities. Plus climate change is expected to exacerbate these developmental stresses.

But whereas emergency management and reconstruction will remain the domain of specialised agencies and risk managers, the principles of disaster risk reduction and climate change adaptation need to become inherent parts of urban planning. In fact, most activities in these fields are within conventional urban management roles – for instance, in land use management, in strategic urban planning and in setting and enforcing regulations for land use, buildings and infrastructure.

Land use planning, carried out by innovative and participatory planning procedures for the regulation of urban expansion, is a particularly effective instrument to reduce disaster risk and adapt to hazards projected to increase due to climate change. Moreover, designing disaster-resistant and resilient buildings and infrastructure as well as upgrading programmes for informal settlements that are well informed of risk reduction measures can dramatically reduce disaster risk. Even though the necessary technological expertise is available, implementation of strategies and plans and enforcement of building codes remains a major challenge. Overcoming these challenges requires not only sufficient technology and accurate, up-to-date data, but also strong and accountable local governments. Also at higher levels, governance systems that facilitate decentralisation and participation of a wide range of actors from several levels need to be established[172].

Interdisciplinary and inter-sectoral training, research and cooperation, especially through public-private partnership, can enhance various capacities at the city level. Interaction among practitioners from different sectors is essential to avoid professional separation and duplication of efforts and to make disaster risk reduction and climate change adaptation fundamental and implicit principles in urban development and planning efforts. Cities cannot bypass developments on the national level (or international commitments which are usually made between national governments) if they want their needs to be respected and funded by national governments. Their local policies should therefore be aligned to regional and national policies, where mainstreaming general development and climate change adaptation is especially important[173]. At the same time, national and international agencies need to specify their DRR, CCA and develop-

ment frameworks so that they reflect local differences and how to work with urban community-based organisations and urban authorities. Initiatives at the various levels should move from reactive emergency relief toward more proactive risk reduction. This requires more and stronger partnership between humanitarian and development actors, especially during reconstruction phases when it is difficult to promote the time-consuming change of "building back better" as opposed the rapid provision of basic services when the risk of uncoordinated and fragmented reconstruction activities is high.

Hazards and vulnerabilities (including exposure and coping capacities) as well as post-disaster needs and the measures implemented need to be continuously monitored and evaluated. Local and national governments need to engage in and improve such urban (risk) assessments, with support from the international community. But assessment data should be embedded in systematic and longer-term efforts and feed into initiatives on the city or national level. These also aim to build a culture of risk awareness through education and information programmes, and especially early warning systems for timely and adequate disaster response.

Food for thought

Despite all the terrible consequences that disasters entail, they should also be seen as an opportunity – to reconstruct cities and communities in a safer and more sustainable way, to raise awareness of risk, health issues and environmental problems, to foster solidarity and social cohesion, and to trigger changes in governance. They offer the chance to establish new relationships of municipal governments with civil society organisations and the private sector and urban and suburban areas with peri-urban and rural areas. They have also led to the concept of cities as systems whose characteristics need to be understood and whose resilience needs to be improved and monitored. For example, UN-HABITAT is tackling the challenge of establishing a new analytical framework for urban territories that takes into consideration the large differences between small towns and large or even mega-cities and the continuum between urban and rural areas. Support from information technology as well as focusing work on homogenous units (e.g. types of spaces, housing, materials, slopes, etc.) can simplify the work of urban planners and their supporters and partners in this context.

Also, neither cities nor development partners are inactive in disaster risk reduction and climate change adaptation. Organisations such as Local Governments for Sustainability (ICLEI) or United Cities and Local Governments (UCLG), whose members are local governments rather than states, are highly active in promoting DRR and CCA and in sharing experiences and good practices. A recent project that also includes networks such as Metropolis, CITYNET and the Earthquakes and Megacities Initiative (EMI) is the "Local Action on Disaster Risk Reduction – Partnership for Risk Reduction". As another example, the mayors of many cities around the globe have signed the Mayors Declaration on Climate Change. In addition, more and more cities are signing up to the "My city is getting ready" campaign[174].

However, international frameworks are still important in focusing the attention of multilateral and bilateral donors, as well as international civil society actors, towards disaster risk reduction and climate change adaptation in urban areas[175]. They can also facilitate advocacy and guide respective strategies at city and community levels, through, for example, internationally coordinated early warning systems for hazards such as cyclones and tsunamis. Furthermore, many governments at various levels – especially in developing countries – still require assistance from the international community in the form of finance, data, information, and technical expertise (e.g. through staff exchanges and secondments in municipal offices) to establish or improve their climate-smart disaster risk management systems and their overall urban management and planning.

Finally, many disasters are not recorded in national and international databases because they do not meet their entry criteria, and the metrics used to assess their impacts do not represent the impacts most relevant to low-income groups. Increasingly, practitioners are stressing the importance of including smaller disasters and broader sets of impact indicators beyond those concerning mortality and tangible economic damage.

164 M. Pelling, *Part IV: Natural and human-made disasters*. In: Enhancing urban safety and security: global report on human settlements (UN Habitat, Nairobi, 2007)

165 For an additional perspective on the importance of taking a separate approach to urban DRR, see contribution of Hans-Jakob Hausmann in M. Hare, Ed., Special report on stakeholder advice to policy makers (CATALYST Deliverable D4.4, 2013)

166 D. Satterthwaite, *Avoiding the urbanization of disasters*. In: *World Disasters Report 2010 – Focus on urban risk* (IFRC, Geneva, 2010)

167 D. Hoornweg et al., eds., *Cities and climate change: responding to an urgent agenda*. Collection of papers prepared and presented at the World Bank's Fifth Urban Research Symposium. Urban Development Series (World Bank, Washington DC, 2011)

168 W. Faling, 2011, *Urban Disaster Risks*. USAID Disaster Risk Reduction Training Course for Southern Africa (African Centre for Disaster Studies (ACDS), Potchefstroom, 2011) (available at http://acds.co.za)

169 D. Dodman et al., *Understanding the nature and scale of urban risk in low- and middle-income countries and its implications for humanitarian preparedness, planning and response* (International Institute for Environment and Development (IIED), London, 2013) (available at http://pubs.iied.org/10624IIED.html)

170 Revealing Risk, Redefining Development: The 2011 Global Assessment Report on Disaster Risk Reduction (United Nations International Strategy for Disaster Reduction (UNISDR), Geneva, 2011)

171 For an additional perspective on the issue of extensive and intensive risks, see contribution of Animesh Kumar in M. Hare, Ed., Special report on stakeholder advice to policy makers (CATALYST Deliverable D4.4, 2013)

172 Pelling, M. op cit.

173 For more on mainstreaming issues, see *Mainstreaming disaster risk reduction and climate change adaptation into policy making*. M.Hare et al. (this volume)

174 *Making Cities Resilient Report 2012. My city is getting ready ! A global snapshot of how local governments reduce disaster risk (*United Nations Office for Disaster Risk Reduction (UNISDR), Geneva, 2012)

175 L. Meyer-Ohlendorf, *Climate change, vulnerability, and adaptation in Sub-Saharan African cities: new challenges for development policy* (Discussion Paper 25/2009, Deutsches Institut für Entwicklungspolitik (DIE), Research Project "Climate Change and Development", Bonn, 2009)

8.

Localising CATALYST

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CATALYST Think Tank Members have called on the CATALYST project to be continued in some form, from 2014 and beyond. They have also been highlighting the vital importance of applying CATALYST knowledge products at the local level. To do so, CATALYST partners and Think Tank Members need to work together to tailor CATALYST knowledge products to the institutional and cultural contexts, as well as language, of rural and urban communities in different countries. This essay presents the CATALYST follow-up to achieve this partnership at the local level: the CATALYST-Local Community of Practice.

A key priority identified in the CATALYST Think Tank has been the eventual tailoring of CATALYST knowledge products to the institutional and cultural contexts of countries and communities, as well as their DRR/CCA capacities and needs[176]. It has been pointed out many times by Think Tank Members that best practices, for example, should be sensitive to the governance regimes and current (institutional) policy frameworks employed at the national and local levels. Furthermore, different cultures and linguistic traditions result in different attitudes to risk perception and management, which means approaches to disaster risk reduction and adaptation need to be tailored to culture and language as well. Although a limited amount of language translation was foreseen in the project itself, further tailoring the products (institutionally and culturally) to local contexts has been beyond the scope and resources of the current project. However, it has been the intention since the launch of the Think Tank process to create follow up projects that bring CATALYST knowledge to the local level.

In addition, it has been a major goal of the CATALYST project to ensure that the network created is maintained beyond the lifetime of the project. However, it is well recognised that websites alone cannot maintain the interest of professionals - there needs to be a strong reason for professionals to engage with any network, to take interest in and contribute to the information it communicates.

The Way Forward: the CATALYST-Local Community of Practice

In order to achieve the goals described above, the CATALYST project is seeking to create the CATALYST-Local Community of Practice (CoP), open to all TTM and other interested DRR/CCA practitioners. These would be individuals working for governmental and non-governmental organisations as well as private institutions, who are interested in the effective implementation of DRR/CCA capacity development activities at the local level, and in understanding how to effectively tailor the plethora of knowledge products available at the regional and global levels (CATALYST being just one source of many) to local needs. Incentives for active involvement in the CoP will be the exchange of quality information based upon the results of capacity development projects at the local level that the CoP will support the members in designing, funding and implementing.

The CoP will act as a focal point for information about the ongoing projects and for exchange of knowledge and know-how among projects and the professionals working in them. It will include tools for allocating resources for knowledge generation in response to local needs. Two important elements will be easy access to information, and active moderation/communication to connect individuals and groups working on those projects with the information they need if it is not readily available. Use of social media will also be incorporated.

CATALYST-Local projects

CATALYST has over 28 countries represented in the Think Tank, and it would be seeking to support the creation of 10 to 15 CATALYST-Local projects in countries across the four CATALYST regions. With this number of projects, it is believed that a critical mass of members will be engaged so that the CoP becomes active and self-propelling.

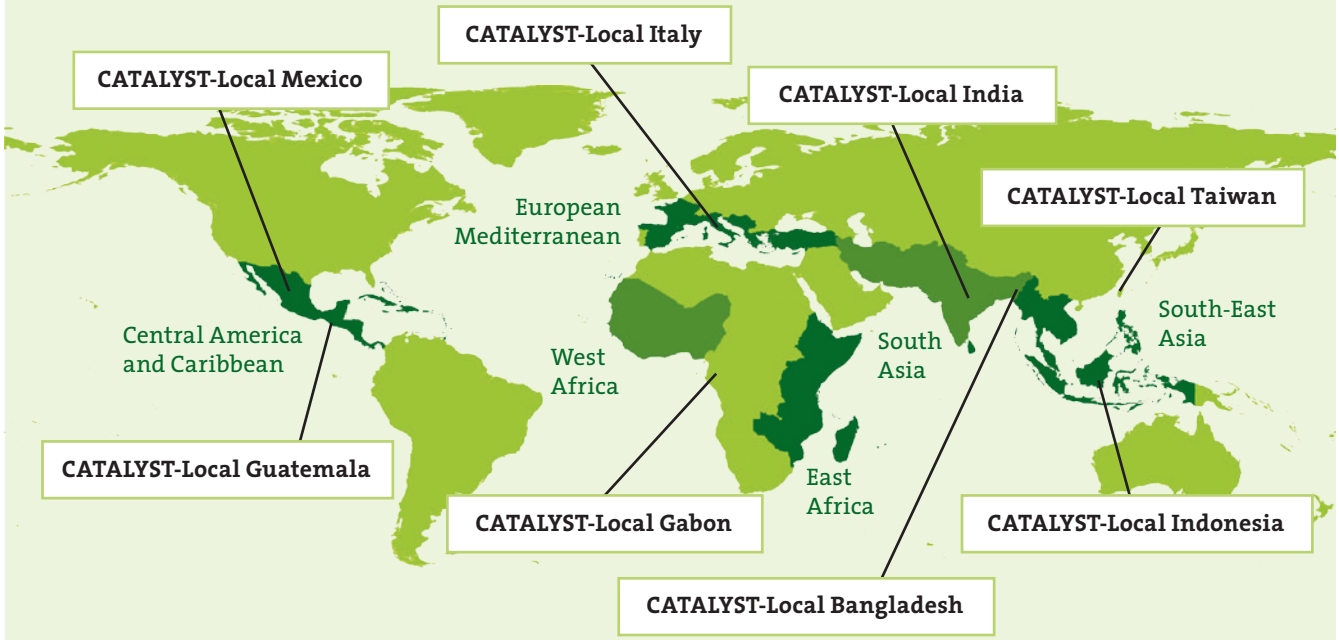
Each project will take one of three forms: Type (1) involves the use of a baseline approach to understand local contexts, capacities and needs with respect to DRR/CCA capacity development (the CATALYST approach), followed by the tailoring of CATALYST knowledge products to implement apposite capacity development activities at the local level; Type (2) involves the use of the CATALYST baseline approach to understand local contexts, capacities and needs with respect to DRR/CCA capacity development, followed by the tailoring of other knowledge products on DRR/CCA in order to implement apposite capacity development activities at the local level; Type (3) involves the creation of teams, composed of experts from the CATALYST-Local CoP to contribute expertise that supports local members in solving problems of DRR/CCA at the local level in a specific country.

A typical blueprint for a CATALYST-Local project of type (1) above can be characterised as follows:

a) Analysis

- *Institutional and cultural analysis* – national and municipal institutions are analysed in terms of the current governance of DRR responses;
- *Cultural analysis* – analysis of local perceptions of DRR/CCA;
- *Hazard mapping* – the analysis and mapping of hazards in the locality;
- *Capacity analysis* – the analysis of adaptive capacities of the locality;

FIGURE 5: CATALYST-LOCAL PROJECTS IN DEVELOPMENT



• *Requirements analysis* – the needs for DRR/CCA in the municipality will be identified

b) Tailoring

• *Identification of participatory knowledge products* – the CATALYST knowledge products that match the requirements of the municipality and that are potentially relevant to local linguistic, cultural and institutional contexts are identified in collaboration with local representatives/actors;

• *Identification and collation of assessment methods for use at local level* – each local level project will collate a list of assessment methods that are used or promoted for use at the local level, taken from national or local guidelines. This list will be added to the toolbox compiled by the CATALYST-Local Community of Practice.

• *Interpretation and tailoring of knowledge products* – the identified CATALYST knowledge products are translated into locally relevant capacity development material that matches the linguistic as well as cultural and institutional circumstances of the municipality;

c) Capacity development

• *Training and dissemination* – training workshops in the municipality, and at national level, based on the locally relevant capacity development material, will be undertaken. Distance learning opportunities will be provided via the CATALYST-Local website. Locally-relevant capacity development material will be disseminated.

Bottom-up funding approach

A proportion of all CATALYST-Local projects' funding supports the maintenance of the website and the community of practice platform for knowledge exchange. The activities will include:

• the launch of the CATALYST-Local website linked to the CATALYST website thus making use of existing communication and discussion tools, and extending its current networking functionality;

• the organisation and implementation of an archive and knowledge exchange facilities to permit the sharing of results and capacity development material among project participants;

• the organisation and moderation of regular discussions via virtual meetings among all CATALYST-Local project participants;

• the organisation of an international workshop, after the conclusion of the first set of projects, to share lessons learned from downscaling DRR/CCA knowledge to the local scale, with all CATALYST-Local project participants;

• the creation of a DRR assessment methodologies toolbox, collated via the local projects and desk research;

- the production and dissemination of workshop proceedings through the website and in hard copy; and
- the production and dissemination of a report on CATALYST-Local projects.

Potential CATALYST-Local Projects

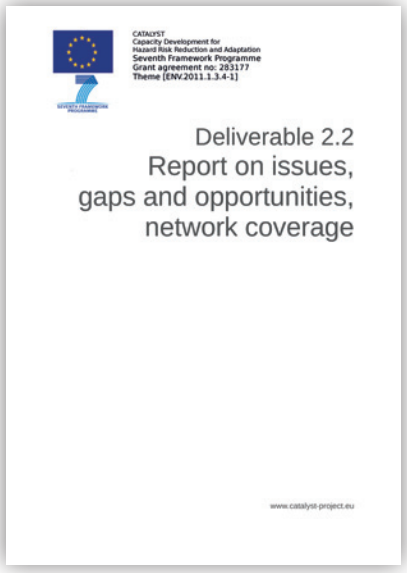
At the time of publication of this document, eight CATALYST-Local projects in Italy, Bangladesh, India, Taiwan, Indonesia, Gabon, Guatemala and Mexico, are in various stages of proposal development, and seeking funding from diverse sources. Figure 5 shows the location of potential CATALYST-Local Projects that would start between 2014 and 2016 with each project running for approximately two years. It is expected that the demonstration of the effectiveness of these initial projects, will lead the way for more CATALYST-Local initiatives around the world.

176 H. Daniel et al., eds., CATALYST Synthesis Report of Best Practices, Networks, Research Gaps, and Recommendations for Fostering Capacity Development for Disaster Risk Reduction and Climate Change Adaptation. (CATALYST Deliverable 5.1/5.2/5.3, 2013)

An annotated bibliography of CATALYST knowledge products

Title: Report on issues, gaps and opportunities, network coverage
Authors: Jaroslav Mysiak (FEEM), Elisa Calliari (FEEM), Lorenzo Carrera (FEEM), Alexandros Maziotis (FEEM), Peter Van Der Keur (GEUS) and Jochen Luther, Christian Kuhlicke (UFZ)
Deliverable no.: 2.2
Date: March 2012
Description: The report is an in-depth analysis of the issues, gaps and opportunities for improving disaster risk reduction practice in the four CATALYST regions. It includes an initial assessment of the regions in terms of hazards exposure and susceptibility to harm. Desk research was complemented by insights gained through face-to-face and telephone consultation with Think Tank members.

Available for download at:
http://www.catalyst-project.eu/doc/dl_2-2.pdf



Title: Report on capacity development for disaster risk reduction
Authors: Fons Jaspers (Alterra), Matt Hare, Caroline van Bers (Seeconsult), Peter van der Keur (GEUS), Jochen Luther (UFZ), Elisa Calliari (FEEM), Humaira Daniel (UNU-EHS).
Deliverable no.: 3.1
Date: July 2013
Description: an introduction to the concepts, terminology, and reference material regarding natural hazards, DRR and CCA to be used in Think Tank discussions. It provides, in the form of regional sub-reports, the foundation material for further discussions in the Think Tank on key issues pertinent to each of the four CATALYST regions, including an assessment of hazards and vulnerabilities; a description of measures and related governance structures; a qualitative assessment of measures; an assessment of the use of science-based knowledge in stakeholder activities and the management of uncertainties; and an overview of available DRR/CCA training.

Available for download at:
http://www.catalyst-project.eu/doc/report_cd_drr_v24_130910.pdf

Title: CATALYST Regional Workshop Reports
Editors: Matt Hare , Caroline van Bers (seeconsult)**Contributing Authors**: Caroline van Bers (seeconsult), Elisa Calliari (FEEM), Matt Hare (seeconsult), Marius Hasenheit (seeconsult), Fons Jaspers (Alterra), Peter van der Keur (GEUS), Christian Kuhlicke (UFZ), Jochen Luther (UFZ), Jaroslav Mysiak (FEEM).
Deliverable no.: 4.2
Date: July 2013
Description:a summary of the approach and in-depth description of the results of each of the four CATALYST regional workshops, involving 109 participants, and each of the two additional events, as well as to provide an evaluation of the regional workshops. This document can be used by readers who are interested in knowing more about the main source of knowledge used to generate key CATALYST knowledge products mentioned above. It is intended that this compendium of stakeholder knowledge will also be of use for scientists seeking more insight into issues important to practitioners within the four CATALYST regions.

Available for download at:
http://www.catalyst-project.eu/doc/dl_4-2_catalyst_workshopreports.pdf

Title: CATALYST Virtual Meetings Report
Editors: Matt Hare and Caroline van Bers (seeconsult)
Contributing Authors: Fons Jaspers (Alterra), Peter van der Keur (GEUS), Jochen Luther (UFZ), Elisa Calliari (FEEM), Caroline van Bers (Seeconsult).
Deliverable no.: 4.3
Date: October 2013
Description: provides the minutes of the ten CATALYST virtual meetings with Think Tank Memebrs held during the Think Tank process (2012-2013), including lessons learned from using this technology for stakeholder networking.

Available for download at:
http://www.catalyst-project.eu/doc/dl_4-3_catalyst_virtual-meeting-report_v1-0.pdf

Title: Special Report on Stakeholder Advice to Policy Makers
Editor: Matt Hare (seeconsult)
Contributing Authors: various Think Tank Members
Deliverable no.: 4.3
Date: October 2013
Description: This report is special since it represents the only knowledge product deriving from the CATALYST project that provides the opinions Think Tank Members about DRR/CCA, *in their own words*. At the end of the CATALYST project, selected TTM from various sectors were interviewed to find out what they considered to be the most urgent policy recommendations they would make to policymakers, in order to support their sector's work on DRR/CCA, and to restructure national and international funding mechanisms to support their sector. The results of these interviews, in the form of short contributions from the interviewees, are presented in this document, according to sector: UN, research, NGO, and SME. The report concludes with a thematically grouped summary of key recommendations made by the contributors.

Available for download at:
http://www.catalyst-project.eu/doc/dl_4-4_catalyst_report-stakeholder-advice_v1-0.pdf

Title: Synthesis Report on Best Practices, Networks, Research Gaps, and Recommendations for Fostering Capacity Development for Disaster Risk Reduction and Climate Change Adaptation
Editors: Humaira Daniel, Karl Schrass and Koko Warner (UNU-EHS)
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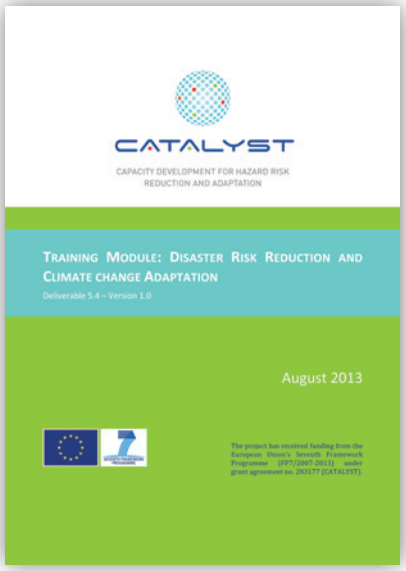
Deliverable no.: 5.1/5.2/5.3
Date: September 2013
Description: a report that outlines and synthesises the knowledge collected during the CATALYST Think Tank process (2012-2013), on best practices as well as the research, knowledge and institutional gaps that affect human capacity to undertake effective disaster risk reduction (DRR) and climate change adaptation (CCA) within the project's four regions. Common issues among the regions are also presented.

Available for download at:
http://www.catalyst-project.eu/doc/dl_5-1_5-2_5-3_synthesis_report.pdf

Title: Training Module: Disaster Risk Reduction and Climate Change Adaptation
Authors: Fons Jaspers (Alterra), Caroline van Bers (seeconsult), Matt Hare (seeconsult), Daniel Schweigatz (seeconsult), Jaroslav Mysiak (FEEM), Elisa Calliari (FEEM), Humaira Daniel (UNU- EHS), Kehinde Balogun (UNU-EHS), Catharien Terwisscha van Scheltinga (Alterra).
Deliverable no.: 5.4
Date: August 2013
Description: as part of an expanding online CATALYST training module on DRR/CCA, this product provides an overview of the first submodule – "The Fundamentals of DRR and CCA", which includes three sets of ready-to-use or adapt teaching materials on DRR/CCA, together with teaching resources such as slides, teaching notes, further reading lists, exercises, and teaching questions. It also explains the participatory process by which the modules were chosen and designed. The teaching topics in this initial submodule are: *Introduction to Disaster Risk Reduction*, *Introduction to Climate Change Adaptation*, and *Disaster Risk Reduction and Climate Change Adaptation*. This submodule is translated into Spanish and Bengali, along with the English-language original. This and other submodules in the CATALYST series will be available via the UNU-EHS online learning platform (http://www.ehs.unu.edu/elearning/).

Available for download at:
http://www.catalyst-project.eu/doc/dl_5-4_catalyst_training-module_drr-cca.pdf



Title: Best Practice Papers – Before Disaster Strikes: Transformations in Practice and Policy
Contributing Authors: Cristina Serra (TWAS), Elisa Calliari (FEEM), Peter van der Keur (GEUS), Jochen Luther (UFZ), Matt Hare (seeconsult), Fons Jaspers (Alterra), Caroline van Bers (seeconsult).
Deliverable no.: 6.4
Date: August 2013
Description: CATALYST's four 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 four extremely disaster-prone regions of the world – East and West Africa, Central America and the Caribbean, European Mediterranean and South and South-East Asia. These are available in English, Spanish and Bengali.

Available for download at:
http://www.catalyst-project.eu/doc/dl_6-4_catalyst_bp_cac.pdf
http://www.catalyst-project.eu/doc/dl_6-4_catalyst_bp_eum.pdf
http://www.catalyst-project.eu/doc/dl_6-4_catalyst_bp_ewa.pdf
http://www.catalyst-project.eu/doc/dl_6-4_catalyst_bp_ssa.pdf

Title: Best Practices Policy Notebook (upon which the present publication is based)
Editors: Matt Hare (seeconsult), Caroline van Bers (seeconsult), Jaroslav Mysiak (FEEM)
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Deliverable no.: 6.5
Date: October 2013
Description: a summary of the key results of the CATALYST Project for policy makers and professionals from all sectors. It presents from a multi-regional perspective some of the most essential themes that have emerged from the CATALYST Think Tank over the last two years, e.g. ecosystems-based DRR/CCA; mainstreaming DRR/CCA; urban DRR; drought risk management for agriculture and, importantly, how the Hyogo Framework for Action should be followed up, as well as how to continue the CATALYST legacy beyond the duration of the project. A popular version of this will be published shortly. This will be available in English, Spanish and Bengali.

Available for download at:
http://www.catalyst-project.eu/doc/dl_6-5_catalyst_bpp_notebook_v1-0.pdf

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