Protifolon

Disaster Risk Management and Climate Change Adaptation in South Asia

Issue 3, December 2010

Contents

Welcome to D.Net's Protifolon, a new print and online policy briefing series that highlights cutting edge thinking on the emerging issues affecting Bangladesh. This issue focuses on where disaster risk management approaches are taking longer term climate change perspectives. The intention is to highlight, through a series of case studies and research summaries, some best practice/management practices implemented in South Asia and offer recommendations for both practitioners and policy makers.

Building resilience, reducing risk

Disaster Risk Reduction (DRR) has been high on the international agenda since the Indian Ocean tsunami of 2004. In January 2005, 168 governments agreed the Hyogo Framework for Action, a detailed set of priorities to minimise losses – human lives as well as community and other assets – by 2015. The five main areas of action are:

- making disaster risk reduction a priority;
- improving risk information and early warning;
- building a culture of safety and resilience;
- reducing risks in key sectors; and
- strengthening preparedness for response.

DRR aims to reduce risk and minimise the effects of a disaster by building safe homes in flood-risk areas, implementing early warning systems, or developing saline-resistant varieties of rice, for example.

It is now widely accepted that climate change has a direct impact on the prevalence and seriousness of disasters. Higher rainfall, changing temperatures and rising sea levels are likely to make natural disasters more frequent. Adaptation to climate change and DRR both seek to reduce vulnerability and achieve sustainability. Indeed, efforts are growing to link DRR and climate change adaptation more closely in policy and practice.

DRR is integral to adaptation – the 'first line of defense against climate change impacts' such as flooding from glacier melt or sea level rises. DRR knowledge and expertise on building resilience is a useful starting point for adaptation policies. In turn, the DRR community, it is argued, needs to think more about the longer term impacts of climate change-related disasters such as the loss of biodiversity, deforestation and soil erosion.

This issue of Protifolon focuses on: how local communities in six countries in south-east Asia are managing risk; how they are coping with and preparing for possible disaster in their villages; how people living on the flood plains of the Brahmaputra-Jamuna river in Bangladesh are coping with annual flooding; and how rice farmers in Hambantota district, Sri Lanka are dealing with increasing soil salinity. Local communities are often the most directly affected by disasters but they also possess important local knowledge, passed down through generations, to manage risk.

The poorest are the most vulnerable to risk. They will probably have no savings or safety nets and no alternative sources of income or food if, for example, a flash flood destroys their home and livelihood. Reducing people's vulnerability at the community level – being better prepared – means they will be more resilient to natural hazards.

There are many types of DRR activities, some of which are described in more detail in the articles that follow. For example:

- establishing early warning systems, although these can be costly to run and maintain
- using local knowledge, which is tried and tested in the local context
- building understanding and awareness through local events and activities
- developing contingency plans
- building flood-resistant buildings and safe homes
- helping people find and develop alternative sources of income
- putting insurance and micro-finance initiatives in place to help transfer risks and provide additional resources.

Useful Reading

Strengthening Climate Resilience: Integrating adaptation, disasters and development, http://bit.ly/a4N3rT

Convergence of Disaster Risk Reduction and Climate Change Adaptation: A Review for DFID, by Tom Mitchell and Maarten van Aalst, 2008, http://bit.ly/bjjTY3

Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters http://bit.ly/b2AUT0

Bangladesh: Clustered villages beat the floods

The effects of recurrent flooding – at least once and sometimes twice a year – in poor rural communities living along the Brahmaputra-Jamuna river in Bangladesh are severe and aggravated by climate change. While coping strategies developed over generations have helped people to survive, they are generally ill-prepared in the face of repeated flooding and ongoing erosion.

Local training activities to mainstream livelihood-centered approaches to disaster management @ Practical Action

Annual flooding affects everyone. Even those who can cope lose their few assets, including their sources of income like crops, for example. The most vulnerable have no savings, no alternative skills or source of income, and no family networks to turn to for help.

A Practical Action project shows that a livelihoods approach to risk reduction can be effective in helping local communities to increase their resilience to flooding. This project was run in the Gaibanda, Bogra and Sirajganj districts on the west bank and floodplains of the river.

A community-based livelihoods approach puts people first and aims to strengthen their ability to prepare for, cope with, and recover from shocks and hazards. The project also links this approach to wider national and institutional initiatives to encourage local government officials and policymakers to respond more effectively to poor people's needs. Coupled with disaster preparedness and contingency planning that build on people's own coping mechanisms, communities can now manage hazardous situations more effectively and recover more quickly.

The communities involved assessed their own situation, using participatory tools. They identified local risks, discussed their strengths and weaknesses, and their assets and deficiencies. They explored ways to strengthen their existing coping strategies and skills. Communities also voluntarily formed community-based organisations to lead in identifying and implementing local development activities. All of this has reinforced community cohesion and emphasised the value of collective action during adverse times.

The project provided training and capacity development in disaster risk reduction (DRR) for community volunteers, students, teachers, religious leaders, and district and sub-district disaster management committees. Around 300 community members and 300 school children, half of which are female, volunteered for the training, which included search and rescue, first aid, and circulating early warning messages. Other community activities included drama and school-based campaigns to raise DRR awareness, and community meetings to: demonstrate what to do before flooding occurs; how to respond to early warning messages; where to find safe shelter during floods; how to stockpile household assets in case of emergency; and so on.

Cluster housing

Low-cost raised dwellings – or cluster housing – are built at least seven feet above the water level so that they are flood and storm resistant. This has improved people's ability to cope and fostered a social network within cluster villages so that people can support each other and work together. In particular, women living in cluster villages are now less vulnerable to disaster impacts, especially when pregnant or giving birth. Further successful initiatives include:

- installing raised tube wells (hand pumps) for clean drinking water whilst normal wells are contaminated by floodwater
- planting saplings around villages to prevent soil erosion
- encouraging alternative livelihood opportunities for income and food, such as floating gardens, vegetable gardening, fish culture and tailoring.

Setting up cluster villages stimulated a productive exchange of ideas and learning, and encouraged people to adapt and replicate successful practices. Innovations based on people's experience and knowledge are needed to ensure that development is sustainable and that communities remain resilient.

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See also

Good Practices for Community Resilience, edited by Barkat Ullah, Farida Shahnaz, and Pieter Van Den Ende, Mainstreaming Livelihood Centered Approaches to Disaster Management, Practical Action Bangladesh, 2009, http://bit.ly/8ZTo4E

Photo: Md. Masum Billah

Bhutan: Melting glaciers and flood risk

Bhutan is a small land-locked country in the eastern Himalayas. It has one of the most formidable mountainous terrains in the world, with peaks rising as high as 7,500 metres and the entire northern highlands covered with glaciers or snow. Temperatures are predicted to rise by at least 2ºC by 2100 and glaciers to retreat by 49cm.

Bhutan's landscape makes its people vulnerable to climate change @Jeremy Horner/Panos

Bhutan is thus becoming increasingly vulnerable to climate change-related extreme weather events. Many Bhutanese live in fertile valleys along river systems that begin life in the glaciers and glacial lakes. If the lakes burst through the moraine, the lives and properties of these communities are at risk. This has happened several times over the last 100 years. The last glacial lake outburst flood (GLOF) along the Puna Tsang Chu valley in 1994 destroyed many houses and livelihoods without warning.

People in Bhutan have maintained a delicate balance over the centuries between their lifestyles and the fragile mountain ecosystem, which could be seriously disrupted by climate change. Various studies and practical observations show that flooding from burst glacial lakes is a real threat. There are 2,674 glacial lakes in Bhutan and 24 have been identified as potentially dangerous with a high risk of bursting their banks and causing flash floods.

Capacity Strengthening in Least Developed Countries for Adaptation to Climate Change is a multi-country project run by the International Institute for Environment and Development in association with partner organisations in Kenya, Senegal, Zimbabwe and Bhutan. The project aims to support efforts to adapt to the effects of climate change through long-term capacity strengthening activities with governments and civil society.

Many villages, towns, agricultural land, and important infrastructure such as hydropower installations are located downstream of rivers fed by these high-risk glacial lakes. A GLOF would have a devastating impact on people's lives, livelihoods, settlements, and infrastructure. Government, civil society and communities need to plan and adopt adaptation measures as a matter of urgency.

Some measures have been already taken in a few areas, for example:

- Personnel have been posted to remote areas and provided with radio communication systems to monitor lakes as a rudimentary early warning system. But remote sensing technology is crucial for monitoring changes in glacial retreat and the growth of glacial lakes.
- Risk assessment and mapping have determined who the most vulnerable people are and where they live.
- Engineering measures included lowering the water levels of high-risk lakes.
- Other measures may involve relocating the most vulnerable populations, reinforcing bridges and roads, and constructing check dams and riverbank protection walls.

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See also

Capacity Strengthening in the Least Developed Countries for Adaptation to Climate Change, Adverse Impacts of Climate Change on Development of Bhutan: Integrating Adaptation into Policies and Activities, by Mozaharul Alam and Dago Tshering, CLACC Working Paper 2, Bhutan, Bangladesh Centre for Advanced Studies, 2004, http://bit.ly/8Yo6tG

Local Coping Strategies and Technologies for Adaptation to Climate Change, UNFCCC Expert Workshop, 12-13 October 2003, New Delhi, Country Presentation on Bhutan by Thinley Namgyel, National Environment Commission, Royal Government of Bhutan, http://bit.ly/dkiceY

India : Community Disaster Resilience Fund

The Community Disaster Resilience Fund (CDRF) is a mechanism to direct resources for disaster risk reduction (DRR) to vulnerable communities. The National Alliance for Adaptation and Disaster Risk Reduction, a network of 170 organisations working with local communities, coordinates the fund and aims to bridge community experience with disaster risk management, climate change adaptation and to develop policies at all levels in India.

The fund aims to:

- show that a funding mechanism can promote a decentralised, pro-poor community-driven approach to DRR
- develop the capacity of local communities to identify their vulnerabilities and how they can reduce associated risks
- improve understanding of community resources and resilience initiatives
- generate lessons and resources, and form partnerships to ensure that community-led disaster resilience priorities are met.

Promoting locally led DRR @ National Alliance for Disaster Risk Reduction, 2009

The initiative was launched in eight states: Assam, Bihar, Orissa, Tamil Nadu, Andhra Pradesh, Uttarkhand, Gujarat, and Rajasthan. Communities seen as the most vulnerable to disasters and facing multiple hazards were selected for the pilot project. These hazards include annual floods, flash floods, tsunami waves, cyclones, droughts, heat waves, earthquakes, and groundwater salinity.

Communities identified a wide range of issues during mapping exercises including: the need to place water pumps and sanitation facilities on higher ground away from flood water levels, the need for safe and flood-resistant housing; and the need to find alternative livelihood strategies given that farming is so vulnerable to devastation from extreme weather events. Stronger community resilience would also require:

- better strategies to prepare for disaster
- early warning and emergency response measures
- stronger community resilience practices – regarding health services, and sanitation and drinking water facilities, in particular.

The project resulted in some impressive examples for DRR and community-based adaptation initiatives in several states, including the story of Bihar, outlined below.

Living with floods in Bihar

Communities in five villages in Darbanga district, Bihar, have formed disaster task forces, which include women and men, to work out how they can cope with recurrent flooding. The villages – Molaganj, Kharatia, Jamalchak, Ranipur and Alinagar – were selected because they suffer from flooding more than others. Flood water enters these villages first and stay there for the longest time– up to three months, resulting in the loss of food, seeds, fodder, grains, agricultural produce, livestock, medicines, documents, and most importantly, livelihoods. Many people live below the poverty line and caste divisions prevail.

Kanchan Seva Asharam, a local NGO, encouraged the formation of the task forces and trained participants. Twenty five new self-help groups in two villages now have seed funding, which they are increasing by lending on to member groups who can then lease land for growing vegetables. The groups also have community grain banks. A longer term aim is to establish links between the village level task forces and disaster management authorities and other government departments.

Recommendations

- Government, NGOs, and private entities need to recognise the important role that women and community groups can play in DRR activities. Building on existing local knowledge and experience in coping with disaster will help communities build resilience.
- DRR programmes must be aligned with poverty reduction, income generation, and sustainable development initiatives.
- Community-level disaster preparedness and resilience strategies need to be used as resources and starting points in creating social safety nets.

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See Also

One year later... Learning's' from the Pilot Initiative in India, National Alliance for Disaster Risk Reduction, Community Disaster Resilience Fund (CDRF) October 2009, http://bit.ly/dzJUXd

Disaster Watch: http://bit.ly/cPgkGq

Myanmar: Disaster Response and Resilience Learning Project

Participants during peer learning activity @ Save the Children in Myanmar

Cyclone Nargis hit Myanmar in May 2008 with 200 kilometre winds and tidal surges of up to four metres high. It is estimated that up to 2.4 million people were affected and at least 135,000 killed.

The Disaster Response and Resilience Learning Project is an inter-agency capacity-building effort, developed by Save the Children, to improve response and recovery capacity and to strengthen disaster risk reduction practices. The project aimed to reach 480 staff working in humanitarian organisations, to increase learning of concepts and principles related to humanitarian work, including: DRR and disaster response, accountability, and international standards.

An assessment helped identify the learning needs and preferences of staff in local and international NGOs and directly informed the objectives and approach of the project. The assessment revealed that, prior to Cyclone Nargis:

- 48 percent of respondents had worked for a humanitarian organisation
- 29 percent had worked in an emergency situation
- 89 percent had never received training in emergency response, humanitarian principles, or disaster preparedness.

Innovative participant-centered learning, based on experience in Sri Lanka, included field-based activities, on-the-job learning, peer support, and personal reflection. Training tools included a self-study workbook, workshops, group meetings, and 'exposure' visits. The workbooks allowed staff to learn on their own without taking them away from their work for significant periods. They were clearly written and accessible to all those working in local, community-based, national, and international organisations. The workshops provided support to participants and helped build confidence during the learning process. Group meetings provided participants with the opportunity to discuss their learning, ask questions, describe how they have applied their learning to their work environment, and to collect feedback on the workbook. The exposure visit provided participants with the opportunity to observe another organisation and to assess and learn from how it operated in response to the cyclone.

Lessons learnt included:

- Allow time to overcome challenges: for example, the lack of communication technologies (fax, internet) created coordination challenges.
- Create opportunities for knowledge transfer: most participants wanted to share their knowledge and learning. Ways must be found to extend the programme's reach across the humanitarian sector and related communities.
- Value staff time and experience: working within an emergency situation means staff are constantly faced with urgent deadlines, impromptu requests, and changing priorities which need to be recognised and accommodated within the learning process.
- Promote learning for all staff in an emergency: the foundation knowledge provided in this programme is essential for all humanitarian and NGO staff. Training and capacity building opportunities are needed at all levels, including 'front-line' staff and those based in the field.

The initial results are positive and have reinforced the need to continue to support the capacity building of humanitarian staff in Myanmar. Further improvements to increase the reach of the programme include:

- providing training-of-trainer sessions and encouraging organisations to offer the programme to their own staff
- establishing links with regional and international organisations and capacity building initiatives to adapt the materials and resources for other contexts and languages.

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See also

Disaster Preparedness Programme, Save the Children in Myanmar Case Study, May 2009, http://bit.ly/cF5GzL

Photo: Md. Masum Billah

Pakistan: Use of traditional knowledge

People living in Chitral district, high in the Hindu Kush in north-west Pakistan, depend largely on natural resources. The area is remote and vulnerable to climate-change-induced water scarcity and flooding. High transportation costs, increased prices of consumer goods, and a shortage of clean water following a disaster considerably add to people's vulnerability.

The recent flooding in Pakistan has devastated large areas of the country @ UNICEF/mogwanja

The International Centre for Integrated Mountain Development was involved in a research project across four countries examining how local communities are adapting to water-related constraints and hazards made worse by climate change in the Himalayan region. How do people cope and respond? And how successful are their strategies at reducing vulnerability? People have many different livelihood strategies including water harvesting, crop diversification, seasonal migration, micro-credit and tapping into social networks.

This article focuses on how two very different areas in Chitral district are coping with water stresses, by using traditional knowledge in particular. Shishikoh Valley has too much water, whereas Mulkhow has too little. Shishikoh endures devastating flash floods: the fertile, irrigated land is in danger of being washed away, and local communities find it hard to adapt. Mulkhow communities suffer acute water shortages as a result of changing rainfall patterns and snowfall. Springs, the only source of water, have dried up and water in irrigation canals is often wasted before reaching crops.

How do people cope in Mulkhow?

Agriculture is wholly dependent on surface irrigation or networks of small irrigation channels. Streams from glacial melt and natural springs are the only source of water. In response to shortages, villagers build *chats* or small reservoirs to store water for agriculture and drinking.

They also rely on an ancient system: water is allotted according to how much agricultural land families own. A rotation system between villages means that some use it in the day time and others at night. In Drasun village, for example, people get their water at night in the summer, while in Saht they get it during the day. The logic behind such an arrangement is that Saht is close to the water source whereas Drasun is at the tail end and the chances of losing water through evaporation during the day are greater. So people in Saht finish work before evening prayers and divert the water to Drasun until morning prayers.

Improving the efficiency of water-use is another strategy used in Mulkhow, again a highly effective indigenous system. Firstly, maintenance of irrigation channels is carried out through *mirzhoi* (communities hire one or more people and pay them in grain after each harvest). Secondly, the communities pool their resources and collectively maintain water-harvesting structures and carry out annual or emergency repair and maintenance. This collective maintenance is called *mone* (or services by turn).

And in Shishikoh?

The increasing frequency of flash floods has forced people to leave the plains and construct their houses higher up on slopes. They also build their houses out of stone rather than mud which provides better protection against floods. But people can only do this if they have access to land, social capital, and financial resources.

There is no organised flood or erosion control system in Shishikoh. Realising that exploiting the forests leads to flash floods, inhabitants of Kalas and Madaklasht villages have banned commercial and illegal cutting. They have established committees and rules under which no one is allowed to graze animals or cut trees in certain parts of the forest.

The economic status of households, strong social networks, the existence of resource (water and land) user rights, and indigenous knowledge all contribute to successful adaptation. On the other hand, poverty, isolation, the scale of the hazards, poor social networks, and the lack of relevant policies are amongst the many constraining factors.

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See also

Traditional Knowledge and Local Institutions Support Adaptation to Water-Induced Hazards in Chitral, Pakistan, ICIMOD, by Shahid Nadeem, Imran Elahi, Abdul Hadi, and Ihsan Uddin, 2009, http://bit.ly/9iZT91

Sri Lanka: Going back to indigenous rice

Climate change is causing increasing hardship and lifestyle changes in rural areas throughout Sri Lanka. It is predicted that temperatures will rise here faster than the average global rate of warming, and that extreme weather events such as cyclones, heat waves, and heavier rainfall will become more frequent.

Farmers harvesting rice @ G.M.B. Akash / Panos

The effects of climate change will be felt most profoundly in agriculture and food security, water and coastal resources, biodiversity, and human health. Rice yields could fall by nearly six percent with a 0.5C temperature rise – in turn leading to a reduction in Sri Lanka's gross domestic product of 0.2 percent, as paddy salinity increases following sea level rises. Increased evaporation will boost demand for irrigated water, further contributing to water scarcity. Higher rainfall will increase soil erosion and silt up reservoirs.

Climate change will have a significant impact on Sri Lanka's rural farmers and force profound lifestyle changes. It will destroy livelihoods if communities do not learn about climate change and get the support they need to adjust.

Testing traditional rice varieties

For rice farmers in Hambantota district in the south, increased salinity in their rice paddy fields was a significant problem, with yields dropping steeply, by up to 50 percent. The situation worsened following the 2004 Indian Ocean tsunami, creating a lack of fresh water for irrigation.

Long-forgotten types of indigenous rice offered a local solution to increasing soil salinity. There are around 2,000 traditional rice varieties in Sri Lanka and many are highly nutritional with medicinal properties and most are resistant to extreme drought conditions, diseases, and pests. Traditionally, these varieties were grown using natural inputs such as organic manure rather than chemical fertilisers or pesticides.

Seventeen farmers in Hambantota district participated in ten trials – in collaboration with the National Federation of Traditional Seeds and Agri Resource and with the support of Practical Action – to see which rice varieties could survive salinity.

Farmers were given the choice of 'variety selection' and asked to score the different rice types according to duration of crop, plant height, grain quality, and yield. The four varieties with the highest scores were then promoted through farmer organisations as hardy, saline-tolerant, high quality rice suitable for coastal rice paddies.

This participatory approach enabled marginalised farmers to adapt to changing conditions. Although traditional rice does not produce the yields of hybrid varieties, farmers' profits remain high. Traditional rice varieties only require organic manure and are purchased at a higher price by the federation – consumer demand for these rare types of rice is high. Applying organic fertiliser has also started to ease the soil salinity problem.

Using local knowledge and working with farmer communities and national farmer federations is important when assessing alternative options for adaptation. These options consider community needs and the challenges they face from rising temperatures, drought, and saline intrusion.

As one farmer said, "We were on the verge of abandoning our fields. The introduction of traditional rice has given a new lease of life to us and our fields".

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Letters to the editor

We welcome your feedback on this issue of Protifolon. Please write to us using the contact details on page 8. Please include your name and address or email.

See also

Promoting Adaptation to Climate Change in Sri Lanka, a briefing for government advisors and development practitioners, Practical Action UK, 2008, http://bit.ly/cigBPE

Success of Traditional Organic Paddy Cultivation in Tsunami Affected Fallow and Marginalized Salinity Fields in Sri Lanka, by Varuna Rathnabharathie, http://bit.ly/8ZQ6A9

Emerging Lessons: Moving forward

Given the challenges posed by climate change, it is important that disaster risk management interventions help people to manage and create sustainable changes that will allow them to adapt over time, as well as protect them from disasters.

The development of the Indian Ocean Tsunami Warning System, according to the International Strategy for Disaster Reduction, is a major achievement. Awareness of disaster risk in the area is now far higher, thanks in part to the Hyogo Framework for Action. Yet, less has been achieved in reaching those most at risk – for example building safer homes on higher ground in Pakistan or clustered villages in Bangladesh.

Emerging lessons from a number of community-level experiences in various South Asian countries outlined in this issue of Protifolon underscore the need to:

- Identify the most vulnerable locations and population groups and the types of support they will need to prepare for and cope with disaster.
- Recognise the important role that community groups and women in particular can play in disaster risk reduction activities. Involving communities is crucial: students and teachers, religious and community leaders, local government officials, local businesses, among others.
- Build on existing knowledge and experience: the success stories from Sri Lanka (traditional rice varieties) and Pakistan (indigenous irrigation management system) were both due to local knowledge.
- Raise awareness and offer and encourage training and capacity development in disaster risk management. People need to know what to do if a disaster is about to happen or has just happened: warning systems, search and rescue, first aid, where to find safe shelter during floods, how to stockpile food for an emergency, and so on.
- Set in place early warning systems. These can range from the expensive (remote sensors to monitor glacier retreat) to the less-expensive (network of local people who alert others by whatever means is locally possible: text messages, newspapers, churches etc).
- Encourage support networks so that people can look out for each other, work together in times of stress and learn from each other. Clustered villages in Bangladesh are a good example.
- Develop low-cost housing appropriate for the environment people live in, such as raised dwellings or stone buildings to escape flooding.
- Ensure access to clean water, when normal supplies are contaminated, with easily maintained wells and hand pumps.

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