



Reducing Risk through Environment in Recovery Operations

An Initial Review of the Status



Paper prepared by the United Nations Environmental Programme (UNEP) and the United Nations International Strategy for Disaster Reduction (UNISDR) as a contribution to the Annual Forum of the International Recovery Platform (IRP) 26-27 January 2009, Kobe, Japan. The purpose of this paper is to provide an introductory review of the current status of recovery operations in terms of integrating environment and long-term disaster risk reduction. The case studies are intended to spur interest in a future study, which could answer the questions above more comprehensively.

Introduction

The theme for this year's Forum of the International Recovery Platform (IRP) is "Building Back Better and Greener." This theme was identified in view of the importance attached to environmental issues in recent recovery operations and the new challenges climate change will pose to communities already vulnerable to natural hazards. It builds on the understanding that, in order to maintain progress in development while adapting to the increasing frequency and intensity of hazards, governments, communities and the international aid community simply cannot afford to incorporate the same vulnerabilities in reconstruction and recovery efforts after a crisis event.

Disaster events frequently involve human suffering and loss of life. In the tragic aftermath, however, there is an opportunity to promote sustainable development and in particular to implement sound environmental practices that reduce future disaster risk. Most changes in countries' disaster management policies and plans are initiated after large crisis events.

One of the prioritized issues of the IRP Forum is how to assess and respond to a disaster's impacts on the environment. Some of the environmental issues typically encountered in a recovery setting are the release of hazardous substances and debris into the environment; water salination and contamination; sanitation and solid waste management; ecosystem damage and loss; sustainable reconstruction; re-establishing livelihoods; and the environmental impact of relief and recovery operations.

To assist decision makers, good practices in respect of the following elements are needed:

- How to assess environmental impacts post-disasters effectively?
- What constitutes environmentally sound relief and recovery operations?
- How to engage environmental actors early in disaster recovery?
- What environment related support and guidance is available in disaster contexts?

Response and recovery efforts can either increase or decrease the risk of future disaster events, depending on how they are managed. Reviews of recent disaster recovery and rehabilitation efforts (2004 South Asian Tsunami, Hurricane Mitch, etc.) have concluded that such operations too often built back previous risk and in some case even increased pre-existing risks. The second issue is therefore how to take advantage of the unique opportunities arising from crises for promoting sound environmental and natural resource management that reduces future risk and maximizes the benefits for livelihoods, longer term development objectives and climate change adaptation. Relevant components include the following:

- What are the barriers to integrated recovery operations that build on existing development priorities and reduce future disaster risk?
- What are the existing natural hazards, as well as the climate change induced trends in hazards, and the implications for recovery operations?
- What opportunities are there in post-disaster situations to promote disaster risk reduction and climate change adaptation that include sound environmental practices?
- How should environmental services in recovery be costed?

Although the importance of environmental risk factors has been clearly demonstrated by many disasters, they are often paid limited attention in the aftermath of events on the assumption that they require long-term planning and management processes. Whilst that perception is largely true, there are also important environmental opportunities and pitfalls that cannot be ignored during short and medium-term post-disaster response, not least to ensure that underlying environmental vulnerabilities are not exacerbated by recovery efforts.

The purpose of this paper is to provide an introductory review of the current status of recovery operations in terms of integrating environment and long-term disaster risk reduction. The case studies are intended to spur interest in a future study, which could answer the questions above more comprehensively.

Green Recovery Partnership – an example of good practice

In the context of recovery work following the 2004 South Asian Tsunami, the World Wildlife Fund (WWF) is working in partnership with the American Red Cross to ensure that recovery and reconstruction activities maintain and enhance healthy ecosystems. The infusion of large amounts of resources to rebuild communities and get people back to work, however well intentioned, can generate greater environmental degradation and increase community vulnerability to future disasters if not designed and implemented according to local environmental conditions. To mitigate these potential negative effects, the American Red Cross utilizes the technical expertise of WWF and World Conservation Union (IUCN)-Sri Lanka to evaluate the environmental impacts of tsunami recovery and reconstruction activities and provide alternative solutions.

The goals of the partnership are as follows:

1. Ensure that disaster recovery projects are as environmentally friendly as possible.
2. Train American Red Cross staff and partners in sound environmental practices to benefit people and preserve habitats.
3. Build mutual organizational learning, knowledge and experience by working with a wide range of organizations and communities

The partnership focuses on four major themes:

1. Livelihoods: Restoring jobs, economic opportunities, food sources and a sense of purpose within communities.
2. Construction: Rebuilding homes and other structures with sound spatial planning, while avoiding damage to local ecosystems, minimizing community exposure, and ensuring future generations have a sustainable supply of building materials.
3. Water and Sanitation: Helping communities restore their water systems to provide clean, safe water for agriculture, aquaculture, washing and cooking, while also protecting streams, rivers and marine environments.
4. Disaster Management: Preparing communities and their environment to deal with future disasters with a minimum of human suffering and environmental degradation.

(Source: Green Recovery Partnership: WWF/IFRC Information Brochure)

Case studies

The following two case studies are used to practically illustrate the integration of environmental concerns into recovery. The case studies are based on reviews of documents related to the recovery operations, such as damage, loss and needs assessments and recovery plans. More comprehensive reviews would be required to systematically assess lessons learned and good practices on the integration of environment and disaster risk reduction into the recovery process of the two cases selected, as well as across more regions and cases.

The two case studies, Myanmar and Bangladesh, have been chosen from the environmental management community's collective experiences in addressing environmental issues in recovery processes, and are used to introduce some concrete lessons learned. The impact of Cyclone Nargis on Myanmar is very recent and the recovery process is still ongoing. Nevertheless, Myanmar's case illustrates good practices in planning and assessment and shows great promise for successfully "building back better and greener." In the case of Cyclone Sidr in Bangladesh, past recovery responses to severe flooding incorporated environment and long-term disaster risk reduction. Marked improvements were noted between flooding events of 1988, 1998 and Cyclone Sidr. Lower casualty rates than what would have been expected from such an intense storm is credited to "improved disaster prevention measures, including an improved forecasting and warning system, coastal afforestation projects, cyclone shelters and embankments" (DLNA March 2008). However, both Myanmar and Bangladesh illustrate the sensitivities in the transition from early recovery to the recovery phase and present challenges for fully integrating environment and disaster risk reduction at the earliest possible stage.

Case study I: Myanmar



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Cartographic Section

Introduction

Myanmar is the largest country in mainland South-East Asia with a total land area of 676,578 sq km and a population of 51.5 million. Its long coastline of about 2,000 km covers almost the entire east coast of the Bay of Bengal. As a heavy rainfall country, floods occur regularly during the mid-monsoon period (June to August) in areas traversed by rivers or large streams. The country is also prone to cyclones, landslides, earthquakes, and drought. Myanmar will also face new and increased threats from climate change, such as sea-level rise.

The category 3 Cyclone Nargis struck Myanmar on 2 and 3 May 2008, making landfall in the Ayeyarwady Division, approximately 250 km southwest of Yangon and affecting more than 50 townships, mainly in Yangon and Ayeyarwady Divisions, including Yangon, the country's largest city. With wind speeds of up to 200 km/h accompanied by heavy rain, the damage was most in the Delta region, where the effects of the extreme winds were compounded by a 12 foot (3.6m) storm surge. Nargis was the worst natural disaster in the history of Myanmar, and the most devastating cyclone to strike Asia since 1991.

Cyclone Nargis had a devastating impact on the environment of the Ayeyarwady and Yangon Divisions, an area where the environment and natural resources underpin the livelihoods of the majority of the population. Cyclone Nargis caused extensive damage to natural resources, destroying some 35,000 ha of natural and replanted mangroves, submerging over 63% of paddy fields, and damaging 43% of fresh water ponds. The impact of the cyclone was exacerbated by pre-existing damage to natural resources, including deforestation and the degradation of mangroves (where only 20% of the original natural cover remained prior to the cyclone) and over-exploitation of natural resources, such as fisheries. The damage caused by the cyclone in the Ayeyarwady and Yangon Divisions poses a major challenge for recovery efforts that strive to achieve sustainable development for the region.

Response

In the aftermath of the cyclone, a Tripartite Core Group (TCG), consisting of the Government of the Union of Myanmar, ASEAN, and the UN, was set up to coordinate relief efforts. One of its first tasks was to conduct a Post-Nargis Joint Assessment (PONJA) to determine the full scale of the impact of the cyclone and requirements for both immediate humanitarian assistance and medium to long term recovery.

The PONJA report recognized the key role of the environment in sustaining livelihoods and that any relief and recovery efforts must be founded on sustainable management of the natural resource base. One of the key recommendations of the PONJA was that a comprehensive Environmental Assessment should be carried out in the immediate future. This assessment would build on the preliminary assessment of environmental damage and associated losses carried out during the PONJA, and be guided by a more thorough and dedicated analysis, focusing on four distinct but related areas:

- Direct environmental damage from Nargis: This component would expand and validate the preliminary findings on mangrove damage and supplement them with more detailed reviews of surface and groundwater pollution, salinization, sedimentation and waste generation;
- Environmental footprint of recovery: Relief and recovery activities should be conducted in an environmentally friendly manner and any additional damage to natural assets need to be identified and, where possible, mitigated;
- Institutional assessment: Policy constraints and capacity gaps at community, state and national level to manage environmental rehabilitation in the short to medium term need to be identified; and
- Vulnerability Assessment: Long-term disaster and risk reduction strategic planning would be undertaken.

In response to the PONJA recommendations, UNEP proposed a project to assist the Nargis recovery programme. The overall objectives of UNEP's assistance to the Government of Myanmar through environmental assessment of Cyclone Nargis impacts and future disaster risk management are:

1. To develop capacity within the National Commission for Environmental Affairs (NCEA) and relevant government agencies to review environmental considerations in recovery efforts in the Nargis impacted areas; and
2. In the longer term to help build capacity within the NCEA and relevant government agencies for integration of environmental considerations in disaster risk reduction and management.

This proposal for a three-year project aims to address these areas, with the main emphasis on long-term recovery (to 2012 and beyond) and the key role of environment and sound natural resource management in attaining sustainable livelihoods and promoting disaster risk reduction. The project will cover capacity building and institutional strengthening for environment and natural resource management at the community, local authority and national government levels.

The Recovery Strategy for Environment and Disaster Risk Reduction

Although initially it appeared that a typical emergency response strategic framework would be adopted by the UN in Myanmar, the formulation of this strategic framework and its action plan was superseded by the decision to develop the Post-Nargis Response and Preparedness Plan (PONREPP). The PONREPP was prepared jointly by the international community and the Government of Myanmar under the auspices of the TCG and sets out a three year framework to guide recovery efforts following Cyclone Nargis.

Good Practice 1: The Placement of Environment in the Strategic Framework (PONREPP)

The advantage of this alternative framework, which makes major considerations for future preparedness, in addition to emergency response, is that the PONREPP provides a platform for transition from emergency relief and early recovery towards medium-term recovery across eight operational sectors. These cover three themes: productive lives, healthy lives and protected lives.

It was a priority to ensure that environment is included effectively in the PONREPP, both within individual sectors, but also as a separate sector. As a cross-cutting issue, environment is now included as part of the theme on "protected lives." This was a major achievement, because environment was previously seen as relating only to mangroves and was therefore classified as part of forestry only. Many interventions were made in each of the sectors, as a result of which environment is included in most sectors (livelihoods, disaster risk reduction, shelter and water, sanitation and hygiene). However, despite progress, some aspects of the cross-cutting nature of environment were still missing.

After discussions with the PONREPP team, environment was also included as a separate section. The responses, particularly from donors, were positive, as they felt that the livelihoods chapters would not be sustainable without simultaneously addressing environmental concerns.

The new post-Nargis structure for the clusters (or technical working groups) proposed by OCHA and the office of the Resident Coordinator provides for a Working Group on Environment.

Beginning Implementation

The recovery strategy for environment focuses on ensuring sound management of the environment and natural resources through strengthened systems at the community, township and national levels. Initiatives include capacity building activities, institutional strengthening, systematic assessments of natural resources, strengthening of monitoring and surveillance systems for environment and natural resources, as well as support for livelihoods-related schemes based on sustainable management of natural resources.

Good Practice 2: Explicit “Environment for Disaster Risk Reduction” Capacity Building

One of the main objectives of UNEP’s assistance in Myanmar is to help build long-term capacity within the NCEA and relevant government agencies for integration of environmental considerations in disaster risk reduction and management.

A half-day session on “Environment and DRR” was given at a “training of trainers” event organised by Mingalar Myanmar, a local NGO, for the Ministry of Social Welfare, Relief and Resettlement (MSWRR). Participants came from townships within the Nargis-affected areas. This training for local authorities was very useful in demonstrating the connections between different sectors.

Technical assistance has also been substantial. Discussions have been held with the WASH Cluster to provide training of trainers and equipment for water quality and safety. Discussions are underway with the Department of Land-use Planning of the Ministry of Agriculture to provide equipment for their planned systematic surveys of soil salinity. In addition, discussions are under way with the Department of Forestry to provide technical assistance and equipment to enable them to complete the assessment of mangroves resources in the Ayeyarwady Delta.

Good Practice 3: Communicating Environmental Advice

Advice on environmental issues must be available, but should also be requested, to have maximum impact. Positively, questions raised by various UN agencies, including FAO, IOM, UNICEF and UNDP on environment issues have been answered as needed. Examples include advice to IOM on sourcing materials for rebuilding 300 dwellings and to UNICEF on environmental education for the curriculum that they are developing for the Nargis-affected areas. The government, however, should be further encouraged to request / accept advice on environmental matters when needed.

Long-term Disaster Risk Reduction

A project concept has been prepared on environmental vulnerability and risk reduction in cyclone affected areas, and for capacity building to formulate plans and policies for disaster risk management. An initial draft was prepared after consultation with government officials, UN agencies and NGOs. If funded, the project would contribute to long-term preparedness.

The overall goal of the proposed project is to promote sustainable livelihoods and disaster risk reduction in the Nargis-affected areas through strengthened systems for the sound management of environment and natural resources at community, local authority and national levels.

This goal would be achieved through the implementation of three inter-related objectives that focus on capacity building and institutional strengthening at the community level (Objective One) and local authorities and national government levels (Objective Two), supported by the strengthening of systems for assessment and monitoring of natural resources in the Nargis-affected areas (Objective Three).

An integrated approach to the implementation of these project outputs would help to strengthen ownership of activities by communities and government agencies, thus helping to promote sustainability of the project outcomes at all levels.

Table: Summary of objectives and outputs for the proposed “Environment and DRR” project

Component One	<u>Objective One:</u> To support sound community-based environment and natural resource management practices for sustainable livelihoods and disaster risk reduction in the Nargis-affected areas.
Outputs	<u>Output 1a:</u> Strengthened capacity amongst communities, CBOs and NGOs in the Nargis-affected areas on environmental and natural resource management and DRR. <u>Output 1b:</u> Strengthened mechanisms for community participation in decision-making on management of natural resources.
Component Two	<u>Objective Two:</u> To strengthen systems at local authority and national levels for natural resource management to support community-based sound natural resource management practices.
Outputs	<u>Output 2a:</u> Strengthened capacity amongst local authorities in the Ayeyarwady Delta and Yangon Divisions to support community-based environment and natural resource management for DRR and sustainable livelihoods. <u>Output 2b:</u> Strengthened capacity at national level for coordinated approaches to the development and implementation of sectoral policies and laws that support sustainable environment and natural resource management. <u>Output 2c:</u> Strengthened capacity in the NCEA to coordinate policy formulation and implementation on sustainable environment and natural resource management.
Component Three	<u>Objective Three:</u> To strengthen information and monitoring systems for sound management of environment and natural resources in the Nargis-affected areas.
Outputs	<u>Output 3a:</u> Vulnerability assessment for Ayeyarwady Delta for climate change and DRR. <u>Output 3b:</u> Monitoring and surveillance systems for drinking water quality and safety established. <u>Output 3c:</u> Strengthened systems for monitoring and surveillance in the Nargis-affected areas for natural resources – biodiversity, fisheries, forests, mangroves, and soil fertility.

Good Practice 4: Scales of Entry Points for Environmental Management

Recovery and preparedness plans need to be planned and implemented at three levels: (1) community or village level; (2) local authority level (townships, districts and divisions); and (3) the national level. In Myanmar, local authorities are essentially national government agents, therefore it is particularly important for the national Government to provide an enabling framework for recovery and preparedness interventions. Similarly, interventions for environment and natural resource management must focus on these entry points: communities and villages, local authorities, and national government. Both the PONREPP and the “Environment and DRR” project concept propose to work at all three levels.

The strategic focus of the PONREPP is at the village level, with full participation decision making, activity design, implementation, management and accountability. Interventions under PONREPP will focus on villages and households, taking into account the different needs of men and women.

The key role of local authorities, as the level of governance closest to the people, is recognised by the PONREPP. The active participation of local authorities at the township, district and division levels in development initiatives is essential for: (1) coherent and equitable recovery and preparedness strategies across villages; (2) important infrastructure, such as schools, clinics and community facilities are correctly prioritised and approved in advance; and (3) adequate environmental assessment and monitoring, as well as local capacity building and awareness raising on environment and natural resource management are implemented.

Representatives of ministries and local administrations at the township, district and divisional levels will therefore have a key role in facilitating environmental and natural resource management by communities. Therefore, they play a key role in providing an enabling framework that supports these community level initiatives, particularly with regard to access and control over natural resources. This will require capacity building for local administration in the implementation of national rules and regulations so as to support community-based initiatives.

On the Ground Challenges

Sectoral government plans that should incorporate an environmental element include: 1) Housing – with an emphasis on sustainable reconstruction; 2) Water – access to safe drinking water for communities; 3) Agriculture – restoration of livelihoods and food security; 4) Fisheries – restoration of incomes from fishing and subsistence fisheries; 5) Salt industry – rehabilitation of salt fields; 6) Forestry – rehabilitation of forests and mangroves (particularly in terms of their environmental benefits); and 7) Preparedness and protection from future natural disasters.

Lesson 1: Communicating the cross-cutting nature of environment

Initial work focused on an analysis of government recovery plans in terms of their incorporation of environmental concerns. This was hindered by the fact that many plans were in the Myanmar language and translations were not easily available. However, based on those that were available in English, an analytical framework was prepared and two government counterparts are analysing all available plans using this framework. Some government sectors, however, still see environment as exclusively part of their own sector and would prefer environment to fall fully under their projects.

Lesson 2: The Lack of Environment as an Initial Consideration

The forestry plan was the only one to take environment into consideration in a very systematic way, although the implementation of the plan would require further environmental assessment before execution. Unfortunately, other agency plans have not taken environment into consideration to any degree and further work is needed for this analysis to be completed by the NCEA, working with each of the agencies concerned.

Lesson 3: Funding and external review

It is often a challenge for government funding to be available for the implementation of the environment plans. When funds are allocated (e.g. for building of embankments), it would be beneficial to provide an opportunity for external technical review of the plans by international agencies.

Myanmar Conclusions

Post-Nargis work in Myanmar has made significant progress, especially in the recognition of the contribution of environment to recovery and disaster risk reduction. Good practices in Myanmar's recovery start at the choice of the PONREPP versus a typical emergency response framework. This provides better transition possibilities from response to recovery and ensures that environmental concerns are integrated from the beginning. Communicating environmental issues to the appropriate actors, providing well-received training and technical assistance - not only to the other clusters, but also to local authorities - enhances the sustainability of future environmental management for reduced hazard risk. Capacity building explicit to environment and disaster risk reduction has great momentum on all levels.

The challenges still remain concerning cross-sectoral cooperation and territorial ownership of environmental issues, as well as the need to foster further governmental support for environmental issues.

Case study II: Bangladesh



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Introduction

Bangladesh is highly vulnerable to frequent natural hazards, including cyclones, droughts, flooding and earthquakes. The recurrence of these devastating events causes high numbers of deaths, considerable losses in infrastructure and livelihoods, and repeatedly sets back progress for development. Bangladesh is currently ranked at 147 out of 179 countries for the Human Development Index (Human Development Report 2008).

It is hard to get ahead when recurrent disasters set back infrastructure and livelihoods time and again. Many elements contribute to Bangladesh's vulnerability to disasters, including poor environmental and resource management / lack of environmental and infrastructure governance, rapid and unplanned urbanization, and population growth (Beck, WB 2005).

Looking back at previous events in Bangladesh, improvements have been noted since the 1998 floods, which lasted 10 weeks, with 68% of the country and about 30 million people affected (Beck, WB 2005). Bangladesh was significantly better prepared in 1998 than in 1988, despite the fact that the flooding affected a larger area and lasted twice as long. Many of the improvements were attributed to increased credit access, economic growth, an increase in harvests based on crop alterations and a definite increase in preparedness through early warning (Beck, WB 2005).

Lesson 1: The Need to Go Beyond Basic Rebuilding

Environmental concerns for recovery and long-term risk reduction was still an area needing more substantial consideration following the 1998 floods. Housing construction was identified as needing improvement during recovery, particularly greater community participation and higher, environmentally sound standards for design.

Cyclone Sidr, a category 4 storm, hit Bangladesh's south-west coast on November 15, 2007. The storm generated 5 meter high tidal waves and coastal and river surges of up to 6 meters, breaching embankments and flooding low-lying areas. The cyclone affected 2.3 million households with 1 million seriously affected. The strong winds of up to 240 kilometres per hour and the flooding seriously damaged infrastructure such as housing, roads, bridges and sanitation. Water resources became contaminated or salinated.

Casualties totalled around 3,406 with 1,001 still missing (March 2008) with over 55,000 people injured. These numbers are considered low for such an intense cyclone and is attributed to previous efforts improving disaster prevention measures: forecasting and warning, coastal afforestation projects, cyclone shelters and embankments (JDLNA March 2008).

Post-Sidr Recovery Strategy

Good Practice 1: Integrating Environment at the Earliest Stage Possible

Starting at the early recovery strategy, environment was given distinct importance in the Joint Damage, Loss, and Needs Assessment for Recovery and Reconstruction after Cyclone Sidr. The JDLNA suggests environmental interventions to include an "awareness raising campaign with the objective to prevent further damage to the vulnerable environment; "activation of an effective GIS/RS based monitoring and evaluation system;" and reactive "environmental clean-up and rehabilitation, restoration of damaged environment and support for further protection, support for restoration of social forestry using local plant species" (JDLNA March 2008).

Good Practice 2: Explicit “Building Back Greener and Better”

While the past saw only partial environmental integration into recovery, usually with a stronger priority on credit and infrastructure assistance, the post-Sidr recovery strategy prioritizes “building back better”: improving the local capacity and utilizing environmental management.

Rebuilding of houses, schools, shelters, rural roads, embankments and markets will provide local economic opportunities and “introduce and mainstream new standards and upgrading that will help protect them against future disasters” (JDLNA March 2008). This also includes rehabilitation of the Sundarbans coastal forests ecosystem, which is listed (although last) as one of the Medium-to Long-term Recovery and Reconstruction Interventions.

JDLNA Medium-to Long-Term Recovery and Reconstruction Interventions

- Construction of housing for 20,000 households;
- Construction and upgrading of the transport network;
- Rehabilitation of electricity services;
- Rehabilitation of damaged or destroyed market places;
- Reconstruction of water supply services;
- Reconstruction of urban public infrastructure;
- Upgrading of health service infrastructure;
- Reconstruction of fully damaged schools to schools-cum-shelter;
- Reconstruction and upgrading of damaged embankments;
- Rehabilitation of the Sundarbans.

Based on the evidence that the coastal forests of the Sundarbans provided significant protection during cyclone Sidr and past events, the recovery strategy prescribes:

- Forestation along embankments, integrated with the recovery program;
- A long-term program of forestation along the coastal belt to reduce vulnerability to storms and surges;
- Large-scale rehabilitation of the Sunderbans;
- Restoration of the Gorai River system.

Along with this agenda, it is recognized that local capacity must be increased to maintain the afforestation and reforestation projects. In this way, environmental projects could help to build resilience against future storm surge, while also providing long-term income opportunities for local residents in the form of future management of forest areas. This in turn contributes to better management of the resource, which again mitigates future risk.

Local participation in projects not explicitly linked to environment, such as for rebuilding infrastructure, are also an advantage, because it allows ownership and local inputs into rebuilding needs. This can assist the environment in the long run through better long-term resource management, providing an understanding of why new types of building materials are more resilient. This would avoid a waste of building materials that the local populations would not themselves choose, without understanding the full benefits.

Risk Mitigation Through Exposure Reduction and National Planning

Good Practice 4: Disasters as Part of the Development Continuum

Flooding in Bangladesh is a natural hazard that cannot be prevented, but the vulnerability level can be lowered. The shift in approach from focusing on emergency response to long-term, sustainable livelihood protection is helping to alleviate the losses at each hazard event.

“Bangladesh is currently ranked as the most climate-vulnerable country in the world” (World Bank 2005). In order for Bangladesh to progress with sustainable development, disaster risk management and reduction simply cannot be left out of long-term planning, and any opportunities created during recovery to build back greener and better cannot be missed. The Draft National Plan for Disaster Management (NPDM, 2005-2015) is one good example of how Bangladesh’s plan incorporates the environment, mainly through its alignment with the priorities of the Hyogo Framework for Action and the United Nations Framework Convention on Climate Change. It is still awaiting final approval by the government.

Lesson 2: Environment Cannot Be the Only Answer

Risk management in Bangladesh, in particular due to its extreme vulnerability to climate hazards, must be realistic. While environmental considerations should not be excluded on any level, environmental protection is also not a stand-alone answer. The JDLNA points out that “absolute protection for all areas against all climate hazards is neither feasible nor economically defensible....Building resilience would involve a combination of ‘hard’ and ‘soft’ engineering solutions, zoning and planning, and an innovative use of economic instruments to protect assets and direct incentives toward investment in climate-resilient forms of economic activity”.

The Riverbank Protection Improvement Program (RBIP) and the Coastal Embankment Improvement Program (CEIP) are proposals that use both environmental measures for mitigating risk, as well as human-made structures.

Lesson 3: Environment Not Recognized in All Sectors

It was recommended in the JDLNA that funding for environmental needs should come from the Forestry Department, because of its role in the preservation of the Sundarbans. While this is one very appropriate area for environment and disaster risk reduction, the recommendation risks losing a coherent and comprehensive environment recovery strategy. If other sectors do not receive allocations for environmental matters, they are less likely to move ahead with plans integrating environment.

Sample JDLNA-Prescribed Recovery Investments Over Time (millions of USD)			
	Early Recovery	Medium-Term Recovery	Long-Term Recovery
Food security	254	not specifically listed	
Shelter-->Housing	45	20	0
Water & Sanitation	5	69	50
Education	5.7	52	50
Health	2.2	8.3	0
Environmental Protection	3.2	10	5.4
Governance (to improve preparedness)	1.6	0	0
Embankments & Water Control	0	66	40
Community economics, social infrastructure repairs / Financial Assistance to recover housing & goods	28.2	85	0
Agriculture	10	140	100
Non-farm	5	50	35

(Source: JDLNA 2008)

The prescribed funding trend in Bangladesh for environmental protection starts at \$3.2 million for early recovery (4-8 months into recovery), which is less than 1% of the total recovery funding. The prescribed medium-term recovery funding for environmental protection increases to \$10 million - still only 1.7% of the total recovery budget of \$597 million. Long-term recovery receives \$5.4 million for environmental protection - 1.5% of the total prescribed for long-term recovery. "Embankments and Water Control" is listed as a separate funding intervention for medium and long-term recovery, which does show more significant funding - 11% out of the total for medium-term recovery and 11.2% of the total for long-term recovery. However, it is difficult to determine how much of that will go toward environmental measures.

Bangladesh – Conclusions

Bangladesh is faced with extreme climate vulnerability, exacerbated by social and economic trends. While the actual hazards are expected to increase in frequency and intensity due to climate change, many improvements have occurred in the nation's risk management and risk reduction strategies. Improvements are seen in recovery operations through the explicit inclusion of environmental considerations, environmental projects protecting riverbanks and coastal areas with local participation, and the recognition that disasters and recovery will be part of the development continuum. However, funding priorities across all sectors should recognize environment issues to a greater degree. Lessons from previous disaster events in Bangladesh show that recovery and reconstruction need to go beyond basic rebuilding and incorporate environment as a key part of any strategy.

Conclusions

Findings from this Initial Review

Past experiences show that there is a need to go beyond isolated disaster response and reconstruction, which risk building back the same vulnerabilities after each disaster event, thereby perpetually inhibiting development progress. From the case studies it is clear that some good practices already integrate environment and long-term disaster risk reduction into recovery planning and operations. However, challenges remain.

	Good Practices	Lessons
Myanmar	Good Practice 1: Comprehensive inclusion of environment in the Strategic Framework	Lesson 1: Communicating environment across sectors
	Good Practice 2: Explicit “Environment for DRR” capacity building	Lesson 2: Early acknowledgment of the importance of environment
	Good Practice 3: Integrating environment across sectors	
	Good Practice 4: Environmental management at the community, local authority and national levels	
Bangladesh	Good Practice 1: Taking environment into consideration at the earliest possible stage	Lesson 1: The need to go beyond basic rebuilding
	Good Practice 2: Explicitly building back greener and better	Lesson 2: Environment should be part of an integrated approach
	Good Practice 3: Environmental projects with Local Participation	Lesson 3: Environment not recognized across sectors
	Good Practice 4: Disaster risk reduction as part of the development continuum	

Some challenges and good practices duplicate between the case studies, giving a preliminary indication that some measures to integrate environment and long-term disaster risk reduction into recovery are easier or could stand for prompt attention. For instance, in both cases—though to a larger extent Bangladesh—cross-sectoral communication and ownership of environment was a noticeable obstacle. When environment is separated under one actor, then it leaves very little motivation for other sectors to act on environmental considerations, especially when their agenda is not funded for environment. This initial review suggests that it may be typical in the first stages of recovery planning that environment needs extra advocacy to be included at all, across all sectors and as a separate issue, and at the earliest stages of recovery.

Both cases explicitly prioritize building back greener and better, and in Myanmar’s case it even narrows down to a project proposal on “Environment and DRR.” This is an excellent step in the right direction. Additionally, it is seen in both cases that local level participation is crucial for inputs and ownership of an environmental agenda, and the scales of entry points for environmental managers and long-term disaster risk reduction actors needs to be at all scales—the same levels as recovery operations.

A major difference to note in the cases is that Myanmar's recovery strategy managed to include environment under "protected lives"—a new achievement—which makes the direct link to future long-term risk reduction. However, Bangladesh's prescribed interventions keep the historical separation with environment under reconstruction, rather than included in livelihood recovery.

Perhaps the best practice from this initial review is a shift to the perspective that disaster risk reduction should form part of the development continuum, and that "start from scratch" emergency response and rebuilding is not enough.

Future Work

Many opportunities to 'build back greener and better' after a disaster, through implementation of sound environmental practices that reduce future disaster risk, are still being missed. It is therefore necessary to conduct a more detailed analysis on how to optimize environmental issues in donor policies and national risk strategies. More comprehensive case studies with a systematic comparison of best practices and lessons learned is needed to better answer the questions: "What constitutes environmentally sound relief and recovery operations?", "How do we engage environmental actors early in disaster recovery?" and "What support and guidance related to the environment is available in disaster contexts?"

Future work calls for more detailed and better pathways to communicate to the recovery community the best measures to integrate environment and disaster risk reduction post-crisis. This includes the earliest stages of recovery, with the goal to create a "seamless link between response and recovery phases such that short, medium and longer-term environmental issues are all addressed in an integrated manner" (Parisetti 2007). It is also important to distinguish the needs of different recovery phases - in some cases (Haiti, as a suggested future illustration) long-term environmental considerations are funded, but there is no capacity on the ground during early recovery to implement related recommendations.

For a potential more extensive study of good practice and lessons learned, the following are proposed as indicators for reviewing the integration of environmental concerns in recovery operations:

1) Incorporation of environmental issues in *post-disaster needs assessments*:

- This would include (a) identification of environmental factors that contributed to the disaster, priorities for reduction of environmental vulnerability and other environmental safeguards for recovery and reconstruction, and (b) use of impact data to demonstrate the effectiveness of environmental risk reduction, i.e. comparison of damage and losses in areas with contrasting environmental quality or resource bases. Highlighting the gaps is equally important, including in disaster waste management, which is almost always an issue in large scale natural disasters, but is not always addressed.
- It is also important to document the lessons learned in terms of the transition from rapid environmental assessment to early recovery planning / programming, including a review of relevant guidelines on this topic.

2) The extent to which recovery *programming and projects* have considered or neglected environmental concerns

- The existence of environmental projects in post-disaster recovery plans and the mainstreaming of environment in other sectors (shelter, sanitation, etc.) should be considered. Sample cases could include post-disaster responses that have inadvertently exacerbated existing environmental weaknesses (e.g. through additional deforestation for housing construction, or through relief efforts that encouraged inappropriate migration or settlement).

3) Evaluation of the *implementation* of recovery projects

- The success and extent of implementing environmental disaster risk reduction measures through completed projects and resources committed should be documented. This would include cases in which disasters have resulted in a retreat from areas of environmentally inappropriate development (e.g. in flood plains and exposed coastal areas), and determinants of successful retreat, such as speedy decision-making structures and preparedness.

Post-crisis events in general can provide opportunities for building back greener and better, so post-conflict scenarios should not be left out of a future study. The interlinkages between environment, recovery, future conflict prevention and development are substantial and deserve further attention.

Funding is always a concern and unless environment is prioritized and ownership taken across sectors, the funding will often fall short. This means that environment and disaster risk reduction opportunities to build back greener and better will be neglected, simply due to the reality of insufficient resources - or not enough information to donors when making funding decisions. In the long run countries like Bangladesh cannot afford these missed opportunities to reduce risk. The best investment is to act on the knowledge of best practices and lessons learned from past recovery planning and operations to facilitate optimized recovery at each disaster event and also along the long-term development continuum.

Annex I

Examples of recovery tools for environment / disaster risk reduction

Risk Reduction and Environment

- **Integrated risk assessment (IRA):** Integrated risk assessment was developed under the International Program for International Chemical Safety (IPCS), jointly chaired by WHO, ILO and UNEP DEWA. The objective of an IRA is to address real situations of multi-chemical, multimedia, multi-route, and multi-species exposure.
- **Risk assessment for industrial accidents (including from natural disasters) (APELL):** The APPEL program is a local process on hazard communication and coordination, consisting of a modular, flexible methodological tool to prepare for accidents and failing this, to minimize their impacts. Missions conducted in the framework of APELL aim to address the risk exposure of local communities to events such as industrial accidents, accidents due to transport of dangerous goods, tropical cyclones, flooding, wildfires, volcanic eruption, earthquakes, landslides and tsunamis.
- **UNDAC Disaster response preparedness missions:** Disaster response preparedness missions are carried out by United Nations Disaster Assessment and Coordination (UNDAC) teams to evaluate countries' management and response capacity and make recommendations for capacity building in this area. Evaluating capacity can reveal hidden assets and resources in governmental agencies and civil society that can be built upon to strengthen preparedness and lead to a more predictable and efficient response and recovery process.

Post-Crisis Assessment and Environment

- **HIT:** The objective of the Hazard Identification Tool (HIT) is to alert the UN Country Team after the natural disaster to potential secondary risks posed by large infrastructure and industrial facilities containing hazardous materials located in the affected area. This information can be shared with local and national authorities. Any actual secondary risk should be addressed at the earliest possible stage.
- **Flash Environmental Assessment Tool (FEAT):** The FEAT provides a rapid scan to identify the most acute environmental issues immediately following the occurrence of a natural disaster. FEAT focuses primarily on the acute issues arising from released chemicals. It also provides general indications of the type of impacts to be expected from physical occurrences, such as erosion of fertile soil and salt water intrusion. As part of the FEAT, an desktop screening
- **Emergency Waste Management Guidelines:** The Guidelines, developed by OCHA and the UNEP/OCHA Joint Environment Unit, provides advice to emergency response actors on good waste management practices - including initial clearance, storage and disposal.
- **Strategic Assessment (SA):** The SA provides the means for undertaking an integrated response and allows senior decision makers to determine the appropriate form of United Nations engagement. It does not aim to repeat previous assessments or validate ongoing programmes, but to indicate possibilities for the United Nations to maximize coherence, focus and impact. *Eg. Central African Republic*

- **Post-Disaster Needs Assessments (PDNAs) and Post-Conflict Needs Assessments (PCNAs):** PDNAs and PCNAs are joint UN-EC-World Bank missions conducted to produce a common post-crisis assessment report by using sectoral PDNA methodologies developed by specialized agencies (such as UNEP, for the environment). They aim to identify priority areas and financial requirements needed for post-crisis recovery and reconstruction. *Eg. PCNA: Georgia in September 2008, PDNA: Haiti in October 2008*
- **Post-Conflict Environmental Assessment (PCEA)** UNEP uses PCEAs to provide an objective scientific assessment of the environmental situation in a country after a conflict. They aim to inform the general public on environmental risks associated with the conflict, and to provide guidance to governments on priority issues to be addressed. *Example: Sudan*
- **Joint Damages Losses and Needs Assessments (JDLNAs):** joint assessment generally led by the World Bank Global Facility for Disaster Risk Reduction (GFDRR), which specifically aims to identify recovery needs and quantify them.

Post-Crisis Recovery and Environment

- **Strategic Environmental Assessment (SEA):** The purpose of an SEA is to ensure that environmental consequences of plans and programmes are identified and assessed during their preparation and before their adoption. Public and environmental authorities give their opinion and all results are integrated and taken into account in the course of the planning procedure. After the adoption of the plan or programme the public is informed about the decision and the way in which it was made. In the case of likely significant trans-boundary effects, the affected Member State and its public are informed and have the possibility to make comments, which are also integrated into the national decision making process. *Eg. Indonesia*
- **Environmental Impact Assessment (EIA):** EIA procedures ensure that environmental consequences of projects are identified and assessed before authorisation is given. The public can give its opinion and all results are taken into account in the authorisation procedure of the project. The public is informed of the decision afterwards.
- **State of Environment reporting (SoE):** The State of the Environment (SoE) refers to the prevailing conditions of the region from two perspectives: bio-physical and socio-economic conditions and trends. Ideally an SoE report will seek to address: emerging issues in the region; present environmental status and trends; existing policy responses at national, sub-regional, and regional level; future perspectives based on the past and present trends of different development patterns; and recommended policy action. SoE reporting will target grass-roots to high-level decision makers.
- **Common Country Assessment (CCA)** As defined by the General Assembly, the CCA is the common instrument of the United Nations system to analyse the national development situation and identify key development issues. Both a process and a product, the CCA takes into account national priorities, with a focus on the MDGs and the other commitments, goals and targets of the Millennium Declaration and international conferences, summits and conventions. *Examples: Afghanistan, Sudan*

Annex II

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Annex III

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