CATALYST

CAPACITY DEVELOPMENT FOR HAZARD RISK REDUCTION AND ADAPTATION

BEFORE DISASTER STRIKES: TRANSFORMATIONS IN PRACTICE AND POLICY

South and South-East Asia Region

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CATALYST

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EUROPEAN COMMISSION

SEVENTH FRAMEWORK PROGRAMME

CATALYST

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

Contents

Why CATALYST?

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

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

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

CATALYST REGIONAL FOCUS

1.

Living in a vulnerable place

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

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

Today, the risk posed by natural disasters is oftentimes reinforced by systemic and human-induced climate change that alters both the frequency and the magnitude of extreme events. According to the Centre for Research on the Epidemiology of Disasters (CRED, www.cred.be) at the Université Catholique de Louvain, natural disasters increased by 233% from 2000 to 2009 compared with the period 1980 to 1989, and by 67% compared with the period 1990 to 1999 (see Table 1 for more details on disaster events). As the Food and Agriculture Organization notes (FAO, 2008)[1], the expected frequency and intensity of extreme climate events is likely to worsen the scale of disasters, with multiple side effects affecting agriculture production, food availability, human health, and a potential rise in social conflicts. Since the beginning of the 1970s, public-political awareness of how disasters evolve and the scientific understanding of their causes have grown in parallel. At that time, however, approaches to mitigate their impact on society were based on previous experience and were, in general, poorly coordinated.

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

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

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

NUMBER OF SIGNIFICANT DISASTERS

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

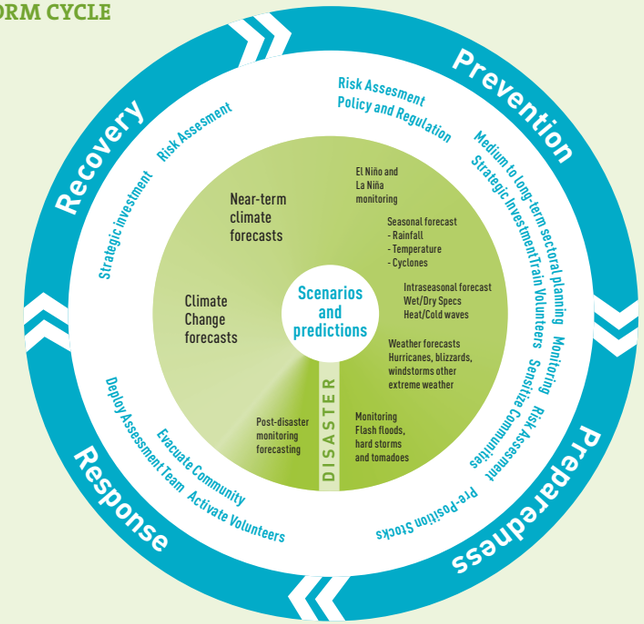
TABLE 1: *Numbers and categories of significant disasters that have plagued CATALYST's geographic sub-regions over the period 2000-2010 (based on CRED's Emergency Events Database EM-DAT, www.emdat.be).*

1.1 From emergency response to DRR planning

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

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

DRM CYCLE



1.2 One solution *does not* fit all

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

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

THREE LEVELS OF ACTION

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

- **Community-level approach** – Small communities react to disasters on the bases of local concerns and priorities. Successful risk reduction measures should build upon local strategies, and promote the development of early-warning systems, policy changes and communication strategies aimed at protecting the most vulnerable groups.
- **National-level approach** – Comprehensive actions and coordination among ministries are desirable, along with *ad hoc* legislation and nationally adapted plans of action.
- **International-level approach** – It is important to identify the existing knowledge – approaches and strategies – promoting cross-cutting coordination, and securing, at the same time, political commitment and financial resources.

2.

South and South-East Asia Region

About 30% of the world's population lives in South and South-East Asia (SSA), making it the most populated region on earth. Diverse ethnic groups co-exist on a surface of about 11.5 million square kilometers, with varied landscapes that are often exposed to extreme weather and variable climate, and a range of natural hazards. In most countries wealth remains concentrated in the hands of a minority, leaving a large part of the population vulnerable to economic shocks.

2.1 Key vulnerabilities

South Asia includes the countries of Afghanistan, Bangladesh, Bhutan, India, the Islamic Republic of Iran, Maldives, Nepal, Pakistan, and Sri Lanka. South-East Asia comprises Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam. Both regions have experienced rapid urbanisation in recent decades, and the growth of hazard-vulnerable slums (for country-specific data, see www.unescap.org/stat/data/syb2011/index.asp).

Population pressure and changing cultivation patterns, made worse by climate change, in hillier or mountainous regions is forcing a shift in agriculture to steeper, less suitable slopes that are at risk from flash floods and landslides triggered by melting snow and heavy rains in the Himalayas.

South and South-East Asia is regularly exposed to a wide range of extreme events, which occur with increasing frequency and intensity, and are worsened by rapid urbanization and climate change. The region as a whole is prone to both hydro-meteorological hazards, especially tropical storms, cyclones, floods, landslides, droughts and forest fires, and geological hazards including earthquakes, tsunamis and volcanic eruptions. Persistent poverty, rapid urbanisation and natural hazards that repeatedly hit the same locations, impact on the quality of life and life expectancy.

The average number of annual disaster events recorded from 2001 to 2010 (153 events) and the number of victims (207.9 million) in the same decade signify a highly distressed region. In December 2004, more than 220,000 people died in 13 countries around the Indian Ocean, from a devastating tsunami. In 2008, cyclone Nargis hit the Irrawaddy Delta in the Gulf of Bengal with high winds and storm surges. And, in 2009 and 2010, Southeast Asia suffered two consecutive years of drought, while the Philippines were ravaged by violent rainfalls. Table 2 provides an overview of the people affected in SSA from 1975 to 2011 by disaster type.

NUMBER OF NATURAL DISASTERS	Drought	Earthquake	Extreme temperature	Flood	Mass movement wet	Storm	Volcano	Wildfire	TOTAL
South Asia	169,390	30,505	732	1,088,431	914	117,236	/	/	1,407,208
South-East Asia	54,550	9,927	/	118,612	804	151,411	2,333	3,092	340,733
TOTAL	223,940	40,432	732	1,207,043	1,718	268,647	2,333	3,092	1,747,941

TABLE 2: *Number of affected people (x 1000) in the South and South-East Asian region sorted by disaster type in the period 1975-2011. Source: EM-DAT: The OFDA/CRED International Disaster Database http://www.emdat.be – Université Catholique de Louvain.*

3.

A unifying concept

Studies on strengthening local capacity presented at the 2012 Asian Ministerial Conference on Disaster Risk Reduction reached a striking conclusion: The challenge of delivering systematic and comprehensive programmes for disaster risk reduction and climate change adaptation in South and South-East Asia can be met by integrating the concept of resilience in such programmes.

1970
- Bhola cyclone in Bangladesh, 300/500,000 casualties

1971
- Bangladesh Meteorological Department

1984
- International Centre for Integrated Mountain Development (ICIMOD) established
- Indonesian Meteorological, Climatological and Geophysical Agency (BMKG) launched

1970s
- Cyclone centers built in Bangladesh

1972
- One of the largest NGOs, with experience in disaster management and climate change established

Timeline of major milestones in DRR and CCA since 1970

3.1 Enhancing capacity

Disasters result from the combination of one or more hazard events and the vulnerability of exposed populations. Awareness, early warnings and evacuation plans and facilities, disaster recovery funds, and emergency preparedness plans all help reduce the impact that hazard events have on vulnerable populations. A combination of good governance, improved knowledge-sharing and communication, as well as broader participation of the affected populations, especially in local level decision-making, are vital ingredients of capacity development for Disaster Risk Reduction and Climate Change Adaptation. Encouraging participation of the poorest and most vulnerable social groups is crucial to this process.

It is projected that climate change will put about 49 million more people at risk of hunger by 2020. By 2050, a significant increase in saline intrusion is expected that will likely affect close to 60% of agricultural lands linked to coastal areas.

Achieving broader involvement of all the actors is a recognized precondition for building resilience, because of the central role it plays in DRR and CCA, and in particular to address the needs of more vulnerable communities. In this region, a culture of government and civil society partnerships, including the private sector, is largely lacking. Efforts to engage communities in local development processes are not always successful and usually do not last long.

Challenges in multi-stakeholder collaboration for DRR and CCA stem from the different perspectives and organizational cultures among potential collaborators, and the lack of a coordinating body among the collaborating partners, which would ensure that short-term measures for DRR are appropriately integrated with longer-term adaptation measures.

1986
- Asian Disaster Preparedness Center (ADPC)
- Unnayan Shahojogy Team (UST) national NGO in Bangladesh

1991
- Storm surge in Bangladesh, 138,000 fatalities

1993
- CARE becomes the "Cooperative for Assistance and Relief Everywhere"
- Disaster Management Bureau (DMB), Council and Committees established

1999
- Orissa Cyclone, 20 million homeless

2004
- Indian Ocean earthquake and Asian tsunami, 280,000 deaths

2005
- International Centre for Water Hazard and Risk Management (ICHARM)

2008
- Hurricane Nargis, 138,000 deaths, US$10 billion damage

2009
- Rainfall devastates the Philippines; droughts affect several Asian countries
- Patuakhali Science and Technology University (PSTU) introduces a Faculty of Disaster Management

2010
- Standing Order on Disasters (Bangladesh)
- Cyclone Phet, Pakistan, US$780 million damage

2013
- Mahasen tropical storm hits Bangladesh, US$5,14 million damage

Timeline of major milestones in DRR and CCA since 1970

3.2 Effective measures

Effective DRR and CCA strategies require a coordinated effort that combines technology, institutional capacities, management skills, and communication. To capitalize on the available knowledge, and include measures that have proven effective, it is necessary to make such knowledge readily available and easily interpreted by operators. Furthermore, integrating Climate Change Adaptations in Disaster Risk Reduction contributes to climate-sensitive decision-making and practices (see QR code).

Pooling resources, expertise, and strengths, as well as sharing experiences among regions and countries, remains one of the best recipes for advancing capacity development and resilience.

In recent years, a number of structural and non-structural measures to enhance risk reduction through improved preparedness and response have been implemented throughout South and South-East Asia. Both have been fulfilled by institutional actors and through community-based initiatives, and both help build local resilience. Floods and earthquakes are among the major hazards often resulting in disasters that traditionally strike this region. To contain floods and to buffer the effects of earthquakes, structural measures have traditionally been relied upon.

The most common measures for flood protection include (1) *embankments* constructed with earth or concrete walls, to restrict rivers to their existing course; (2) *dams, reservoirs and water storage basins* for storing excess water that can be used for irrigation, power generation, and industrial purposes; and (3) *coastal protection dikes and other structures* to prevent flooding from sea water.

In general, disaster management tends to rely on physical infrastructure for building protective shields. However, structural measures (e.g., building dikes in flood-prone areas) are nonflexible solutions with high levels of sunken costs. Instead, the designation of floodwater retention areas to store excess water can be used to mitigate the impact of sea level rise. This is an example of alternative structural measures that are often more effective for reducing impacts.

Non-structural measures include legislation, policies, awareness-raising programmes, training and education, and guidance on good practices. Measures associated with the mitigation of earthquake-related disasters are numerous and include:

1. *early warning systems*;
2. *periodic review of existing codes for earthquake resistant buildings*, the introduction of new model building codes and retrofitting guidelines;
3. *capacity development* among engineers, planners and architects, through training and education at various levels;
4. *development of realistic attenuation models* for estimation of seismic hazards, which are lacking in many South Asian countries.

Awareness-raising and training are cost-effective measures for reducing the risks associated with natural disasters. Community Volunteer Groups, going from door to door in Bangladesh, for example, play a key role in raising awareness on actions that reduce risk and disaster impact, and in developing individuals' skills through training courses including fire safety, first aid and search and rescue.

4.

From goodwill to best practices

CATALYST's Think Tank Members (TTMs) have discussed the state-of-the-art measures and actions employed in South and South-East Asia to reduce risks associated with natural disasters and cope with climate change. The following pages provide a selection of best practices recommended to help promote the transformative processes that draw on existing scientific and indigenous or local knowledge.

4.1 BP 1: strengthening development planning

Despite progress made in the assessment of vulnerability and risks, experimental approaches still prevail. There is a need to standardize assessment methods and tools and integrate them into national and local development planning processes.

The procedure

CATALYST's TTMs have provided several examples that showcase progress in this area. The National Institute of Disaster Management (NIDM, www.nidm.net), established in India under an act of Parliament, fuels capacity-development across the nation. Its vision is to create a disaster-resilient India by developing capacity in disaster prevention and preparedness. The Institute has five divisions at the district level, and provides technical support to state governments through 30 regional Disaster Management Centres.

In many disaster-prone Asian countries, standardizing procedures and enhancing connectivity, cooperation and coordination can help promote data-sharing among authorities.

Vietnam's Community-Based Disaster Risk Management Programme (CBDRM, www.adpc.net/v2007/programs/CBDRM/) is developing disaster-resilient communities, giving priority to the 6,000 most disaster-prone communities by helping them identify, monitor and evaluate disaster risks. The World Bank-funded natural disaster mitigation initiative has encouraged the participation of Vietnamese beneficiaries in the decision-making processes for local development projects. By enhancing resilience, the project is addressing the lack of transparency and accountability, building links between decision-makers and beneficiaries.

COMMITTED TO INVESTMENT

Adequate investments to promote the integration of long-term CCA and short-term DRR, are needed to respond to the frequency and intensity of extreme climate events. Endowing national budgets with binding commitments to invest in vulnerability studies, and for the transparent mainstreaming of climate/risk issues in a preparedness-oriented rather than a disaster-recovery approach is mandatory. Funding may also come from international donor funds, for example, the Asian Development Bank and the UN Capital Development Funds which fund small adaptation projects.

A similar project has been funded by the Australian Agency for International Development (AusAid, www.ausaid.gov.au) in the Quang Ngai province of Central Vietnam, where natural disasters amplify poverty levels. The project has focused on four river basins, to reduce flood and storm vulnerability. A major achievement was a rise in community awareness and improved infrastructure.

Applicability of the practice

Achieving sustainable results in DRR and CCA calls for integrating various approaches and sharing visions. Both improved coordination at political and administrative levels and stronger collaboration between governments and NGOs are needed in order to merge these two fields, especially in community-level planning.

However, linking villages and small communities to district and provincial policies can be demanding, as a shared vision may be lacking and it often requires the blending of perspectives and working cultures.

4.2 BP 2: strengthening knowledge access and dissemination

Merging scientific and indigenous knowledge on DRR and CCA calls for exchange of data and information across sectors and levels. This approach has two important advantages: it enables local stakeholders to participate in and benefit from risk reduction and adaptation measures, and it helps vulnerable populations understand scientific information. This allows communities to respond quickly by implementing preventive and adaptation measures.

Knowledge sharing entails the promotion and maintenance of an open source society, which ensures free access to publications and data, as well as training and other forms of knowledge transfer. An Internet platform for open source knowledge would include standardized national/sub-national and global data sets (e.g. DesInventar, EMDAT), a regularly updated inventory, and links to training curricula and experts.

The procedure

Effective knowledge sharing in disaster risk reduction and adaptation is achieved when the recipients of the information gain a better understanding of the potential threat posed by the hazard, and the importance of responding in a way that reduces risk and increases resilience to the event.

This objective calls for a two-sided approach. Practitioners need rigorous training in data collection, elaboration and management methods. Scientists, on the other hand, must ensure stringency in the methods used, and transparency in the results delivered. Scientists should explicitly communicate the uncertainties in their results. This is an important step in building trust in science among practitioners and the public.

Raising awareness in DRR and CCA through knowledge dissemination may be achieved at the community and district levels by offering basic education curricula on risk reduction and climate change in elementary/secondary schools; by disseminating information through Civil Service Organizations and community leaders; and by providing standardized "knowledge packages", in the form of modular information units for fieldworkers in local authorities and community organisations.

Indonesia is working to improve knowledge-sharing on disaster-risk reduction practices at the community level in communities that were reluctant to discuss disaster preparedness because of cultural taboos. These same communities have been encouraged to change their perspectives and behaviour, and today are proactive partners of civil society organisations and universities. This has strengthened their engagement with provincial and district-level governments on DRR-related policy issues (for more information on this work by SHEEP-Indonesia: Society for Health, Education, Environment and Peace, see QR code).

A key determinant to successful risk reduction and adaptation is knowledge access and dissemination, targeted at specific audiences through appropriate language, illustrations, demonstration projects and educational tools.

In Nepal, scientific and local knowledge is being integrated through an iterative dialogue. Science-based knowledge is provided to local organizations that, in turn, help to interpret and promote effective application of knowledge for DRR purposes. In the Hindu Kush Himalaya area, local residents are being trained to become "barefoot geo-hydrologists", semi-professional figures able to recognise and interpret warning signals and changes in weather conditions.

Applicability of the practice

One of the limitations to knowledge sharing in South and South-East Asia is the lack of financial resources needed to purchase costly data and modeling software; to provide training to carry out data-collection and -modeling; to interpret data and simulation results, and to implement new measures.

Other limitations and gaps include the lack of a central repository for data that are often too dispersed to be useful, or are inaccessible due to ownership or governance issues. Knowledge-sharing is a vital ingredient of DRR, but its success depends on its institutionalization and the involvement of multiple stakeholders, especially the vulnerable groups, in knowledge generation and dissemination.

4.3 BP 3: promoting leadership and social involvement

Leadership is not only a combination of planning, giving orders, coordinating and monitoring, it is also about organizing a group of people to achieve a common goal. Leadership, whether formally sanctioned or not, is critical for launching any new initiative or measure for risk reduction or adaptation, and for sustaining it over time. It plays a central role in implementing transformative practices by promoting learning, innovation, adaptive management, and by providing solid guidance throughout the implementation phase.

Effective leaders play a visionary and directional role that helps to shape policy and practice. Entrepreneurial leaders can facilitate access to resources. Collaborative leaders can bridge skills and build coalitions, particularly among diverse sectors.

The procedure

Leadership must be present at the community level, and in particular where communities need to rely on their own resources and knowledge in order to understand and reduce risks, particularly in the absence of science-based information.

The Asian Disaster Preparedness Centre (ADPC) has implemented a training course that promotes leadership in integrating disaster-risk reduction and adaptation in daily development work. In their training courses, public-sector officials from national disaster management and planning agencies, together with development professionals, share their experiences and discuss ways in which DRR can be integrated into development planning processes. This integration includes, for example, developing resilient land-use plans and DRR-enhanced investment programmes and budgets.

In the area surrounding Mount Muria, a dormant volcano on the North coast of Java, leadership has been promoted at the community level by the SHEEP-Indonesia Foundation. Comprehensive work on risk management and reduction has been undertaken in nine villages. The result of these exercises has demonstrated that participation of community members in riskmapping is instrumental in creating a sense of empowerment, and encouraging forms of community-level leadership that went beyond the formal authority roles. The Indonesian Red Cross, supported by various international Red Cross societies, is experiencing success with similar approaches.

Applicability of the practice

Encouraging public agencies to delegate some of their authority to experts and non-experts alike, particularly at the community level, promotes proactive participation and empowers citizens to take leadership roles in Disaster Risk Reduction and Climate Change Adaptation. However, accomplishing this goal remains a challenge in many countries where exclusion of the most vulnerable, and often poorest, communities is blocking greater participation and hence leadership at the community level.

4.4 BP 4: development of effective risk communication

Risk communication is a vital element of risk reduction and adaptation, and its capacity to reach target audiences depends on the source of the message (spokespersons, scientists), the media used and the message itself. It is essential that national, regional and local authorities develop risk communication plans at an early stage, carefully tailoring them to diverse audiences who often have different perceptions of the risks.

Achieving a balance between alerting people and reassuring them, especially in emergency situations, is a challenging undertaking. When developing a message, two components must be considered: the potential damage that a hazard event can inflict on human life, property, livelihoods, services and the environment; and the individual perceptions of risk that are often based on intuitive feelings and non-scientific frames of reference.

The risks associated with natural hazards always have some uncertainty and complexity that must be taken into account in the communication campaign. Well-timed, precise communication improves awareness, particularly among the most vulnerable groups, as long as the resulting public reports and statements are not oversimplified and do not omit important uncertainties.

The procedure

In many Asian countries, where human and financial resources are limited and logistical and infrastructural deficiencies are common, precise communication disseminated by well-trained communication specialists could help support the implementation of effective disaster reduction measures. Special attention must be paid to building trust and promoting collaboration between scientific institutions and the press. That helps to ensure a flow of information that can be translated into meaningful messages for local communities.

Effective messages on risk reduction and climate adaptation should be straightforward, not overloaded with scientific and technical information. But they should not be oversimplified. Tailor the message to the target audience; avoid sensationalism and overly reassuring statements.

To reach the widest audience, SHEEP Indonesia recommends a multimedia approach including newspapers, TV/radio, the Internet, social media, local info points and health centres. Raising awareness and understanding among journalists is similarly important, together with the regular exchange of information with the target audience. SHEEP, therefore, provides journalists with training focused on DRR and at the same time involves them as instructors for training community leaders and practitioners on the use of social media (e.g., Facebook, LinkedIn, Twitter).

The International Centre for Integrated Mountain Development, in collaboration with the Regional Climate Change Adaptation Knowledge Platform for Asia (http://www.climateadapt.asia/) and the Asia Pacific Adaptation Network (http://www.apan-gan.net/), have enhanced the quality and frequency of coverage of climate change issues in major newspapers in Nepal and in Pakistan. A series of training events and workshops have provided media staff, including senior journalists, with the opportunity to develop a better understanding of the science behind climate change, and the importance of adaptation (see QR code).

Applicability of the practice

In South and South-East Asia, several barriers to the successful implementation of communication strategies exist, both in rural and urban contexts. In rural areas, communication infrastructure is often poor, not just because of language and cultural barriers, but because there are fewer institutions to communicate messages. In many larger urban settings, rapid population growth has led to the rise of marginalized communities that are not included in the communication network. Underprivileged populations have less access to means of communication such as mobile phones, newspapers, television and the Internet. Also, their literacy levels are often insufficient to appreciate the nuances in key messages.

Further reading

"Disaster risk reduction: How the media can and should help". http://europeandcis.undp.org/blog/2012/11/15/disaster-risk-reduction-how-the-media-can-and-should-help/

"Know disaster, tell disaster risk reduction: training handbook". http://www.unisdr.org/we/inform/publications/11705

4.5 BP 5: integrating uncertainty in capacity development

DRR and CCA tend to be addressed on the basis of experience, whether it is science-based or derived from local knowledge. Historical information, for example, is used to develop new building codes and infrastructure projects. However, little attention is paid to uncertainty in the frequency and magnitude of future extreme climatic events.

The notion of integrating uncertainty into capacity development for DRR and CCA is not yet commonplace, at the national or regional levels. Hence, decision-makers need to increase their awareness and knowledge of the different types of uncertainties inherent in risk reduction and climate change adaptation.

Uncertainty stemming from incomplete knowledge can be dealt with by providing access to more accurate and reliable scientific information. Intertwining local knowledge with scientific data should enable the scientific community to provide better scientific knowledge that is more tailored to local needs. Uncertainty may also stem from the inherent variability of climatic patterns, or from ambiguity in the likelihood and impacts of events due to different perspectives and cultural backgrounds of the population. The latter type of uncertainty can be reduced through closer cooperation, information-sharing and the development of mutual understanding among all the parties involved in DRR and CCA. This in turn can contribute to more informed and coordinated decisions under uncertain conditions, thus avoiding costly mistakes – or even worse, inaction.

The procedure

Capacity development in DRR and CCA should address the uncertainty related to increasing variability of current climatic patterns[2]; to future climatic conditions, and to the outcomes of climate models. Unanticipated socio-economic developments may also increase vulnerability to disasters. Likewise, the inclination to neglect local knowledge in the assessment of vulnerabilities and in the design of risk reduction and adaptation measures may render them less effective.

Examples of integrating uncertainty in DRR and CCA include:

(1) addressing sources of uncertainty directly. In flood management, for example, it is important to evaluate available climate data and maps that, in turn, influence the quality of the results of computer simulations of projected water levels. This, in turn, influences the development of adaptation strategies for coastal defenses. Successful examples include the Jakarta Coastal Defense Strategy in Indonesia and the Delta Programme for flood protection and flood risk management in the Netherlands (http://www.deltacommissie.com). The approaches to addressing uncertainty in these programmes can be transferred to other delta areas in countries such as Bangladesh, Thailand and Vietnam.

(2) the joint development of scenarios by experts and stakeholders to identify relevant socio-economic uncertainties. Such an approach has been applied in the German Nordwest2050 project on climate adaptation (http://www.nordwest2050.de/) and in the European CLIMSAVE project on the assessment of climate change variability (http://www.climsave.eu/). The same methodologies can be adapted to the Asian region.

Applicability of the practice

The ability to deal with uncertainty is relevant at all levels of governance. It is possible to make considerable progress through training and education, uncertainty guidelines (see QR code), and the introduction of policies that explicitly address uncertainty[3]. When uncertainty cannot be fully addressed or coped with, priority should be given to no-regret measures.

Uncertainty in DRR and CCA, and its mainstreaming in capacity development, planning and development of measures can be promoted through three key actions:

(1) Raising awareness of and demystifying the notion of uncertainty;

(2) Making use of existing guidelines on dealing with uncertainty;

(3) Promoting stakeholder and public participation to share different perspectives on uncertainty.

[2] IPCC. (2012). Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. http://ipcc-wg2.gov/SREX/report/

[3] Jaspers, A., M. Hare, P. Van der Keur., J. Luther, E. Calliari., H. Daniels., C. Van Bers (2012), CATALYST Deliverable 3.1 - Report on Capacity Development on Disaster Risk Reduction (downloadable from http://www.catalyst-project.eu)

Take home messages

Years of experience in Disaster Risk Reduction and Climate Change Adaptation confirm that these two fields require merging into planning and management. CATALYST has analyzed recent knowledge in these fields and extracted the recommendations that should be adopted, monitored and evaluated to obtain effective results, while minimizing risks and damages to people and property.

- **Disaster Risk Reduction and Climate Change Adaptation are a priority** – DRR and CCA must become an integral part of policies and administrative programmes, based on standardized approaches, synchronized plans and enhanced coordination between actors involved in natural hazards and climate change. Promoting vertical integration of interventions could avoid duplication of activities and fragmentation of efforts.
- **Knowledge sharing and dissemination promote cooperation** – Providing access to proper information is a priority. Knowledge-sharing and information transparency is a vital ingredient of DRR, but its success depends on its institutionalization (e.g. via an "open source society") and the involvement of multiple stakeholders, especially vulnerable groups, in knowledge generation and dissemination.
- **Leadership and social involvement are pivotal** – Leadership is critical to address the complexity and uncertainty associated with natural hazards. Collaborative leaders respect local traditions and approaches; effective leaders forge partnership; entrepreneurial leaders ease access to resources.
- **Early risk communication is a must** – Communication strategies must be planned ahead of emergencies, ensuring close cooperation with the media. Messages from institutional sources must convey clear information avoiding sensationalism. Communicators must be aware of different risk perceptions associated with a hazard which shape the response to the disaster and to authorities' recommendations.
- **Coping with uncertainty is part of capacity development** – Uncertainty must be a matter of open communication. Guidelines to communicate uncertainty, access to data and measurements, and the promotion of stakeholder and public participation to help reduce ambiguity, are essential. They can support a fruitful process leading to adaptive solutions for uncommon problems.

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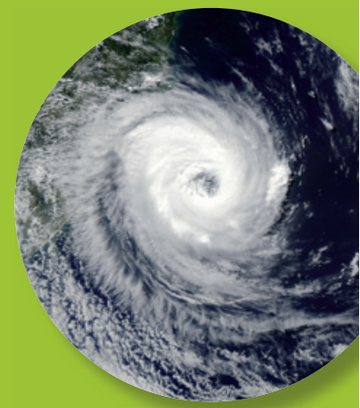

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