

8

GREEN
GUIDE TO



LIVELIHOODS

GREEN RECOVERY AND RECONSTRUCTION: TRAINING TOOLKIT FOR HUMANITARIAN AID





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The Green Recovery and Reconstruction Toolkit (GRRT)
is dedicated to the resilient spirit of people around the world
who are recovering from disasters. We hope that the GRRT
has successfully drawn upon your experiences in order to
ensure a safe and sustainable future for us all.

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LIVELIHOODS

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A NOTE TO USERS: The Green Recovery and Reconstruction Toolkit (GRRT) is a training program designed to increase awareness and knowledge of environmentally sustainable disaster recovery and reconstruction approaches. Each GRRT module package consists of (1) training materials for a workshop, (2) a trainer's guide, (3) slides, and (4) a technical content paper that provides background information for the training. This is the technical content paper that accompanies the one-day training session on integrating environmentally sustainable approaches into livelihoods projects.

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MODULE 8: GREEN GUIDE TO LIVELIHOODS

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1 INTRODUCTION

1.1 Module Objectives

The module provides information and references to help participants identify environmental issues associated with post-disaster livelihoods recovery projects. This module also provides participants with an overview of environmental management techniques designed to reduce environmental impacts and improve livelihood outcomes for people and communities recovering from disaster.

Specific learning objectives for this module are as follows:

1. Explain how livelihoods, disaster recovery, risk reduction, and ecosystems are linked.
2. Identify the recurring environmental impacts of typical livelihoods interventions.
3. Understand and address solutions for sector-specific livelihoods challenges, and be able to identify sources of expertise to improve livelihoods project outcomes.

1.2 The Green Recovery and Reconstruction Toolkit

This is Module 8 in a series of 10 modules comprising the Green Recovery and Reconstruction Toolkit (GRRT). Collectively, the GRRT modules provide information and guidelines to improve project outcomes for people and communities recovering from disaster by minimizing harm to the environment and taking opportunities to improve the environment. Module 1 provides a brief introduction to the concept of green recovery and reconstruction and how it helps make communities stronger and more resilient to future disasters by integrating environmental issues into the recovery process. GRRT Module 2 provides guidance on how project design, monitoring, and evaluation can better incorporate and address environmental issues within the typical project cycle. GRRT Module 3 builds upon Module 2, focusing specifically on assessment tools that can be used to determine the environmental impact of humanitarian projects regardless of the type of project or sector. GRRT Modules 4 through 10 provide sector-specific information to complement Modules 2 and 3, including livelihoods, disaster risk reduction, water and sanitation, and greening organizational operations.

1.3 Intended Audience

The module workshop is designed for program staff planning and implementing livelihoods recovery projects with post-disaster or conflict-affected populations and communities. The range of livelihoods recovery projects is expected to be broad and varied and not simply limited to rural agriculture, aquaculture, or fishing projects. Workshop participants will include a mix of program and project officers from humanitarian, development, and environmental organizations. The target audience is emergency recovery managers who may implement cash-for-work programs, cash grants, and other early-recovery livelihoods programs, as well as, project planners involved in longer-term livelihoods recovery projects.

1.4 Module Key Concepts

This module builds on three key concepts:

1. Livelihoods planners should incorporate a conceptual livelihood framework that includes the environment as an asset in their programs and projects.
2. Project planners can use several existing assessment methods and tools to evaluate and address the environmental impacts of a livelihoods project. The Environmental Stewardship Review for Humanitarian Aid is one such tool.
3. It is crucial to ensure that a variety of different stakeholders (e.g., government officials, donors, partners, and affected populations) understand the environmental linkage to the project's benefits and support the project's intended outcomes.

1.5 Module Assumptions

This training module assumes that participants are generally familiar with the needs arising from various post-disaster and post-conflict contexts (e.g., earthquakes, floods, hurricanes, violent civil conflicts) and with community-based livelihoods-planning approaches. This is not a “how to manual” for livelihoods. The focus of the module is on ways to address *environmental issues* relative to livelihoods projects in a post-disaster or post-conflict recovery and reconstruction setting. Given the diversity of potential livelihoods activities, it is not possible to provide detailed technical solutions to address the environmental impacts of every type of livelihoods project. The module will support project planners in “how to think” instead of “what to think,” because no two disaster recovery scenarios are the same. This module is intended to provide sufficient information for program managers to identify some typical issues and solutions, obtain more information, and gain an understanding of when additional technical expertise may be required.

1.6 Key Module Definitions

The following are key terms used in this module. A full list of terms is contained in the Glossary.

Livelihoods: A livelihood comprises the capabilities, assets (including both material and social resources), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and can maintain or enhance its capabilities and assets both now and in the future, without undermining the natural resource base.

Better Management Practices (BMPs): BMPs are flexible, field-tested, and cost-effective techniques that protect the environment by helping to measurably reduce major impacts of growing of commodities on the planet's water, air, soil, and biological diversity. They help producers make a profit in a sustainable way. BMPs have been developed for a wide range of activities, including fishing, farming, and forestry.

Ecosystem Services: The benefits that people and communities obtain from ecosystems. This definition is drawn from the Millennium Ecosystem Assessment. The benefits that ecosystems can provide include “regulating services” such as regulation of floods, drought, land degradation, and disease; “provisioning services” such as provision of food and water; “supporting services” such as help with soil formation and nutrient cycling; and “cultural services” such as recreational, spiritual, religious, and other nonmaterial benefits.

Integrated management of land, water, and living resources that promotes conservation and sustainable use provides the basis for maintenance of ecosystem services, including those that contribute to the reduction of disaster risks.

Biodiversity: Biological diversity means the variability among living organisms from all sources, including inter alia, terrestrial, and marine and other aquatic ecosystems, as well as the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.



A livelihood comprises the capabilities, assets, and activities required for a means of living. Livelihoods can exist on multiple scales from a local, artisanal fishery to a multi-national corporation. In this picture, a woman waters pepper plants in her home garden in southern Sri Lanka which she will later sell at a community market in support of her livelihood. © American Red Cross/Daniel Cima

2 PROJECT CYCLE AND SUSTAINABLE LIVELIHOODS

In planning and carrying out disaster response activities, many humanitarian agencies follow a standard project management cycle, as shown in Figure 1.

The project manager should consider the environmental implications and opportunities related to sustainable livelihoods at the earliest stages of project planning, and continue throughout the project design process as shown in Figure 2. The majority of the technical content in this training module falls under Step 3 (Project Design) and Step 4 (Implementation).

FIGURE 1: STANDARD PROJECT MANAGEMENT CYCLE

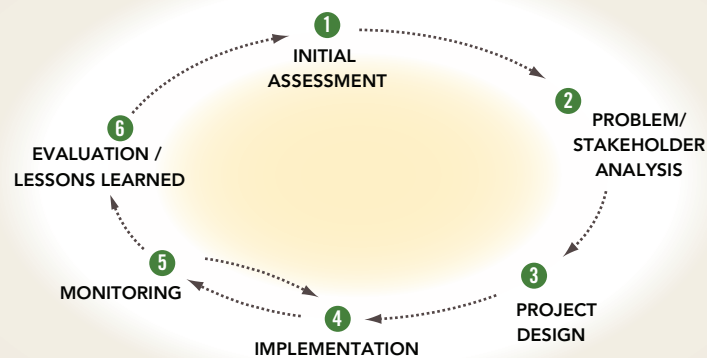
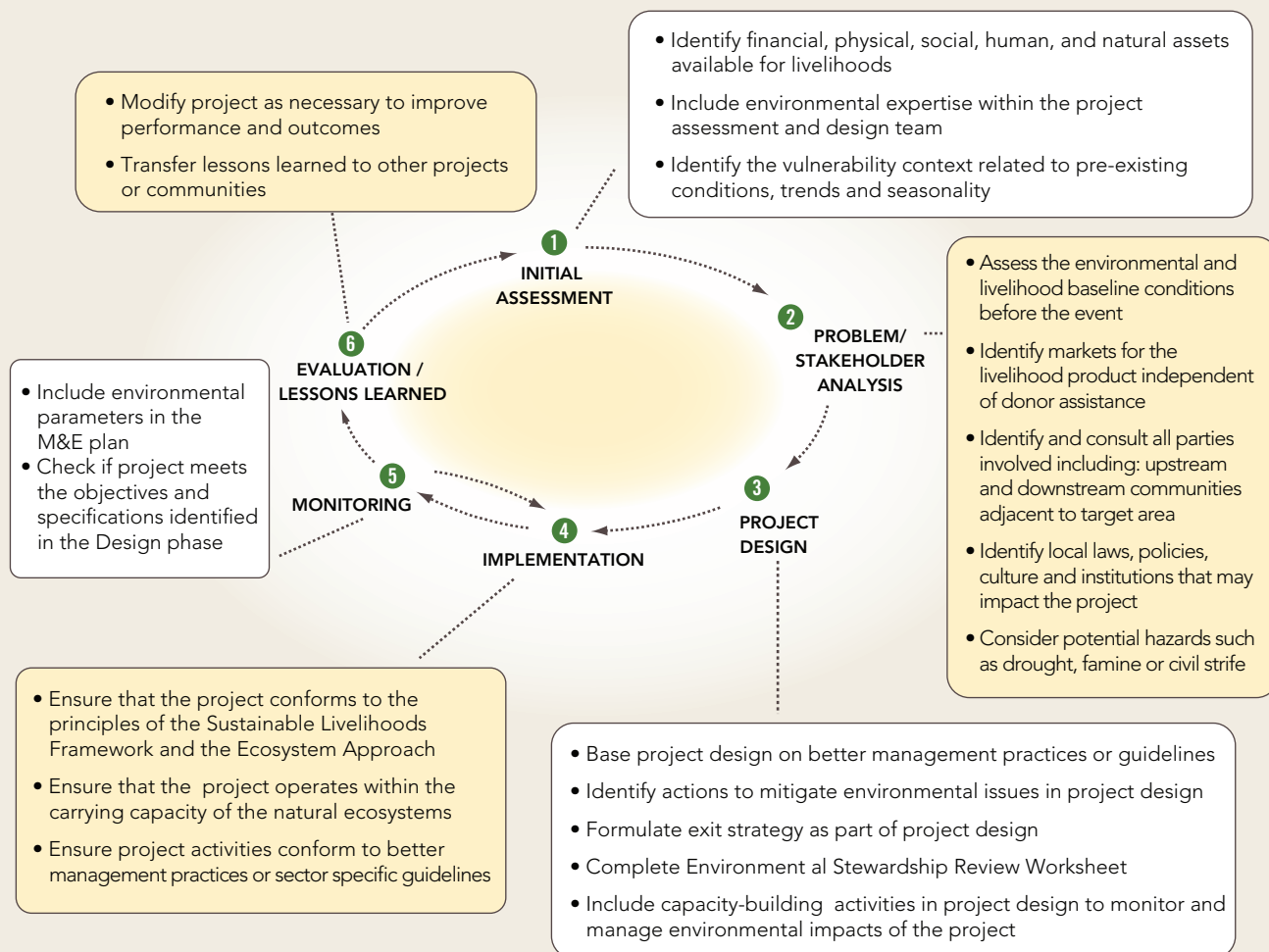


FIGURE 2: PROJECT MANAGEMENT CYCLE FOR LIVELIHOODS AND ENVIRONMENTAL CONSIDERATIONS

2.1 Initial Assessments

At the initial assessment stage, it is crucial for livelihoods project planners to understand the range of livelihoods activities that are practiced by the disaster-affected communities and to what extent these livelihood activities are dependent on natural resources. Module 3, Green Guide to Environmental Impact Assessment Tools and Techniques, contains information on specific assessment tools that can be used at the initial assessment stage. One such tool is the Rapid Environmental Impact Assessment Guidelines, which provide guidance on how to identify, define, and prioritize potential environmental impacts in disaster situations and improve linkages between sustainable environmental management and disaster response.¹

If livelihoods are closely linked to natural resources (e.g., people are fishermen or farmers versus shopkeepers), then it is important to assess the baseline for the natural resources. The baseline is essentially the starting point from which to measure change. For example, if a community reported catching an average of 6.2 tons per

¹ Kelly, Charles. 2005. *Guidelines for Rapid Environmental Impact Assessment in Disasters (REA)*. Version 4.5. London: CARE International and Benfield Hazard Research Center.

year of a certain species of fish between the period 2000 and 2008 and only 4.3 tons of fish in 2009, it can be said that the 2009 catch is lower than the average for the baseline period. When evaluating the baseline for a natural resource, it is useful to be aware of the “shifting baseline syndrome.”²

When reestablishing livelihoods, consideration should be given to preexisting conditions. Livelihoods project planners should consult local government agencies, research institutions, and communities about historical levels of natural resources, to see if there has been a trend of declining resources over time that need to be taken into account during project designs. Project planners conducting initial assessments may want to consider the inclusion of environmental specialists in their assessment teams.

2.2 Problem/Stakeholder Analysis

During this phase, it is important to understand the local environment and work with local experts in order to further understand the range of traditional livelihood activities practiced and their environmental impacts. The problem analysis should include consideration of whether the natural resource base that supports these livelihoods activities is sufficient to continue activities into the future. At this stage, consideration should also be given to the evaluation of regional-level donor or national government-driven initiatives outside of the immediate project area that may be putting an added strain on the natural resources that support livelihood activities. If the natural resources base is at risk of being overexploited or is already in decline, project planners should consider alternative livelihoods activities that will place less pressure on resources, or ways to ensure that project activities strengthen the natural resource base (e.g., a timber-harvesting project that includes a replanting and conservation component).

Stakeholder analysis should include consideration of how to build back the local human capacity to manage natural resources and minimize environmental impacts. At the project design stage, this may include investment in the development of formal and informal institutions at the local level (e.g., fisheries cooperatives or local government agricultural extension officers).

Additionally, the stakeholder analysis should explore ways to equitably share the natural resource capital assets, with particular attention paid to the poorest and most disadvantaged groups and to women, to make sure their needs are met. The analysis should also consider that men and women use and/or have access to different resources. For example, women are often responsible for firewood and wild food plant collection and men often undertake hunting and logging. Both men and women may fish, but they often catch different fish species in different places with different techniques.

Project planners should inquire within communities about traditional natural resource management practices that guard against overuse, and these should be taken into account. Livelihoods activities should reinforce these preexisting natural resource management practices and the local institutions that promote them.

2 The shifting baseline syndrome occurs when each generation of evaluators accepts as a baseline the stock size and species composition that occurred at the beginning of their careers, and uses this to evaluate changes. So an evaluator who starts his or her career in 1985 might set the baseline at the 1980s levels, whereas the evaluator who starts a career in the 2000s might set the baseline at the 2000 levels. The problem with this gradual shift of the baseline is that it can lead to the gradual acceptance of the slow disappearance of species that form the basis of natural capital assets.

2.3 Project Design

The design phase is where livelihood project planners can play a critical role in addressing the potential environmental implications of livelihood project activities. The project design should reflect the information gathered during the assessment phase in terms of the quantity of resources that will be used to implement and maintain the livelihood activity. For example, if the project is for an agriculture-based activity, the project design should include consideration of the amounts of fertilizer, seeds, and pesticides that might be used during project implementation. The project design should be adjusted to minimize the environmental impacts accordingly (e.g., promotion of organic fertilizer or local seed stock). Project designers should also make sure that the activities do not result in unintentional overextraction of the natural resources (e.g., oversupply of boats for fishermen or supplying nets that are so large they result in harvesting of the fishery resource beyond the natural capacity).

Additional guidance is provided in Section 5, Guidance for Project Planners.

2.4 Implementation

During the implementation phase, project managers for livelihoods projects can make sure that better management practices are being followed by training their staff on the techniques. If inputs are required for the livelihoods project, such as timber for constructing markets or seed stock for agriculture, the project manager should ensure that the materials are sustainable (e.g., use sustainable timber or local noninvasive species for agriculture plants). Note: Better management practices (BMPs) are flexible, field-tested, and cost-effective techniques that protect the environment by helping to measurably reduce major impacts of growing commodities on the planet's water, air, soil, and biological diversity. They can also help producers make a profit in an environmentally sustainable way. BMPs have been developed for a wide range of activities such as fishing, farming, and forestry. Additional information on BMPs is contained in Section 5.

2.5 Monitoring and Evaluation

During the monitoring and evaluation phase, project planners can monitor the project for unanticipated environmental impacts and implement ways to correct them. For example, if farmers are using chemical fertilizers, then the project managers should consider alternative techniques with less environmental impact (e.g., organic fertilizer or use of fewer chemical fertilizers with the same benefit). Additionally, the rates of use of inputs should be monitored so that they do not exceed the original project design, and do not result in the waste of both natural resources and money (e.g., overfertilizing, catching more bait fish than necessary for fisheries projects). The communities in the immediate vicinity of the project area should also be monitored so the project does not have unintended consequences, such as fishing in one community adversely impacting another community's livelihood activities.

2.6 Project Completion and Exit Strategy

Subsidizing livelihood generation through capital inputs or capacity building is common and undoubtedly necessary in many disaster recovery instances; however, if the subsidies or capacity building are required to support the livelihood, then there is the potential for the livelihood to collapse once the external support is no longer available. If the livelihood collapses once the project is completed or the external agency departs, the livelihood project will have wasted time, financial resources, community effort, and natural resource capital assets that could have been put to better use.

It is critical therefore that exit strategies be planned during the development of the project so that the initial investment in terms of time, funds, and natural resources extracted or utilized **does not go to waste and the livelihoods activities continue after the withdrawal of the assistance agency.**

As illustrated by the disaster to development continuum in Section 3, the goal of recovery and reconstruction is to move to sustainable development that in turn supports disaster resilience and risk reduction.

Exit strategies will likely be modified as projects progress. Key tenets of a sufficient exit strategy include the following:

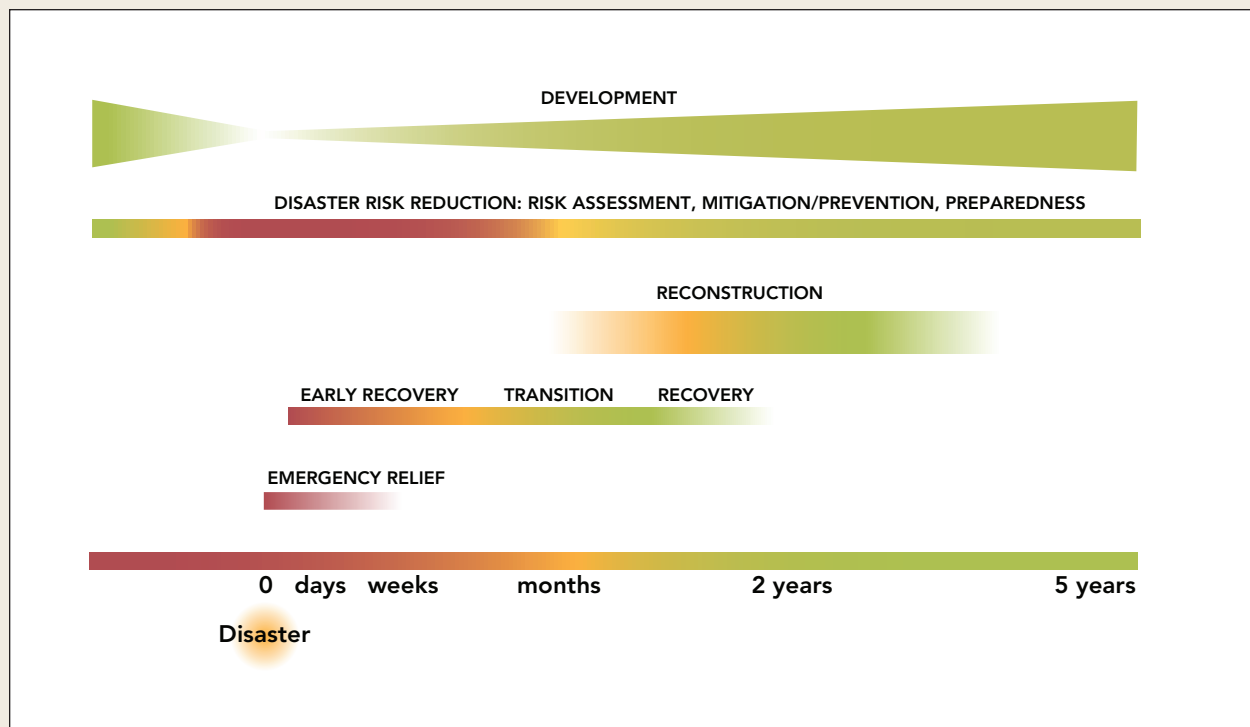
- ❑ Organizational, community-level, or government monitoring, evaluation, and controls are established to prevent overuse of primary resources.
- ❑ If products are produced or skills were taught, there is a market for these products and skills that will be present for the foreseeable future.
- ❑ The communities receiving livelihood project assistance are themselves contributing, and are aware of and understand the inevitability of the sponsoring organization's departure.
- ❑ The communities receiving livelihood project assistance agree to attempt the facilitated livelihood following this departure.
- ❑ The communities have sufficient capacity and adequate internal governance processes to continue the livelihood activity in an equitable manner.
- ❑ Contracts and agreements with communities are fulfilled.

3 LIVELIHOODS, DISASTERS, AND THE ENVIRONMENT

Disasters can cause many adverse ecological effects. Earthquakes can result in fires, landslides, and the release of toxic chemicals into the environment. Oil spills and leaks can destroy fisheries and tourism livelihoods (e.g., Exxon Valdez in Alaska in 1989, the 2001 Galapagos oil spill, and British Petroleum in the Gulf of Mexico in 2010). Flooding caused by hurricanes and tsunamis may destroy vegetation and salinize soils, making them unfit for agriculture, and can pollute ground and surface water with garbage, debris, and toxic chemicals carried in wave surges.³ Marine and coastal environments, including coral reefs (nursery grounds for fisheries and tourism points of interest), may also be damaged as waves recede and carry sediment and debris back into the ocean after hurricanes or tsunamis. Landslides, mainly in the hills and mountains, expose infertile soils and may reduce the productivity of agricultural or forest lands. Moreover, landslide debris that gets carried down by flash floods such as those that occur in Nepal, India, and Bangladesh destroy productive lands with sedimentation.

One disaster, therefore, can wipe out development (including infrastructure and livelihoods) that may have taken generations to build. Although there are differences between humanitarian and development activities, it is clear that disaster preparedness, recovery, and reconstruction are all links in the disaster-to-development continuum. A simplified version of this continuum is shown below.

FIGURE 3: DISASTER TIME LINE



3 Srinivas, Hari. Cyclical Interlinkages of Disasters and the Environment. GDRC. www.gdrc.org/uem/disasters/disenvi/cyclical.html (Accessed on April 13, 2010)

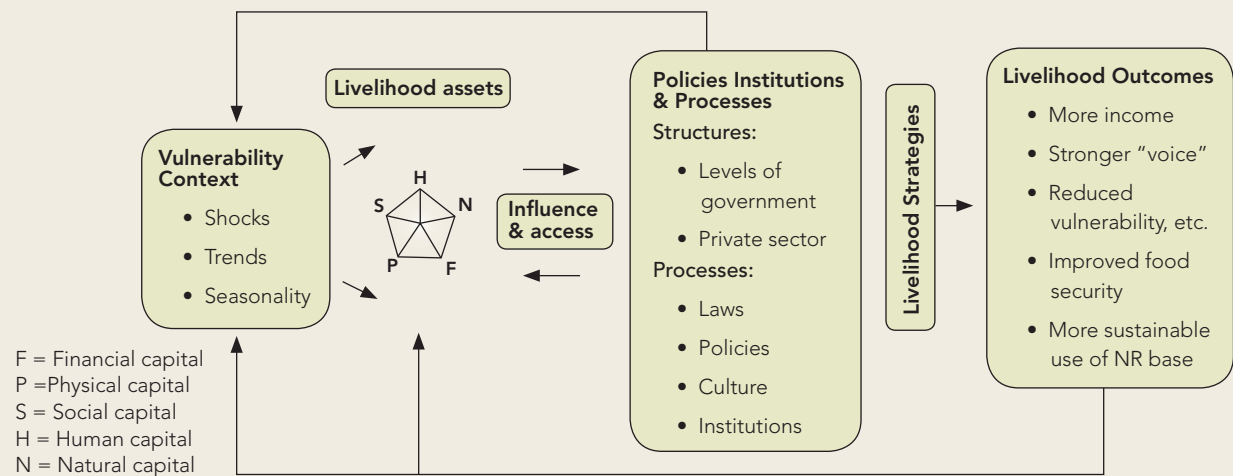
Humans depend on ecosystems to alleviate the effects of disasters and to provide resources for their livelihoods. There are therefore strong and critical links between disasters, livelihoods, and ecosystems. In many regions of the world, people are vulnerable to disasters as a result of poverty, disputes over natural resources, and the hazard-prone areas that they inhabit. For example, certain communities can be marginalized to high-risk regions that could be susceptible to the impacts of floods or landslides. Violent conflict can result from various groups’ limited or disputed access to natural resources on which their livelihoods depend. In addition, climate change may lead to displacement and/or migration, creating “climate refugees.” Therefore, livelihood recovery projects should be designed to restore, manage, and have limited impact on the environment.

In natural disasters, people with a greater asset base are often less vulnerable and able to recover more quickly. Emergencies have varying impacts on assets, which may be lost, destroyed, or sold. In complex emergencies, people’s assets themselves can be transformed into life-threatening liabilities as other groups try to gain control over these assets.

In order to reduce future risk and vulnerabilities, organizations can integrate an ecologically sound approach in livelihoods recovery to support sustainable development, which in turn supports disaster preparedness and disaster risk reduction.

The importance of integrating the environment into the planning of livelihoods activities is underscored by the Sustainable Livelihoods (SL) Framework developed by the United Kingdom’s Department for International Development (DFID). While the SL approach was developed for use in “development” contexts, it has been used in and adapted to disaster contexts. The UN International Labour Organization and UN Food and Agriculture Organization have, for example, used the concept to underpin their “Livelihood Assessment Tool-kit” for use in post-disaster situations.⁴ The Office of Foreign Disaster Assistance (OFDA) uses the SL as a disaster assessment tool.

FIGURE 4: DFID SUSTAINABLE LIVELIHOODS FRAMEWORK ADAPTED FROM CARNEY ET AL, 1999



Source: DFID. 1999. *Sustainable Livelihoods Framework*. Guidance Sheets.

4 FAO and ILO. 2009. *Disaster Livelihood Assessment Toolkit: Analysing and responding to the impact of disasters on the livelihoods of people*.

The SL framework suggests that reestablishing or preserving Natural Capital or “N” in the figure above (e.g., land, forests, mangroves, animals, etc.) is dependent on an understanding of its dynamic relationships to peoples’ other assets and to the larger forces and factors that influence their desired livelihood strategies and desired outcomes. Thus, livelihoods projects may need to include initiatives to address the education, policies, institutions, and processes that undermine sustainable livelihoods and limit people’s sustainable livelihood options. For example, work to restore agricultural livelihoods may need to be accompanied by training on new farming techniques or advocacy work on environmental policy, land rights, or land use issues. A full discussion of the SL Framework is included in Annex 4, Livelihoods Frameworks.

Another method utilized for livelihood development is the Ecosystem Approach⁵, which is a strategy for the integrated management of land, water and living resources that promotes sustainable use of natural resources in an equitable way. The Ecosystem Approach can be used to seek an appropriate balance between the conservation and use of natural resources in areas where there are multiple resource users. It is therefore of relevance to professionals and practitioners active in post-disaster recovery of livelihoods in farming, forestry, fisheries, protected areas, urban planning and many other fields. A full discussion of the Ecosystem Approach is included in Annex 4.

LINKING LIVELIHOODS, ECOSYSTEMS, AND DISASTER RISK MANAGEMENT

Ecosystem management can contribute to more effective reduction of disaster risk and sustainable livelihoods. Productive ecosystems can support sustainable income-generating activities and are important assets for people and communities in the aftermath of a disaster. For ecosystems to make these contributions, it is essential that they be factored into relief and rebuilding efforts in the post-disaster response phase. Not taking care of critical ecosystems after a major disaster can cause significant economic and environmental losses, and impose hardships on already vulnerable communities.

Source: Sudmeier-Rieux, K., H. Masundire, A. Rizvi and S. Rietbergen (eds). 2006. *Ecosystems, Livelihoods and Disasters: An integrated approach to disaster risk management*. Gland, Switzerland and Cambridge, UK: UK

5 UNEP. Operational guidance for application of the ecosystem approach. Convention on Biodiversity. www.cbd.int/ecosystem/operational.shtml (Accessed on June 9, 2010)

4 COMMON ENVIRONMENTAL IMPACTS OF LIVELIHOODS ACTIVITIES

In order to understand the methods for minimizing the environmental impacts of livelihoods activities, it is useful to begin with a discussion of some common environmental challenges. They can be grouped into the following categories: 1) overharvesting of natural resources; 2) loss, degradation, and fragmentation of land; 3) pollution; and 4) invasive species. Guidance on how to address these environmental issues is contained in Section 5.

4.1 Overharvesting of Natural Resources

In many cases, livelihoods depend on the sale of products that originate from natural capital, that is, physical resources such as trees, fish, agricultural plant, or animal products. In addition, some communities use natural resources as reserves to tide them over during an emergency or crisis period. Unless products are developed and managed so that the natural capital is renewable for the long term, there can be detrimental human and environmental impacts associated with livelihoods products as described further below.

4.1.1 Fish, Seafood

Seafood production has a high revenue potential when compared to many other animal or agricultural products. This revenue potential makes it a highly desirable livelihood that is often promoted in coastal communities after a disaster. Seafood capture (both industrial and artisanal) has depleted the world’s oceans and continues to stress fisheries’ ability to reproduce enough to maintain viable stocks globally. In addition to the capture of fish for human consumption, the farming of fish may raise pressure on wild fisheries by extracting wild juveniles for further culturing, or by utilizing wild fish as a feed source. Therefore fisheries-based livelihoods may be vulnerable to collapse because of insufficient natural capital.

Guidance note: Ensure that fisheries-related livelihoods...

- ☐ are based on assessment of the viability of target fish stocks.
- ☐ support proper monitoring practices that allow understanding of the trends in fish stocks.
- ☐ are developed in consultation with local environmental NGOs with experience in fisheries and livelihoods.
- ☐ include training with the community, fisheries agencies, and fishing cooperatives in ecosystem-based management of fishing livelihoods.

See Section 5.2.1, Fisheries, for additional guidance on how to address these issues.

4.1.2 Timber, Block, Cement, Brick

The harvesting or extraction of building materials as a livelihoods activity (e.g., timber from forests, or sand and clay from hillsides, streams, or rivers) can result in increased sediment runoff, landslides, and increased flooding risk. In addition, the habitat destruction involved with these types of livelihoods can result in reduction of habitat for wildlife, resulting in a threat to livelihoods that are based on ecotourism. Habitat destruction caused from resource extraction can also lead to food insecurity related to the decrease in harvestable wildlife.

In times of disasters, these materials become a precious commodity, often used for the reconstruction of homes and businesses. Unlike gradual development processes, rapid resource extraction on a large scale – needed after most significant disasters – increases the above-mentioned impacts if not actively managed.

Guidance note: If livelihoods activities involve the harvesting or extraction of natural resources for building materials, then project planners should ensure that associated environmental damage is minimized by implementing better management practices.

See Section 5.2.2, *Forestry*, and Module 5, *Green Guide to Materials and the Supply Chain*, for additional guidance on how to address these issues.

4.2 Loss, Degradation, and Fragmentation of Land

Habitat and associated ecosystem services perform vital functions for society and wildlife. Therefore, the loss, degradation, and fragmentation of habitat are paramount environmental and societal issues. For example, if entire forests are cut down to provide timber for rebuilding, there can be a negative impact on a community's water supply, or erosion could prevent the community from using the land for agriculture. Thus, how, when, and where to convert a natural resource (such as cutting down forested areas to clear land for an agricultural field) needs to be considered carefully in terms of other needs and opportunities. Land use analysis at a watershed scale can provide an overview of multiple objectives, complementary as well as conflicting, taking place in a particular location so that adjustments could be made. Almost all livelihoods sectors have the potential to result in some type of habitat conversion.

Guidance note: Consider alternative needs and use of land prior to commencing livelihood development and ensure that prospective livelihoods do not preclude alternative use of land or downstream resources. If existing government development or land use plans are available, consult them for guidance.

See Section 5.2, *Sector-Specific Guidance*, and Module 4, *Green Guide to Site Selection and Development*, for additional guidance on these issues.



Youth with a tuber he dug from the spiny forest after the village lost its rice crop in floods from a cyclone. The village protected the forest, recognizing its value for emergency food and medicines. © Cara Honzak/WWF

4.3 Pollution

Pollution is the addition of unwanted substances into the environment as a consequence of human activities and can come in several forms, including the addition of nutrients (e.g., from fertilizers) to land and waterways; the addition of sediment or soil particles (from erosion from hillsides and drainage systems); and the input of chemicals (e.g., pesticides and chemicals used in manufacturing processes).

4.3.1 Nutrients

Some livelihoods activities lead to the eutrophication⁶ of waters that receive effluent or runoff from agriculture and aquaculture. The main nutrients of concern are nitrogen and phosphorus. Excessive nitrogen and phosphorus can lead to overproduction of algae or plants that alter natural water conditions and can kill important food species.

Guidance note: Farmers add nutrients to crops or ponds to improve production of the target organism. However, if the farmer uses more nutrients in the form of fertilizer than can be absorbed, the excess causes pollution. Thus, for the benefit of the farmer who purchases fertilizer, and for the environment that has to absorb excess, livelihood project managers should encourage farmers (of, for example, rice, shrimp, or milkfish) to reduce the net release of nutrients into the environment. Wasting nutrients is wasting money and can cause negative downstream environmental impacts, putting other livelihoods at risk.

See Section 5.2, Sector-Specific Guidelines, for additional guidance on how to address these issues.

4.3.2 Sediment

Upstream activities such as slash-and-burn agriculture, logging, and infrastructure development may result in release of sediments, which are defined as any particulate matter (e.g., sand, gravel, soil, minerals, plant leaves) that can be transported by water. Sediment often is the major carrier of organic matter and phosphorus, which will have the pollution effects described above. Sediment can also create turbidity in water, restricting light penetration and preventing important plant growth. Sediment can cover natural spawning grounds of a variety of aquatic organisms to such an extent that the organisms cannot reproduce and may die. It can suffocate coral reefs, thus having a negative impact on livelihoods associated with those resources, such as fisheries and tourism. Additionally, sediment can cause an increased rate of the filling in or “shallowing” of natural water bodies, thus having a negative effect on livelihoods taking place in those water bodies, such as fisheries or seaweed farming.

⁶ Defined as the process of over-enriching waters in mineral and organic nutrients that promote a proliferation of plant life, especially algae, which reduces the dissolved oxygen content and often causes the extinction of other organisms.

Guidance note: Livelihoods project managers should be aware of rivers, streams, wetlands and other waterways that are located within their proposed project or have the potential to be affected by project activities. The design of the livelihoods project should include specific measures to ensure that project activities do not result in soil erosion or deposition of excess dirt, soil, or rocks in waterways. Specific measures may include the following: maintaining vegetation buffer zones along waterways, planting vegetation to restore plant cover, and installing temporary silt fences around construction activities to prevent soil movement into waterways. Project managers should also monitor whether livelihoods activities are leading to unexpected impacts to waterways over the life of the project. Awareness-raising and capacity-building within local communities can also assist with monitoring and addressing environmental issues, such as sedimentation.

See Section 5.2, Sector-Specific Guidelines, for additional guidance on how to address these issues. GRRT Module 6, Green Guide to Construction, also contains information on techniques for reducing environmental impacts during construction.

4.3.3 Chemicals

Agriculture, forestry, aquaculture, and manufacturing processes often use a variety of chemicals. Row crop farmers may apply pesticides to plants to reduce loss from insect foraging, aqua culturists may use antibiotics to treat disease outbreaks in the culture system, and loggers may use creosote on site to preserve wood. The use of chemicals in manufacturing processes (e.g., dyes used in fabric production) can lead to harmful effects for humans and the environment. All of these chemicals can be transported through effluents and runoff and enter into soil and waterways, and can pose serious threats to terrestrial and aquatic organisms as well as to human health. An impact on people's livelihoods might include pesticides used on agricultural land crops that inadvertently kill non-target organisms (e.g., bees) that are required for pollination of other crops. Another example would be the wastewater associated with aquaculture projects that is released into water bodies and results in the death of fish species that are harvested by other communities.

Guidance note: Livelihoods project managers should first determine if the chemical is legal for the stated use; no chemical should be provided for use in a project if it is illegal. Similar to the discussion on nutrient recovery, the best use of pesticides or antibiotics is achieved when they are captured in the target organisms. For insect pests, too much pesticide application will waste money and potentially kill non-target organisms that other people normally harvest for sale or consumption. In the case of antibiotics used in animal husbandry, if these are not administered to animals efficiently, antibiotics are wasted and released into the environment, causing negative downstream effects on other livelihoods. Livelihoods project planners should ensure that project beneficiaries are trained on the proper use of chemicals to avoid public health problems and ensure that the products are not being overused. Many people believe that "more is always better," but in the case of chemical products, such as fertilizers, this is often not true. Additionally, prophylactic use of antibiotics should not be practiced, as unintended consequences are difficult to monitor or control, potentially putting other people's health and livelihoods at risk.

See Section 5.2, Sector-Specific Guidelines, for additional guidance on how to address these issues.

4.4 Invasive Species

Some livelihoods projects seek to introduce an exotic (nonnative) species, such as a new agriculture species like rice or corn or aquaculture species like tilapia. Nonnative species that are not completely contained and accidentally get introduced to the local environment can quickly outcompete native species for food and habitat, threatening the native species with local extinction. Local extinction of native species can have a negative effect on livelihoods dependent on those species and can cause unintended ecological havoc. Therefore it is best to avoid introduction of nonnative species. In some carefully monitored and maintained instances, however, a nonnative species can be utilized.

INTRODUCING SPECIES FOR LIVELIHOODS: THE GOOD AND THE BAD

Nepal: Introducing Higher-Productivity, Stalled Cattle

There are situations in which introduction of improved species did improve livelihoods and the environment. One example is from the Terai region of Nepal, where free-roaming cattle were taken out of a forest and replaced by a species of introduced, higher-productivity cattle that were confined to stalls and fed. This led to a restoration of the forest (now free from cattle grazing and soil compaction), improved children’s nutrition from improved milk, and improved income from sale of better-quality milk.

Philippines: Introducing The Golden Apple Snail

The golden apple snail (*Pomacea canaliculata*) was introduced intentionally into Asia in 1980 with the expectation that it could be cultivated as a high-protein food source for local consumption and as an export commodity for high-income countries. It has since invaded Asian rice systems, where it is dispersed through extensive irrigation networks and feeds voraciously on young rice seedlings. In the Philippines, the cumulative cost of the snail invasion to Philippine rice agriculture in 1990 were between \$425 and \$1200 million (USD), even without taking into account the nonmarket damages to human health and ecosystems. If this amount were invested in an effective quarantine and inspection program for nonindigenous species, similar exotic pest problems in agriculture could be avoided in the future.

Source: Naylor, R. 1996. Invasions in Agriculture: Assessing the Cost of the Golden Apple Snail in Asia. *Ambio* 25:443-448.

Guidance note: Avoid no new species introduction as an element of a livelihood project. If a new species must be introduced, conduct research or consult experts in order to determine if the species has the potential to escape the target project area, threaten other species, and cause environmental harm. Beneficiaries should be informed and trained in ways they can minimize threats from nonnative introduced species.

See Section 5 for additional guidance on these issues.

5 GUIDANCE FOR LIVELIHOODS PROJECT PLANNERS

5.1 Tools for Assessing and Addressing Environmental Impacts

There are a few generalized tools that project planners involved in livelihoods activities after disasters can use to identify and address environmental impacts. The Environmental Stewardship Review for Humanitarian Aid, the U.S. Agency for International Development (USAID) Environmental Guidelines for Small-Scale Activities in Africa, and Better Management Practices are three such tools that are described in more detail below. In addition, several sector-specific checklists are provided in Section 5.2.

5.1.1 Environmental Stewardship Review for Humanitarian Aid

The World Wildlife Fund's Environmental Stewardship Review for Humanitarian Aid (ESR) is a tool that can assist staff in improving livelihoods project performance by identifying and addressing environmental sustainability issues in the project design and implementation phases. This can help reduce time-consuming and costly project adjustments required during implementation. The tool examines 22 parameters, including factors such as air, water, hazardous materials, cultural resources, socio-economics, natural resources, disaster management, and spatial planning. The tool also supports coordination with applicable government and technical organizations — such as the national ministries of agriculture or fisheries. It also includes a requirement to identify actions to mitigate environmental issues and identify areas that need further investigation and expertise. Sector specialists can adapt the ESR to specific needs and sectors. For example, the World Wildlife Fund has adapted the ESR for aquaculture projects in order to identify key sustainability issues for that sector. A copy of the ESR is included as Annex 2 and the resource CD for this module. More detailed information on using the ESR is contained in Module 3, Green Guide to Environmental Assessment Tools and Techniques.

5.1.2 USAID Guidelines

The USAID Environmental Guidelines provide guidance to assess environmental impacts and develop environmental practices for implementing small-scale activities. The guidelines are specifically related to livelihoods activities in Africa, but can be modified or adapted to other locations.⁷ The guidelines address the following sectors:

- Agriculture and irrigation
- Community-based natural resources management
- Ecotourism
- Energy sources for small-scale development
- Fisheries and aquaculture
- Forestry
- Humanitarian response and natural disasters
- Livestock production

⁷ USAID Africa Bureau. 2007. *Environmental Guidelines for Small-Scale Activities in Africa: Environmentally Sound Design for Planning and Implementing Development Activities*. 2nd ed.

- Micro- and small enterprise (including brick and tile production, food processing, leather processing, metal finishing, wet textile operations, and wood processing)
- Pest management: integrated pest management
- Pest management: safer pesticides

5.1.3 Better Management Practices

Better management practices (BMPs) are flexible, field-tested, and cost-effective techniques that protect the environment by helping to measurably reduce major impacts of growing of commodities on the planet’s water, air, soil, and biological diversity. They can also help producers make a profit in a sustainable way. An example of a BMP is keeping livestock off of shrimp or milkfish pond embankments. This practice is good for the environment because it prevents erosion, and keeps soil and nutrients from polluting the pond. It is also cost effective because it helps keep the pond banks stable so they require less frequent repairs. Better management practices criteria are available for seaweed, clams, oysters, mussels, scallops, abalone, shrimp, salmon, catfish, tilapia, trout, and tuna.⁸ See Section 5.2 for sector-specific BMPs.

Most products sold to markets that meet BMP criteria will be of higher quality (if appropriate product handling and transport post harvest is maintained) and can therefore command a higher price and financial return to the producer, by, for example, minimizing inputs such as fertilizers or feed.

BMPs are designed to improve product quality, not necessarily product quantity. Therefore, BMPs limit the amount of natural resource capital required. BMPs are a way to improve efficiency (and thus produce savings). Producers that implement BMPs may not always command a higher retail price at the marketplace if consumers are not aware of the better practices that were used in the good’s production or if consumers are unwilling to pay extra for a sustainably-produced good. Products that have received a certification by an independent third party can improve the retail price; however, product certification does require some investment which can be out of reach for some producers. The use of BMPs will frequently result in cost-savings by increasing production efficiency rather than commanding higher market prices.

Better Management Practices and Shrimp Farming in Aceh: In Banda Aceh, Indonesia, following the 2004 tsunami, many agencies worked to reestablish shrimp farming as a key local livelihood. The natural tendency of most farmers is to produce high quantities of a crop at an acceptable level of quality. In Aceh, however, the way shrimp farmers achieved high quantity was to soak dead shrimp in water to absorb more weight, a technique that decreases the quality. Unknowingly, farmers reduced the unit price of the shrimp sale. Some farmers could reduce their production by 25%, increase quality by using better management practices (BMP) such as avoiding overfeeding, and make the same amount of money at the point of sale as they did when producing more shrimp of lower quality. From a resource extraction perspective, farmers who use BMPs are doing more with less; from a farming perspective, farmers are decreasing their inputs and increasing their net profits; and from a pollution perspective, farmers are feeding less and thus releasing fewer nutrients into receiving waters.

8 WWF. 2005. *Aquaculture and the Environment: A WWF Handbook on Production Practices, Impacts, Markets.*

5.2 Sector-Specific Green Reconstruction Guidelines

The following section provides sector-specific guidelines and BMPs that can be used to improve the sustainability of livelihoods projects during disaster recovery and reconstruction.

5.2.1 Fisheries

- ❑ Develop a sustainable fisheries reconstruction plan that focuses on creating an overarching sustainable fisheries management framework; sustaining target fish populations; conserving sites critical for replenishment; rebuilding boats, gears, supporting infrastructure, and markets; strengthening local institutions involved in fisheries; and strengthening small-scale fisheries governance.
- ❑ Where possible, promote community-led reconstruction efforts, including investment in local industries and local capacity for rebuilding boats and infrastructure and livelihoods, taking care to ensure that fish are not overharvested.
- ❑ Where possible, promote the use of recycled or sustainably sourced materials in the rebuilding of boats and supporting infrastructure, and re-equip with appropriate gears according to national and local management frameworks, working within an overarching sustainable fisheries management plan.
- ❑ Avoid the introduction of inappropriate technologies (e.g., steel boats), and critically evaluate donor or national government-driven initiatives that seek to introduce substantially different boats or gear.
- ❑ Invest in the reconstruction of strong local formal and informal institutions and human capacity for management, including monitoring and enforcement.
- ❑ Protect and effectively manage all known important fisheries spawning and recruitment sites, using appropriate traditional, local, and national management mechanisms (including time-area closures and marine protected areas).
- ❑ Ensure that effective surveillance, enforcement, and compliance mechanisms are in place to prevent overexploitation of fish populations and other targeted components of the ecosystems, and to prevent other activities from having a significantly damaging impact on the health of the ecosystems.
- ❑ Provide incentives and access to markets for products that meet a certification standard to encourage better practice and, if appropriate, develop infrastructure and trade networks and seek markets to support such ventures.
- ❑ Maintain or improve water quality in coastal and nearshore environments.
- ❑ Maintain traditional fishing grounds, including traditional access to beach landing sites.

For more information, see:

Berkes, F., R. Mahon, P. McConney, R. Pollnac, and R. Pomeroy. 2001. *Managing Small-Scale Fisheries: Alternative Directions and Methods*. IDRC.

Defeo, O., and J. C. Castilla. 1999. *A co-management approach to artisanal fisheries in Chile and Uruguay*. Wise Coastal Practices for Sustainable Human Development Forum. www.csiwisepactices.org/?read=12 (Accessed on April 14, 2010)

Johnson, C. 1998. Beyond Community Rights: Small-Scale Fisheries and Community-Based Management in Southern Thailand. *TDRI Quarterly Review* 13:25-31.

Sustainable Fisheries Livelihoods Program. 2008. *Niger: National Workshop on Poverty Reduction in Fisheries*. FAO.

Ward T. J., D. Heinemann, and N. Evans. 2001. *The role of Marine Reserves as Fisheries Management Tools: A review of concepts, evidence and international experience*. Canberra: Bureau of Rural Sciences.

Ward T. J., and E. Hegerl. 2003. *Marine Protected Areas in Ecosystem-Based Management of Fisheries*. Canberra: Department of Environment and Heritage.

5.2.2 Forestry

- ❑ Promote fuel-efficient stoves to reduce work and time spent collecting firewood, reduce demand for firewood and thus protect the forest's natural capital asset, and reduce indoor air pollution.
- ❑ Forestry sector development activities can include reforestation, natural forest management, and agroforestry; each sector has unique opportunities and challenges.
- ❑ For all forestry-related activities, organize information to create watershed-specific forest cover mapping and land-use plans to forecast the demands on the natural resources.
- ❑ Comply with the principles of the Forest Stewardship Council⁹ in any livelihoods development around this industry:
 - ❑ **Comply with Laws and Principles:** Forest management shall respect all applicable national laws, international treaties, and agreements to which the country is a signatory.
 - ❑ **Clearly Define Tenure and Use Rights and Responsibilities:** Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented, and legally established.
 - ❑ **Recognize and Respect Indigenous Peoples' Rights:** The legal and customary rights of indigenous peoples to own, use, and manage their lands, territories, and resources shall be recognized and respected.
 - ❑ **Maintain and Enhance Community Relations and Workers' Rights:** Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.
 - ❑ **Manage for Social and Environmental Benefits from the Forest:** Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.
 - ❑ **Minimize Environmental Impact:** Forest management shall conserve biological diversity, water resources, soils, and unique and fragile ecosystems and landscapes, and by so doing maintain the ecological functions and integrity of the forest.
 - ❑ **Draft Written Management Plan:** A management plan appropriate to the scale and intensity of operations shall be written, implemented, and kept up to date. The long-term objectives of management, and the means of achieving them, shall be clearly stated.
 - ❑ **Ensure Monitoring and Assessment:** Monitoring shall be conducted to assess the condition of the forest, yields of forest products, chain of custody, and management activities, as well as their social and environmental impacts.
 - ❑ **Maintain Natural Forests:** Primary forests; well-developed secondary forests; and sites of major environmental, social, or cultural significance shall be conserved. Such areas shall not be replaced by tree plantations or other land uses.
 - ❑ **Utilize Plantations Where Appropriate:** Plantations shall complement, not replace, natural forests. Plantations should reduce pressures on natural forests.
- ❑ Ensure that all project activities comply with local, regional, and national laws that govern natural resource management. Note that some laws may be changed as a result of the disaster.

For more information, see:

Heising, K. Ed. 2006. *Improved Stoves as a Key Intervention to Enhance Environmental Health in the Andes*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)

Marsh, R. 2002. *Working with local institutions to support sustainable livelihoods*. www.fao.org/sd/2002/PE0702a3_en.htm (Accessed on April 14, 2010)

McCall, M. 2004. *Can participatory-GIS strengthen local-level spatial planning: Suggestions for better practice*.

International Network on Household Energy in Humanitarian Settings: www.fuelnetwork.org

⁹ The Forest Stewardship Council (FSC) is a non-profit organization devoted to encouraging the responsible management of the world's forests. www.fsc.org

5.2.3 Aquaculture

- ❑ As far as possible, provide alternative livelihoods and compensation while the aquaculture sector is reviewed for environmental and economic sustainability, infrastructure needs are assessed, and a sector-specific redevelopment plan is completed.
- ❑ Ensure that reconstruction is framed within a larger coastal zone management and spatial planning framework, and that there is effective participation of local communities in issues of land tenure, reclamation, and zoning.
- ❑ Ensure that reconstruction follows better practice guidelines for aquaculture, including minimal impact on other ecosystems and provision of incentives and access to markets for products of a certification standard.
- ❑ Use the reconstruction of the aquaculture sector as a means of promoting local-level enterprise opportunities, coupled to the implementation of best practice, such as providing individuals with equity in a larger enterprise.
- ❑ Follow the standards for siting under the aquaculture dialogues¹³ for the respective species.
- ❑ Ensure that actions fall within the legal framework and land use planning.
- ❑ Ensure that product quality is high and that chemicals are not used.
- ❑ Embody resource efficiency to reduce cost to producers and reduce impacts on the environment. Resource efficiency refers to management of raw materials, energy, and water to minimize waste and thereby reduce cost

For more information, see: ¹⁰

Tucker, C., and J. Hargreaves. Eds. 2008. *Environmental Best Management Practices for Aquaculture*. Hoboken: John Wiley and Sons.

World Bank, NACA, WWF, and FAO. 2003. *Shrimp Farming and the Environment: A Consortium Program to Analyze and Share Experiences on the Better Management of Shrimp Aquaculture in Coastal Areas*. Synthesis Report.

World Bank, NACA, WWF, and FAO. 2003. *Shrimp Farming and the Environment: Can Shrimp Farming Be Undertaken Sustainably?*

World Bank, NACA, WWF, and FAO. 2003. *Shrimp Farming and the Environment Booklet*.

¹⁰ WWF engaged more than 2,000 people — farmers, conservationists, academics, government officials, and others — in roundtables called “Aquaculture Dialogues.” Jointly through these dialogues, they are creating standards that will minimize key negative environmental and social impacts for 12 species including shrimp, salmon, abalone, clams, mussels, scallops, oysters, pangasius, tilapia, trout, seriola, and cobia.

5.2.4 Agriculture

- ☐ Provide alternative livelihoods options for those displaced or unable to use impacted lands, prioritizing those most in need.
- ☐ Frame reconstruction efforts within a spatial management planning framework that includes sector-specific reconstruction plans with environmental safeguards, and rehabilitation strategies for lands suffering degradation such as saltwater intrusion.
- ☐ Promote crop production according to standards of sustainability or in accordance with better management practice guidelines, including avoidance of human-wildlife conflict.
- ☐ Ensure that agriculture practices have minimum negative impacts on water quality and do not have negative impacts on the watershed or adjacent river basins.
- ☐ Employ production practices that reduce soil erosion, pesticide use, and water pollution, and better manage production wastes.
- ☐ Ensure that rebuilt agriculture industries do not use more water than is sustainably available in the long term, and that they consider trends in climate change and climate variability.
- ☐ Ensure that effective systems are in place to prevent pollution, sedimentation, and contamination of water systems from all human activities (e.g., agriculture, aquaculture, heavy and light industry, urban and rural waste, runoff, infrastructure development).
- ☐ Promote agroforestry where appropriate. Agroforestry is a system of land use in which harvestable trees or shrubs are grown among or around crops or on pastureland, as a way to maintain or enhance productivity. The increased diversity of crops can improve nutrition (e.g., with fruit trees) and enhance food security, especially important in areas with high climate variability. Agroforestry improves soil fertility, reduces erosion, and can create habitat for pollinators; this helps to increase productivity, and is especially important for families with small land holdings. The trees create shade and shelter from wind, and can provide fodder for livestock and woody products such as timber. All this helps to improve livelihoods and make them more sustainable.

For more information, see:

Asian Development Bank. Agriculture Sector Program Loan Afghanistan. www.adb.org/Documents/Profiles/LOAN/37046013.ASP (Accessed on April 14, 2010)

Bishkay, F. 2003. *Towards Sustainable Agricultural Development in Iraq: The Transition from Relief, Rehabilitation and Reconstruction to Development*. FAO.

The East Timor National NGO Forum. www.pcug.org.au/~wildwood/01junagriculture.htm (Accessed on April 14, 2010)

5.2.5 Tourism

- ☐ Protect and effectively manage all known important areas for endangered or vulnerable species (e.g., turtle nesting beaches), as well as other plant and animal species of interest, using appropriate traditional, local, and national management mechanisms.
- ☐ Protect sites of importance for cultural, historical, or traditional values, maintain access to such sites, and take advantage of the ecosystem that encompasses the main tourist activities in particular settings, such as beaches, jungles, and deserts. Protect the natural resource base such as wildlife concentrations, including birds and fish, to protect tourism development and potential.
- ☐ Adopt integrated land management as a framework for protecting marine, coastal, or terrestrial sites of high natural and cultural value.
- ☐ Link rehabilitation and protection efforts to the spatial planning process to ensure that identified areas are included in a redevelopment spatial plan.
- ☐ Promote development of tourism associations so that an organized body can be engaged in upstream and downstream resource management decisions that will impact tourism-based livelihoods.
- ☐ Ensure that the planning process is participatory, taking into account needs of the local community and the environment, and ensuring that the needs of women, the poor, and the disadvantaged are taken into account.

For more information, see:

Overseas Development Institute. Tourism Program. www.odi.org.uk/programmes/tourism/default.asp (Accessed on April 14, 2010)

Pro Poor Tourism Partnership. Pro Poor Tourism. www.propoortourism.org.uk/ (Accessed on April 14, 2010)

UNEP. 2001. *Environmental Impacts of Tourism*. www.gdrc.org/uem/eco-tour/envi/index.html (Accessed on April 14, 2010)

UNEP and CBD. 2007. *User's Manual on the CBD Guidelines on Biodiversity and Tourism Development*.

5.2.6 Microfinance and Small-Scale Enterprise

- ☐ Include prescreening and stipulations such that ecosystem integrity is a condition of lending.
- ☐ Make the business case for protecting the ecosystem one aspect of the livelihood microfinance lending program.
- ☐ Promote microfinance mechanisms that enable lending to women and poor and disadvantaged groups, not just wealthier individuals; poor and disadvantaged people are often more dependent on natural resources, especially during times of crisis. Microfinancing can help tide them over shocks and reduce additional environmental pressures.

For more information, see:

Consultative Group to Assist the Poor. Microfinance Gateway. www.microfinancegateway.org/ (Accessed on April 14, 2010)

Global Development Research Center. The Environmental Colours of Microfinance Theory and Practice. www.gdrc.org/icm/envi/environ.html (Accessed on April 14, 2010)

5.2.7 Animal Husbandry

- ☐ Ensure sufficient knowledge to manage intensive farming. For example, when farmers increase animal densities, there is often an increase in animal disease, which requires access to veterinarians or substantial veterinary training.
- ☐ Do not allow animals that are pastured to roam in coastal or freshwater buffer zones or other critical natural habitats, and delineate and fence watering areas to reduce erosion.
- ☐ Recycle animal waste to reduce reliance on fertilizers used on other crops.
- ☐ Consider climate, terrain, and ecosystem.
- ☐ Evaluate policy, legal, customary, and cultural context.
- ☐ Assess current and proposed species and breeds.
- ☐ Evaluate current and proposed livestock management practices, likely acceptance of new practices, and who the practices will benefit most (will the poor and disadvantaged benefit, or only richer members of the community?).
- ☐ Assess demand for, markets for, and use of livestock products through a feasibility study.
- ☐ Assess livestock ectoparasite management.
- ☐ Consider livestock population pressure, carrying capacity of pasture or rangeland, and disease burden.
- ☐ Consider existing and potential conflict with wildlife, including disease transmission and attacks on livestock.

For more information, see:

USAID. Asia and Near East: Sector Specific Guidelines. www.usaid.gov/our_work/environment/compliance/ane/ane_guidelines.htm (Accessed on April 14, 2010)

ANNEX 1: ADDITIONAL RESOURCES

The following organizations and publications provide additional resources that elaborate on the concepts presented in this module.

Organizations

African Development Bank: The bank's policy on environmentally sustainable development in Africa is based on the belief that to sustain economic growth in Africa, the ecological capital enriching such growth must be preserved. In 2004, the bank developed an Implementation Plan that seeks to ensure that a strong and diversified economy will continue to value environmental protection, and to guarantee that all developmental decision making integrates economic, social, and environmental considerations. www.afdb.org/en/topics-sectors/sectors/environment/

Asian Development Bank (ADB): The ADB, based in Manila, is dedicated to reducing poverty in the Asia and Pacific region through inclusive economic growth, environmentally sustainable growth, and regional integration. ADB is raising awareness of the poverty-environment linkage and improving poverty-reduction operations through sound environmental management, disaster protection, and emergency support for the vulnerable poor. www.adb.org/poverty/environmental-sustainability.asp

Eldis-Livelihoods Connect: Livelihoods Connect aims to provide researchers, policy makers, and development practitioners with up-to-date, diverse, and credible information on the application of livelihoods approaches to development, research, policy, and practice. www.eldis.org

International Finance Corporation (IFC): A member of the World Bank Group, IFC's purpose is to create opportunity for people to escape poverty and improve their lives by helping to generate productive jobs and deliver essential services to the underserved. IFC is committed to environmental and social sustainable development as a fundamental part of its mission, and applies environmental and social standards that minimize the impact on the environment and on affected communities of all the projects it finances. www.ifc.org

International Union for Conservation of Nature (IUCN): IUCN's Commission on Environmental, Economic and Social Policy (CEESP) is an interdisciplinary network of professionals providing expertise and policy advice on economic and social factors for the conservation and sustainable use of biological diversity. The CEESP has several themes and working groups organized around key topics in sustainability, one of which, the Theme on Sustainable Livelihoods (TSL), is concerned with local aspects of environmental sustainability and community well-being. www.iucn.org/about/union/commissions/ceesp/

Network of Aquaculture Centres Asia Pacific (NACA): NACA is an intergovernmental organization that promotes rural development through sustainable aquaculture. NACA implements development assistance projects in partnership with research centers, governments, development agencies, farmer associations, and other organizations to help farmers prepare and adapt to climate changes affecting aquaculture systems worldwide. www.enaca.org/

UN Food and Agriculture Organization (FAO): The FAO has long promoted natural resources management and environmental protection in its work. FAO's Sustainable Development Department provides policy and program support to help countries analyze the core elements for fostering sustainable livelihoods, one of which is the dynamics of the natural resource base. www.fao.org/sd/

UNEP: UNEP seeks to minimize environmental threats to human well-being from the environmental causes and consequences of conflicts and disasters. UNEP has produced a wide variety of reports and guidance on the integration of environmental issues into livelihoods. www.unep.org

UNEP provides four core services to Member States through its Disasters and Conflicts Programme:

- Post-crisis environmental assessments
- Post-crisis environmental recovery
- Environmental cooperation for peace building
- Disaster risk reduction

United States Agency for International Development (USAID): USAID's programs in natural resource management are closely linked with programs to improve health, increase agricultural productivity, and mitigate or adapt to climate change. www.usaid.gov/our_work/environment/

World Bank: The World Bank integrates principles of environmentally sustainable development. It has developed an environment strategy that identifies the importance of the close links between poverty and environmental change and clusters them into three strategic areas of work: environment and health, livelihoods and natural resources, and vulnerability and resource management. The World Bank provides analytical work, training, and project support in many areas. www.worldbank.org

WorldFish Center: WorldFish believes that climate change poses huge threats to aquatic food production and the poor who depend upon it. Much of WorldFish's work involves research on impacts, mitigation, and the adaptation crucial to making fisheries and aquaculture systems more resilient to global climate change, thereby securing a brighter future for the people that depend upon them. www.worldfishcenter.org

World Wildlife Fund (WWF): WWF is working directly with humanitarian organizations and governments to advise them on better practices for rebuilding communities impacted by disaster. The goal of the Humanitarian Partnerships Program is to ensure that recovery and reconstruction efforts include environmentally sustainable options. To reduce risk and vulnerability and achieve long-lasting results for affected communities, the recovery and reconstruction process must be comprehensive and must include a "design through implementation" approach to ensure restoration of livelihoods, protection of natural resources, and strengthening of communities against future disasters. www.worldwildlife.org/what/partners/humanitarian/index.html

Emergency Market Mapping and Analysis (EMMA), developed for Oxfam GB and International Rescue Committee UK (IRC) by Practical Action Consulting. The EMMA tool kit can be used by project managers to undertake essential market analysis. This analysis can inform early decisions about the possibility of using cash, help identify opportunities and actions needed to restore or rehabilitate critical market systems, and track the impact of a crisis and humanitarian interventions on critical markets. EMMA provides accessible, relevant guidance to staff who are not already specialists in markets or livelihoods analysis. The ultimate purpose of EMMA is to improve the efficiency and effectiveness of the early humanitarian actions taken to ensure people's survival, protect their food security, and re-establish their livelihoods. For more details about the publication, contact <http://practicalactionpublishing.org/publishing/emma>

Publications

Ariyabunu, M. 2005. *Livelihood Centered Approach to Disaster. Management: A Policy Framework for South Asia*. Practical Action South Asia.

Canadian International Development Agency. 2005. *Environmental Handbook for Community Development Initiatives*. 2nd Ed.

FAO and ILO. 2009. *Disaster Livelihood Assessment Toolkit: Analysing and responding to the impact of disasters on the livelihoods of people*.

Kelly, C. 2005. *Guidelines for Rapid Environmental Impact Assessment in Disasters (REA)*. Version 4.5. London: CARE International and Benfield Hazard Research Center.

Neefjes, K. 2000. *Environment and Livelihoods: Strategies for Sustainability*. Oxfam.

Pallen, D. 1997. *The Environmental Sourcebook for Micro-Finance Institutions (MFIs)*. Canadian International Development Agency-Asia Branch.

Small Enterprise Education and Promotion Network. 2009. *Minimum Standards for Economic Recovery After Crisis*.

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ANNEX 2: ENVIRONMENTAL STEWARDSHIP REVIEW FOR HUMANITARIAN AID

Environmental Stewardship Review for Humanitarian Aid



The purpose of this worksheet is to assist humanitarian staff improve project performance by identifying and addressing environmental sustainability issues. Use of this worksheet is consistent with SPHERE Standard #6. Include a completed worksheet with the project file.

A. Project Information

Implementing Agency: **Humanitarian International** Project Title: **Pa’agnan Island Relocation**
 Project Location: **Pa’agnan, Rakudinia**
 Project Coordinator: **Joe Reconetto**

Environmental Stewardship Review completed by: **Achalo Nanathumo/ Mittaka Dangadasa** Date: **08-02-2009**

B. Project Objectives

Approximately 3,600 people were left homeless when the 2008 tsunami rolled across the tiny island of Ngeri in the country of Rakudinia. The project objective is to resettle the affected community members at an alternate location in the nearby Pa’agnan Island which was previously uninhabited in order to increase community resiliency against future disasters.

C. Project Description

Humanitarian International is planning to construct of a total of 315 houses, primary school, secondary school, community administration building, community buildings, waste water disposal system, electric network, roads and street lighting.

D. Coordination *(Develop a list of local, state, and national experts that can assist with identifying the key environmental issues associated with your project and contact them. Examples include the Ministry of Natural Resources, local planning authorities, Ministry of Fisheries, national and international environmental NGOs, and academic institutions. These contacts will also be useful for completing the Environmental Issues Matrix in Section E. Use the following table to record the results of coordination or attach additional sheets.)*

Name	Organization	Key Issues	Date contacted
Sandib Mohammed Baaklini	Ministry of Energy, Environment and Water (MEEW)	Wastewater outflow to the marine environment, proper permitting	23-12-2008
Esther Chuyana	Atoll Office	Not using coral as a source of building materials. Maintaining fish stocks for the fishermen.	05-01-2009

Note: Humanitarian International is in constant contact with both these offices regarding various issues related to Dhuvafaaru, and to obtain permission for various construction activities.

Environmental Stewardship Review for Humanitarian Aid



E. Environmental Issues Matrix (Complete the following matrix based on the coordination you completed in Section D, along with field visits, and additional research as needed. The objective is to identify the key environmental issues associated with your project and ways to address these issues. Instructions for completing the matrix are in the first row of each column.)

		Environmental Issue	To answer...	Yes	No	Not sure	Comment	Action Taken
		This column asks questions related to key environmental issues. Note: during the coordination phase in Section D, you may have identified some issues that are not described below but should be addressed in order to ensure your project achieves environmental sustainability.	This column suggests ways to obtain the information needed to answer the questions at the right.	Check this box if the answer is "Yes."	Check this box if the answer is "No."	Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.		This column provides space to identify what further action needs to be taken to address the environmental issue. These actions may include improvements to the design of the proposed project, additions to the project TOR (i.e., addition of contract requirement that timber be obtained from sustainable sources), need for additional coordination with resource experts, or preparation of additional studies.
Air	1	Will the project result in the emission of air pollutants (e.g., smoke, gases, dust particles)?	① Review project proposal. ② Consult local natural resources department.	X			Emissions from the three generators installed have been controlled. However, solid waste is burnt under uncontrolled conditions in the open.	Ensure solid waste is burnt under controlled conditions. If not, in future waste burning could become a serious issue. There is also opportunity to improve the waste collection and separation to reduce burning of hazardous waste such as batteries, electronic items, etc.

Environmental Stewardship Review for Humanitarian Aid



		Environmental Issue <i>This column asks questions related to key environmental issues. Note: during the coordination phase in Section D, you may have identified some issues that are not described below but should be addressed in order to ensure your project achieves environmental sustainability.</i>	To answer...	Yes <i>Check this box if the answer is "Yes."</i>	No <i>Check this box if the answer is "No"</i>	Not sure <i>Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.</i>	Comment	Action Taken <i>This column provides space to identify what further action needs to be taken to address the environmental issue. These actions may include improvements to the design of the proposed project, additions to the project TOR (i.e., addition of contract requirement that timber be obtained from sustainable sources), need for additional coordination with resource experts, or preparation of additional studies.</i>
Water	2	Will the project result in alteration of waterways (addition of spring catchments, drainage infrastructure, placement of rock along river bank)	<p>Review area maps. Consult with local environmental organizations.</p> <p>☐ ☐</p>	X			<p>The groundwater lens is 1m deep and currently clean. It has been noticed to be recharging relatively quickly in areas where rainwater is not being harvested. Each house has a well but there is no measurement of usage. The waste management centre and fuel storage sites are both concrete padded, and/or bunded with grease traps to collect any wastewater.</p> <p>Each house has a 2,500l rainwater harvesting tank. There are fourteen 10,000l community rainwater harvesting tanks.</p> <p>All the wastewater from households are pumped out to the deep sea. As the underground wastewater collection lines run close to the groundwater lens, there is a possibility for the wastewater pumping system to pump out the groundwater if there is groundwater infiltration into the pipes due to construction defects. This could reduce the groundwater sources rapidly as it is replenished only through rainwater.</p>	<p>Promote water conservation with the beneficiaries and ensure they understand efficient use of the groundwater source and protect it being polluted.</p> <p>Community sensitization programs would be required to ensure community understands their responsibility to conserve water and protect water resources.</p> <p>At present there is a drinking water shortage in the island. Rain Water Harvesting would need to be increased through increasing roof area used for water collection and increasing water storage tank volumes.</p> <p>Increased rainwater harvesting will reduce the recharging of the groundwater aquifer. However, considering the amount of open space available (through observations) for rainwater infiltration to ground, this would not pose a significant threat as long as open spaces are maintained at present levels. As the possibility of island roads and open spaces being paved are unlikely, increasing collection of rainwater at household level should not be a major environmental threat.</p> <p>Ensure the wastewater collection pumps are pumping only wastewater from houses and not the groundwater lens. Regular checkups must be made on the quantity of water pumped out at each pumping station and the total must be tallied with expected wastewater quantities from the island. This needs to be done regularly and systematically.</p>

Environmental Stewardship Review for Humanitarian Aid



		Environmental Issue <i>This column asks questions related to key environmental issues. Note: during the coordination phase in Section D, you may have identified some issues that are not described below but should be addressed in order to ensure your project achieves environmental sustainability.</i>	To answer...	Yes <i>Check this box if the answer is "Yes."</i>	No <i>Check this box if the answer is "No"</i>	Not sure <i>Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.</i>	Comment	Action Taken <i>This column provides space to identify what further action needs to be taken to address the environmental issue. These actions may include improvements to the design of the proposed project, additions to the project TOR (i.e., addition of contract requirement that timber be obtained from sustainable sources), need for additional coordination with resource experts, or preparation of additional studies.</i>
Water	3	Will the project result in pollution of rivers, streams, wetlands, or other waterways? Examples include: Addition of sediment, wastewater, hazardous materials, runoff from roads.	① Review area maps. ② Consult with local environmental organizations.			X	There are no surface water sources on the site. The groundwater lens is very close to the surface and it is important that islanders understand the possible methods that could pollute this water source. Construction on the island has not affected the groundwater, but future activities by islanders may do so. Wastewater collected through the sewer network is pumped out to the sea. If the sewer outfall is not properly constructed as given in the designs there could be wastewater pollution within the shallow coral areas and wash zone.	Community sensitization programs would be required to ensure community understands their responsibility to protect the water resources. Ensure sewer outfall is properly constructed underwater.
Water	4	Will the project restrict access to water sources or other public use areas/resources?	① Review spatial planning maps. ② Conduct site visit.			X	During dry seasons the water resources available are inadequate for the needs of the people.	As water is scarce in the area it is recommended that water conservation be encouraged within the community. Further, drinking water sources need to be improved as this is a serious issue. Rain water harvesting needs to be increased. For this roof area collecting rain water and storage volumes need to be increased.

Environmental Stewardship Review for Humanitarian Aid



		Environmental Issue <i>This column asks questions related to key environmental issues. Note: during the coordination phase in Section D, you may have identified some issues that are not described below but should be addressed in order to ensure your project achieves environmental sustainability.</i>	To answer...	Yes <i>Check this box if the answer is "Yes."</i>	No <i>Check this box if the answer is "No"</i>	Not sure <i>Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.</i>	Comment	Action Taken <i>This column provides space to identify what further action needs to be taken to address the environmental issue. These actions may include improvements to the design of the proposed project, additions to the project TOR (i.e., addition of contract requirement that timber be obtained from sustainable sources), need for additional coordination with resource experts, or preparation of additional studies.</i>
Hazardous Materials	5	Are there toxic or hazardous materials at the project site?	① Ask neighboring residents about current and previous use of site. ② Conduct field survey	X			Fuel is present on the site which is needed for all the machinery. It is currently stored in un-bunded tanks. In the future fuel will be kept on site to run the generators. The fuel tanks are in bunded areas with grease traps for the wastewater. The wastewater goes into the main sewer line, which will be disposed beyond the reef into the ocean.	Ensure that the fuel tanks are filled with as little spillage as possible.
Hazardous Materials	6	Will the project result in the generation of hazardous materials?	② Review project proposal.		X			
Cultural Resources	7	Are there cultural, archeological, prehistoric or historic resources at the site?	① Talk with neighboring residents. ① Consult local heritage organizations, museums or universities. ① Conduct field survey.	X			During construction some archaeological remains were unearthed, together with an ancient well. These artifacts have been kept on the island in an area cordoned off for preservation of this historic site.	Ensure archeological site is kept protected.
Socio-economics	8	Will the project result in an increase in local fees, taxes?	② Review project proposal.	X			The Government of the Maldives will be introducing taxes in the future. A management fee would be introduced for electricity and any other services.	These fees are necessary for operation and maintenance of the facilities. A reasonable fee mechanism must be set up to maintain the general community services.
Natural Resources	9	Will the project result in the extraction of natural resources? Examples: Fish, timber, water	② Review project proposal. ③ Talk with local natural resource organizations.	X			Water usage will increase with the increase in population. This could have a serious impact on the groundwater sources.	As water is scarce in the area it is recommended that water conservation be encouraged within the community.

Environmental Stewardship Review for Humanitarian Aid



	Environmental Issue <i>This column asks questions related to key environmental issues. Note: during the coordination phase in Section D, you may have identified some issues that are not described below but should be addressed in order to ensure your project achieves environmental sustainability.</i>	To answer...	Yes <i>Check this box if the answer is "Yes."</i>	No <i>Check this box if the answer is "No"</i>	Not sure <i>Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.</i>	Comment	Action Taken <i>This column provides space to identify what further action needs to be taken to address the environmental issue. These actions may include improvements to the design of the proposed project, additions to the project TOR (i.e., addition of contract requirement that timber be obtained from sustainable sources), need for additional coordination with resource experts, or preparation of additional studies.</i>
Natural Resources	10 Are there any endangered species (e.g., sea turtles, orangutans) or their habitats located near the project or have the potential to be impacted by project activities?	① Talk with local environmental organizations. ② Talk with local, provincial, or national natural resources organizations.		X		Turtles have been noted on the beach. The community is generally quite protective of these species.	
Natural Resources	11 Are there any sensitive habitats in the project area (e.g., mangroves, peat bogs, forests, marine resources)?	① Conduct field visits with local experts. ② Review natural resources maps.	X			Coral reef surrounds the island. Local regulations stipulate that people are not allowed to remove coral/sand from the reef. Further there is a tendency for most islanders to throw garbage into the sea.	Ensure the community is aware of this regulation and encourage them not to damage the reef. Introduce solid waste management and awareness programs within the community to reduce future impacts on marine resources.
Natural Resources	12 Have construction materials been obtained from unsustainable sources?	① Talk with suppliers about the source of their materials. ② Talk with local environmental organizations for additional information.		X		Not applicable at this stage as construction is completed.	
Natural Resources	13 Will the project result in the introduction of non-native species (e.g., exotic plant or animal species)?	③ Review project proposal.	X			Beneficiaries will plant fruit trees, vegetables and exotic plants for their gardens.	Local regulations regarding removal of certain vegetative species from neighboring islands and bringing them to this one should be investigated and adhered to.
Disaster Mngt.	14 Is the project site subject to flooding?	① Review floodplain maps if available; ② Talk with local planning authorities; ③ Speak with neighboring residents.		X			

Environmental Stewardship Review for Humanitarian Aid



	Environmental Issue	To answer...	Yes	No	Not sure	Comment	Action Taken
	<i>This column asks questions related to key environmental issues. Note: during the coordination phase in Section D, you may have identified some issues that are not described below but should be addressed in order to ensure your project achieves environmental sustainability.</i>	<i>This column suggests ways to obtain the information needed to answer the questions at the right.</i>	<i>Check this box if the answer is "Yes."</i>	<i>Check this box if the answer is "No"</i>	<i>Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.</i>		<i>This column provides space to identify what further action needs to be taken to address the environmental issue. These actions may include improvements to the design of the proposed project, additions to the project TOR (i.e., addition of contract requirement that timber be obtained from sustainable sources), need for additional coordination with resource experts, or preparation of additional studies.</i>
Disaster Mngt.	15 Is the project vulnerable to natural hazards such as typhoons, earthquakes, landslides, unstable slopes, fires, coastal erosion, wave action, tides, sea level rise?	① Talk to National Emergency Management Agency or similar agency to determine relevant natural hazards in the project area. ② Review hazard identification maps.			X	This island is protected by the reef to a large extent. The maximum height of the island is 2.5m above sea level.	As any other island in Maldives this island is also vulnerable to sea level rise, tides, coastal erosion and typhoons.
Disaster Mngt.	16 Will the project result in the ponding of water (thus providing a disease vector for mosquitoes?)	③ Review project proposal.	X			There is potential for mosquito breeding within the household wells and rainwater harvesting tanks more than in open ponds.	Protect wells and rainwater harvesting tanks with mosquito netting and filters to reduce mosquito breeding in clean water.
Disaster Mngt.	17 Will the project result in removal of vegetation on slope slides?	④ Review project proposal. ⑤ Conduct site visit.		X		There are no slopes on the site.	
Disaster Mngt.	18 Will the project involve soil movement or excavation that could lead to an increase in landslides?	⑥ Review project proposal. ⑦ Conduct field visit. ⑧ Talk with geologists or geo-technical engineers.		X			
Spatial Planning	19 Is the project located within a designated Coastal Zone buffer?	① Talk with local planning authorities to determine if there is a legally designated coastal buffer zone and how this coastal zone policy relates to your project.			X	Some construction activity visible close to the coastal zone.	
Spatial Planning	20 Are there any current or planned Parks or Protected Areas within 15 km distance to the project site?	⑨ Review provincial maps. ⑩ Talk with local authorities.		X			

Environmental Stewardship Review for Humanitarian Aid



	Environmental Issue <i>This column asks questions related to key environmental issues. Note: during the coordination phase in Section D, you may have identified some issues that are not described below but should be addressed in order to ensure your project achieves environmental sustainability.</i>	To answer...	Yes <i>Check this box if the answer is "Yes."</i>	No <i>Check this box if the answer is "No"</i>	Not sure <i>Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.</i>	Comment	Action Taken <i>This column provides space to identify what further action needs to be taken to address the environmental issue. These actions may include improvements to the design of the proposed project, additions to the project TOR (i.e., addition of contract requirement that timber be obtained from sustainable sources), need for additional coordination with resource experts, or preparation of additional studies.</i>
Spatial Planning	21 Will the project impact or be impacted by other sectors in the project area, such as spatial planning decisions, water and sanitation projects, disaster management, livelihoods activities, etc.?	① Coordinate with other donor agencies and other organizations at work in the project area. ② Review spatial planning maps.		X		Spatial planning could have been done better before the construction of the housing to maintain enough greenery within the island as it resembles a desert environment at present.	Greenings programs should be conducted urgently to improve the general environmental conditions. These could be done in partnership with home gardening programs at household level.
Spatial Planning	22 Will the project deviate from existing village plans?	③ Review village spatial plans. ④ If village plans have not been developed speak with community planners/leaders.		X		Permission had to be obtained from local authorities and the government was responsible for planning of the island	

Environmental Stewardship Review for Humanitarian Aid

F. Other information *(Please answer the following questions)*

Are personnel preparing this form familiar with the site? ☒ Yes ☐ No

Did personnel visit the site? ☒ Yes ☐ No

Have local laws been considered and applied to the project? ☒ Yes ☐ No

Are there existing local, state, or national management plans that pertain to the project (e.g., Village Plan, Integrated Water Resources Management Plan, Fisheries Management Plan, etc.)? ☒ Yes ☐ No If so, list plan name(s):

If plans exist, is the project consistent with existing plans? ☒ Yes ☐ No
(If no, determine how the project can better fit with existing plans or whether existing plans need to be updated to reflect current conditions. If no plan exists, consider whether one should be undertaken in coordination with implementation of the proposed project)

Has the community been given the opportunity to provide input on the proposed project? ☒ Yes ☐ No. In not, ensure that community involvement has been integrated into project planning. If so, describe the method used to obtain community input:

Community has been involved in the project from the planning stage to the managing of the island after it was handed over to them. Housing allocation and beneficiary selection was also conducted in a participatory manner.

G. Determine Need for Additional Studies

Based on completion of Sections A – F, determine whether you require additional information or if the project requires an Environmental Impact Assessment (EIA). In determining whether additional information/EIA is required, consider:

- ⌚ **Size and scale of the project.** *If the project is of such a size and scale that it can not be adequately evaluated in this worksheet, consider preparing a more detailed EIA.*
- ⌚ **Uncertain and potentially significant environmental risks.** *If the environmental effects of the project are not well-understood and could lead to potentially significant risks to the environment and the beneficiaries who depend on it, consider preparing additional information and/or preparing an EIA.*
- ⌚ **Cumulative impact.** *If the project has a relationship with other activities that, when considered cumulatively, would have a potentially significant impact, then consider conducting additional studies and/or preparing an EIA to fully understand the impact. For example, if the project involves the installation of groundwater wells in area where several other agencies are also installing a number of groundwater wells, there may be a cumulatively significant impact on the area’s groundwater supply, and a groundwater resources assessment should be conducted.*

In consideration of the above factors, are additional studies or an EIA necessary?

☐ Yes ☒ No. If Yes, list the additional studies that are needed (examples include EIA, groundwater study, Fisheries Management Plan, hazardous materials survey, Solid Waste Management Plan, hydrology study, biological assessment, endangered species survey, Forest Management Study):

Environmental Stewardship Review for Humanitarian Aid

H. Take Action!

The most important component in environmental stewardship is to take action. In Sections D (Coordination) and E (Environmental Issues Matrix), you identified the key environmental issues associated with your project and ways to address these issues. These actions may have included improvements to the design of the proposed project, specifications in the Terms of Reference, or the need for additional consultations and research. Use this page to list the specific measures that were identified to eliminate or minimize the impact of the proposed project on the environment.

	Action	Has Action Been Taken?	
		Yes	No
1	Ensure solid waste is burnt under controlled conditions. If not, in future waste burning could become a serious health issue. Need to improve waste collection, separation and reduce burning of hazardous waste such as batteries, electronic items, etc.		
2	Introduce solid waste management and awareness programs within the community to reduce future impacts on water and marine resources		
3	As water is scarce in the area it is recommended that water conservation be encouraged in the community. Community sensitization programs would be required to ensure community understands their responsibility to conserve water and protect the water resources.		
4	Ensure sewer outfall is properly constructed underwater.		
5	Ensure the wastewater collection pumps are pumping only wastewater from houses and not the groundwater lens. Regular checkups must be made on the quantity of water pumped out at each pumping station and the total must be tallied with expected wastewater quantities from the island. This needs to be done regularly and systematically.		
6	Protect wells and rainwater harvesting tanks with mosquito netting and filters to reduce mosquito breeding in clean water. Conduct public health awareness programs for the community on mosquito borne diseases such as Dengue and Chikangunya.		
7	Initiate greening programs in the island and promote home gardening programs to increase greenery and shade. It would further improve the community livelihoods and make the island more habitable.		
8	Ensure fuel tank spillage will not harm the groundwater lens		

ANNEX 3: SECTORAL INTERNATIONAL STANDARDS

Agriculture Dialogues

Roundtable on Responsible Soy: www.responsiblesoy.org

Better Sugarcane Initiative: www.bettersugarcane.org

Better Cotton Initiative: www.bettercotton.org

Roundtable on Sustainable Palm Oil: rspo.org

Aquaculture Dialogues

Shrimp: www.worldwildlife.org/what/globalmarkets/aquaculture/dialogues-shrimp.html

Salmon: www.worldwildlife.org/what/globalmarkets/aquaculture/dialogues-salmon.html

Mollusk: www.worldwildlife.org/what/globalmarkets/aquaculture/dialogues-molluscs.html

Tilapia: www.worldwildlife.org/what/globalmarkets/aquaculture/dialogues-tilapia.html

Freshwater Trout: www.worldwildlife.org/what/globalmarkets/aquaculture/troutdialogue.html

Pangasius: www.worldwildlife.org/what/globalmarkets/aquaculture/dialogues-pangasius.html

Abalone: www.worldwildlife.org/what/globalmarkets/aquaculture/dialogues-abalone.html

Seriola and cobia: www.worldwildlife.org/what/globalmarkets/aquaculture/seriolaandcobiadialogue.html

Marine Stewardship Council: The MSC works with partners to transform the world's seafood markets to a sustainable system. With the help of experts, MSC developed standards for sustainable fishing and seafood traceability. These ensure that MSC-labeled seafood comes from, and can be traced back to, a sustainable fishery. The MSC meets the highest benchmarks for credible certification and eco-labeling programs, including the UN Food and Agriculture Organization guidelines and the ISEAL Code of Good Practice. www.msc.org

Forest Stewardship Council: The FSC sets high standards to ensure that forestry is practiced in an environmentally responsible, socially beneficial, and economically viable way. The FSC guarantees that the wood from a certified well-managed forest is available across the world from a variety of mills, manufacturers, and distributors. www.fsc.org

Rain Forest Alliance: The Rainforest Alliance works with farmers to ensure compliance with the SAN standards for protecting wildlife, wild lands, workers' rights, and local communities. Farms that meet these rigorous standards are awarded the Rainforest Alliance Certified seal. www.rainforestalliance.org

Marine Aquarium Council: The Marine Aquarium Council (MAC) is an international not-for-profit organization that brings marine aquarium animal collectors, exporters, importers, and retailers together with aquarium keepers, public aquariums, conservation organizations, and government agencies. MAC's mission is to conserve coral reefs and other marine ecosystems by creating standards and certification for those engaged in the collection and care of ornamental marine life from reef to aquarium. www.aquariumcouncil.org

ANNEX 4: LIVELIHOODS FRAMEWORKS

Sustainable Livelihoods Framework¹¹

The sustainable livelihoods (SL) framework is a visual representation of the sustainable livelihoods approach to poverty eradication based on core principles of people-centered, participatory, sustainable activities. The SL framework places people and their priorities at the center of development and recognizes that there is a multiplicity of actors, influences, livelihoods strategies, and outcomes. While the SL framework was developed for use in normal development situations, the ILO and FAO have used the concept to underpin its “Livelihood Assessment Tool Kit” for use in post-disaster situations.¹²

The SL framework recognizes that livelihoods and the forces that influence them are dynamic. It focuses on poverty reduction interventions that empower the poor to build on their own opportunities, support their access to assets, and develop an enabling policy and institutional environment. While there are several SL frameworks in use, the one referenced in this paper is based on the DFID SL framework, as it is perhaps the best known and the least organizationally specific.¹³

The SL framework represents the factors and dynamic forces affecting peoples’ livelihoods, including:

- The priorities that people define as their desired **livelihood outcomes**
- People’s access to social, human, physical, financial, and natural **capital or assets**, and their ability to put these to productive use
- The different **strategies** they adopt (and how they use their assets) in pursuit of their priorities
- The **policies, institutions**, and processes that shape their access to assets and opportunities
- The context in which they live, and factors affecting **vulnerability** to shocks and stresses

The SL framework can be used to help select and plan post-disaster livelihoods recovery activities and to assess the contribution that existing activities have made to the sustenance of livelihoods.

11 Unless otherwise noted, this section draws most heavily on content found on the Eldis Livelihoods Connect Web site and also includes excerpts from others cited at the end of this paper in the section “Sustainable Livelihoods Approaches.”

12 FAO and ILO. 2009. *Disaster Livelihood Assessment Toolkit: Analysing and responding to the impact of disasters on the livelihoods of people*.

13 The DFID model builds on other organizations that use or have adapted the SLA; these include ILO, FAO, UNDP, WFP, IFAD, ODI, CARE, Oxfam, and Cooperative Housing Foundation.

Livelihood Assets

At the core of the SL framework are people's livelihood assets. The SL framework takes a broad view of these and expresses these assets as an "Asset Pentagon," which includes the following¹⁴:

- Human capital: skills, knowledge, health and ability to work
- Social capital: social resources, including informal networks, membership of formalized groups, and relationships of trust that facilitate cooperation
- Natural capital: natural resources such as land, soil, water, forests, animals, and fisheries
- Physical capital: basic infrastructure such as roads, water and sanitation, schools, and ICT, and producer goods, including tools and equipment
- Financial capital: financial resources including savings, credit, and income from employment, trade, and remittances

Households with many livelihood assets are generally more resilient or better able to withstand shocks than are households with fewer assets. Resilient *farming households* have sufficient savings to buy food when crops fail; resilient *small traders* have sufficient cash to buy new stocks of raw materials after a disaster has destroyed their previous stock; and resilient *pastoralists* can afford to lose or sell a few animals and still have enough to build up their herds again after the emergency passes.¹⁵

The SL framework helps one see that natural capital (e.g., land, forests, mangroves, animals) is just one asset amongst many and has to be seen in conjunction with other assets in order to understand its importance in an overall livelihood strategy. If one is interested in reestablishing or preserving natural capital, one needs to understand the dynamic relationship of natural capital to these other assets, and to people's wider vulnerability context, structures, institutions and processes, livelihood strategies, and desired livelihood outcomes.

Vulnerability Context

Assets can be destroyed or created as a result of the trends, shocks, and seasonal changes in the vulnerability context within which people live. The factors comprising the vulnerability context are important because they can have a direct impact on people's assets and the options available to them to pursue beneficial livelihood strategies. The model presents three main categories of vulnerabilities:

- Trends: population trends, economic trends, resource trends (including increasing tensions and confrontations over resources), government and political trends, technological trends, etc. Not all trends (e.g., technology, medical advances) are negative.
- Shocks: natural disasters, conflicts, economic or financial shocks, epidemics, etc. Shocks can destroy assets directly or force people to dispose of assets as a coping strategy.
- Seasonality: seasonal fluctuations in prices, production, health, and employment opportunities.

14 Subsequent to the original DFID model, other categories of capital and assets have been identified, including people's political capital (i.e., their power and capacity to influence decisions).

15 FAO and ILO. 2009. *Disaster Livelihood Assessment Toolkit: Analysing and responding to the impact of disasters on the livelihoods of people*.

A *coping strategy* is a short-term response to threats to one's livelihoods. Coping strategies can be successful, in terms of protecting the ability to make a livelihood, when they are able to preserve vital assets, or negative, when they are unable to do so and may lead to further impoverishment. Any response should aim to support existing positive coping strategies and release households and communities from dependence on negative ones.

- Examples of coping strategies following the Kashmir earthquake in 2005¹⁶:
 - Distress migration to peri-urban areas
 - Selling or slaughtering animals
 - Consuming crops that were either ready for harvest or had just been harvested

The magnitude of the shock, coupled with the low level of assets of the population, meant that for many people these coping strategies were unable to preserve vital assets.

Policies, Institutions, and Processes

People's vulnerability is usually influenced by external factors outside their direct control; it is dependent on wider policies, institutions, and processes that operate from the household to the global level, and within both private and public arenas. These policies, institutions, and processes are important because they determine people's access to and use of various types of assets and livelihood strategies, and can reduce or worsen the impacts of external shocks on vulnerable people.

Policies, institutions, and processes include the interrelated issues of the following:

- Social relations: the way in which gender, ethnicity, culture, history, religion, and kinship affect the livelihoods of different groups within a community
- Social and political organization: decision-making processes, civic bodies, social rules and norms, democracy, leadership, power and authority, rent-seeking behavior
- Governance: the form and quality of government systems including structure, power, efficiency and effectiveness, rights and representation
- Service delivery: the effectiveness and responsiveness of state and private-sector agencies engaged in delivery of services such as education, health, water, and sanitation
- Resource access institutions: the social norms, customs, and behaviors (or "rules of the game") that define people's access to resources
- Policy and policy processes: the processes by which policy and legislation are determined and implemented, and their effects on people's livelihoods

Policies, institutions, and processes can have a great influence on access to assets by creating those assets, determining access to them, and influencing rates of asset accumulation. Those with more assets are more likely to have greater livelihood options with which to pursue their goals and reduce poverty. This dimension of the SL framework also helps us understand how macrostructures in society and the economy enable or constrain the livelihood strategies that can be locally developed.

¹⁶ FAO and ILO. 2009. *Disaster Livelihood Assessment Toolkit: Analysing and responding to the impact of disasters on the livelihoods of people*.

To illustrate how policies, institutions, and processes affect natural resource management, consider how they might influence forests. The public sector's ability to make and enforce legislation impacts people's access to and use of forests. Similarly, the existence (or lack thereof) of local natural resource management organizations influences forestry use legislation and enforcement. The existence (or lack thereof) of markets for forest products influences the types of livelihood options that people and communities might pursue. Culture also influences forestry use depending on what value and symbolism people and their communities ascribe to forests.

Livelihood Strategies

Livelihood strategies are the combination of activities that people choose to undertake to achieve their livelihood goals. These include productive activities, investment strategies, and reproductive choices. Livelihoods approaches try to understand the strategies pursued and the factors behind people's decisions; to reinforce the positive aspects of these strategies and mitigate constraints.

The choice of strategies is a dynamic process in which people combine activities to meet their changing needs. For example, in farming households, activities are not necessarily confined to agriculture but often include non-farm activities to diversify income and meet household needs. Migration, whether seasonal or permanent, is one common livelihood strategy.

According to FAO, one of the most important factors in determining the success of livelihood strategies is people's access to capital assets, although the vulnerability context and the constraints and opportunities posed by wider institutional processes also play a crucial role.¹⁷

While capital assets can gauge the success of livelihoods that depend on capital assets, there still remain communities that do not have to fill an income gap to sustain a livelihood. An example of this non-capital incentive, community-based livelihood can be observed in areas of Africa and South America where indigenous people do not and have never relied on a monetary income to sustain community or individual viability.

Livelihood Outcomes

Livelihood outcomes are the goals to which people aspire, the results of pursuing their livelihood strategies. Livelihood approaches stress the importance of understanding and supporting poor people's efforts to achieve these goals.

Examples of livelihoods outcomes include:

- Increased income
- Reduced vulnerability
- Increased well-being
- Improved food security
- More sustainable use of natural resources

Livelihoods outcomes are important because they help us understand the results of peoples' livelihood strategies in a particular context, why people pursue particular strategies, what their priorities are, and how they are likely to respond to new opportunities or constraints.

¹⁷ Cotula, Lorenzo. 2002. *Improving Access to Natural Resources for the Rural Poor – The Experience of FAO and of Other Key Organizations from a Sustainable Livelihoods Perspective*. FAO Livelihoods Support Programme.

The Ecosystem Approach: Twelve Guiding Principles¹⁸

The following 12 principles are complementary and interlinked.

Principle 1: The objectives of management of land, water and living resources are a matter of societal choices. Different sectors of society view ecosystems in terms of their own economic, cultural and society needs. Indigenous peoples and other local communities living on the land are important stakeholders and their rights and interests should be recognized. Both cultural and biological diversity are central components of the ecosystem approach, and management should take this into account. Societal choices should be expressed as clearly as possible. Ecosystems should be managed for their intrinsic values and for the tangible or intangible benefits for humans, in a fair and equitable way.

Principle 2: Management should be decentralized to the lowest appropriate level. Decentralized systems may lead to greater efficiency, effectiveness and equity. Management should involve all stakeholders and balance local interests with the wider public interest. The closer management is to the ecosystem, the greater the responsibility, ownership, accountability, participation, and use of local knowledge.

Principle 3: Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems. Management interventions in ecosystems often have unknown or unpredictable effects on other ecosystems; therefore, possible impacts need careful consideration and analysis. This may require new arrangements or ways of organization for institutions involved in decision-making to make, if necessary, appropriate compromises.

Principle 4: Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:

- Reduce those market distortions that adversely affect biological diversity.
- Align incentives to promote biodiversity conservation and sustainable use.
- Internalize costs and benefits in the given ecosystem to the extent feasible.

The greatest threat to biological diversity lies in its replacement by alternative systems of land use. Land use that degrades the environment often arises through market distortions which undervalue natural systems and populations and provide perverse incentives and subsidies to favor the conversion of land to less biologically diverse systems.

Often those who benefit from conservation do not pay the costs associated with conservation and, similarly, those who generate environmental costs such as pollution escape responsibility. Alignment of incentives allows those who control the resource to benefit and ensures that those who generate environmental costs will pay.

Principle 5: Conservation of ecosystem structure and functioning in order to maintain ecosystem services should be a priority target of the ecosystem approach. Ecosystem functioning and resilience depends on a dynamic relationship within species, among species, and between species and the natural environment, as well as the physical and chemical interactions within the environment. The conservation and, where appropriate, restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species.

Principle 6: Ecosystem must be managed within the limits of their functioning. In considering the

¹⁸ UNEP. Operational guidance for application of the ecosystem approach. Convention on Biodiversity. www.cbd.int/ecosystem/principles.shtml (Accessed on June 9, 2010)

likelihood or ease of attaining the management objectives, attention should be given to the environmental conditions that limit natural productivity, ecosystem structure, functioning and diversity. The limits to ecosystem functioning may be affected to different degrees by temporary, unpredictable or artificially maintained conditions and, accordingly, management should be appropriately cautious.

Principle 7: The ecosystem approach should be undertaken at the appropriate spatial and temporal scales. The approach should be bounded by spatial and temporal scales that are appropriate to the objectives. Boundaries for management will be defined operationally by users, managers, scientists and indigenous and local peoples. Connectivity between areas should be promoted where necessary. The ecosystem approach is based upon the hierarchical nature of biological diversity characterized by the interaction and integration of genes, species and ecosystems.

Principle 8: Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term. Ecosystem processes are characterized by varying temporal scales and lag-effects. This inherently conflicts with the tendency of humans to favour short-term gains and immediate benefits over future ones. A balance between fulfilling poor people's immediate needs and human rights and long-term ecosystem health is important to be reached. Otherwise it will be impossible to secure livelihood, disaster reduction and healthy ecosystems

Principle 9: Management must recognize the change is inevitable. Ecosystems change, including species composition and population abundance. Hence, management should adapt to the changes. Apart from their inherent dynamics of change, ecosystems are beset by a complex of uncertainties and potential "surprises" in the human, biological and environmental realms. Traditional disturbance regimes such as periodic wildfires or floods, may be important for ecosystem structure and functioning, and may need to be maintained or restored. The ecosystem approach must utilize adaptive management in order to anticipate and cater to such changes and events and should be cautious in making any decision that may foreclose options; at the same time, however, mitigating actions to cope with long-term changes such as climate change should be considered.

Principle 10: The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity. Biological diversity is critical both for its intrinsic value and because of the key role it plays in providing the ecosystem and other services upon which we all ultimately depend. There has been a tendency in the past to manage components of biological diversity either as protected or non-protected. There is a need for a shift to more flexible situations, where conservation and use are seen in context and the full range of measures is applied in a continuum from strictly protected to human-made ecosystems

Principle 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices. Information from all sources is critical to arriving at effective ecosystem management strategies. A much better knowledge of ecosystem functions and the impact of human use is desirable. All relevant information from any concerned area should be shared with all stakeholders and actors, taking into account, inter alia, any decision to be taken under Article 8(j) of the Convention on Biological Diversity. Assumptions behind proposed management decisions should be made explicit and checked against available knowledge and views of stakeholders.

Principle 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines. Most problems of biological-diversity management are complex, with many interactions, side-effects and implications, and therefore should involve the necessary expertise and stakeholders at the local, national, regional and international level, as appropriate.

GLOSSARY

The following is a comprehensive list of the key terms used throughout the Green Recovery and Reconstruction Toolkit. In some cases, the definitions have been adapted from the original source. If no source is given, this indicates that the module author developed a common definition for use in the toolkit.

Anaerobic Filter (or Biofilter): Filter system mainly used for treatment of secondary effluent from primary treatment chambers such as septic tanks. The anaerobic filter comprises a watertight tank containing a bed of submerged media, which acts as a support matrix for anaerobic biological activity. For humanitarian aid agencies, the prefabricated biofilters that combine primary and secondary treatment into one unit can provide a higher level of treatment than do traditional systems such as precast cylindrical septic tanks or soakage pit systems. Source: SANDEC. 2006. *Greywater Management in Low and Middle Income Countries*. Swiss Federal Institute of Aquatic Science and Technology. Switzerland.

Better Management Practices (BMPs): BMPs are flexible, field-tested, and cost-effective techniques that protect the environment by helping to measurably reduce major impacts of growing of commodities on the planet's water, air, soil, and biological diversity. They help producers make a profit in a sustainable way. BMPs have been developed for a wide range of activities, including fishing, farming, and forestry. Source: Clay, Jason. 2004. *World agriculture and the environment: a commodity-by-commodity guide to impacts and practices*. Island Press: Washington, DC.

Biodiversity: Biological diversity means the variability among living organisms from all sources, including inter alia, terrestrial, and marine and other aquatic ecosystems, as well as the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems. Source: United Nations. Convention on Biological Diversity. www.cbd.int/convention/articles.shtml?a=cbd-02 (Accessed on June 18, 2010)

Carbon Footprint: The total set of greenhouse gas emissions caused directly and indirectly by an individual, organization, event, or product. For simplicity of reporting, the carbon footprint is often expressed in terms of the amount of carbon dioxide, or its equivalent of other greenhouse gases, emitted. Source: Carbon Trust. Carbon Footprinting. www.carbontrust.co.uk (Accessed on June 22, 2010)

Carbon Offset: A financial instrument aimed at a reduction in greenhouse gas emissions. Carbon offsets are measured in metric tons of carbon dioxide-equivalent (CO₂e) and may represent six primary categories of greenhouse gases. One carbon offset represents the reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gases. Source: World Bank. 2007. *State and Trends of the Carbon Market*. Washington, DC

Climate Change: The climate of a place or region is considered to have changed if over an extended period (typically decades or longer) there is a statistically significant change in measurements of either the mean state or the variability of the climate for that place or region. Changes in climate may be due to natural processes or to persistent anthropogenic changes in atmosphere or in land use. Source: UN International Strategy for Disaster Reduction. Terminology of disaster risk reduction. www.unisdr.org/eng/terminology/terminology-2009-eng.html (Accessed on April 1, 2010)

Construction: Construction is broadly defined as the process or mechanism for the realization of human settlements and the creation of infrastructure that supports development. This includes the extraction and processing of raw materials, the manufacturing of construction materials and components, the construction project cycle from feasibility to deconstruction, and the management and operation of the built environment.

Source: du Plessis, Chrisna. 2002. *Agenda 21 for Sustainable Construction in Developing Countries*. Pretoria, South Africa: CSIR Building and Construction Technology.

Disaster: Serious disruption of the functioning of a society, causing widespread human, material, or environmental losses which exceed the ability of the affected society to cope using only its own resources. Disasters are often classified according to their speed of onset (sudden or slow) and their cause (natural or man-made). Disasters occur when a natural or human-made hazard meets and adversely impacts vulnerable people, their communities, and/or their environment. Source: UNDP/UNDRO. 1992. *Overview of Disaster Management*. 2nd Ed.

Disaster preparedness: Activities designed to minimize loss of life and damage; organize the temporary removal of people and property from a threatened location; and facilitate timely and effective rescue, relief, and rehabilitation. Source: UNDP/UNDRO. 1992. *Overview of Disaster Management*. 2nd Ed.

Disaster Risk: Potential disaster losses in lives, health status, livelihoods, assets, and services that could occur to a particular community or a society over some specified future time period. Risk can be expressed as a simple mathematical formula: Risk = Hazard X Vulnerability. This formula illustrates the concept that the greater the potential occurrence of a hazard and the more vulnerable a population, the greater the risk. Source: UN International Strategy for Disaster Reduction. Terminology of disaster risk reduction. www.unisdr.org/eng/terminology/terminology-2009-eng.html (Accessed on April 1, 2010)

Disaster Risk Reduction: The practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. Source: UN International Strategy for Disaster Reduction. Terminology of disaster risk reduction. www.unisdr.org/eng/terminology/terminology-2009-eng.html (Accessed on April 1, 2010)

Ecosystem: Dynamic complexes of plants, animals, and other living communities and the nonliving environment interacting as functional units. Humans are an integral part of ecosystems. Source: UN. Convention on Biological Diversity. www.cbd.int/convention/articles.shtml?a=cbd-02 (Accessed on June 18, 2010)

Ecosystem Services: The benefits that people and communities obtain from ecosystems. This definition is drawn from the Millennium Ecosystem Assessment. The benefits that ecosystems can provide include "regulating services" such as regulation of floods, drought, land degradation, and disease; "provisioning services" such as provision of food and water; "supporting services" such as help with soil formation and nutrient cycling; and "cultural services" such as recreational, spiritual, religious, and other nonmaterial benefits. Integrated management of land, water, and living resources that promotes conservation and sustainable use provides the basis for maintenance of ecosystem services, including those that contribute to the reduction of disaster risks. Source: UN International Strategy for Disaster Reduction. Terminology of disaster risk reduction. www.unisdr.org/eng/terminology/terminology-2009-eng.html (Accessed on April 1, 2010)

Embodied Energy: The available energy that was used in the work of making a product. Embodied energy is an accounting methodology used to find the sum total of the energy necessary for an entire product life cycle. Source: Glavinich, Thomas. 2008. *Contractor's Guide to Green Building Construction: Management, Project Delivery, Documentation, and Risk Reduction*. John Wiley & Sons, Inc: New Jersey.

Environment: The complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon individual organisms and communities, including humans, and ultimately determine their form

and survival. It is also the aggregate of social and cultural conditions that influence the life of an individual or community. The environment includes natural resources and ecosystem services that comprise essential life-supporting functions for humans, including clean water, food, materials for shelter, and livelihood generation. Source: Adapted from: *Merriam Webster Dictionary*, "Environment." www.merriam-webster.com/netdict/environment (Accessed on June 15, 2010)

Environmental Impact Assessment: A tool used to identify the environmental, social, and economic impacts of a project prior to decision making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment, and present the predictions and options to decision makers. Source: International Association of Environmental Impact Assessment in cooperation with Institute of Environmental Assessment. 1999. *Principles of Environmental Impact Assessment Best Practice*.

Green Construction: Green construction is planning and managing a construction project in accordance with the building design in order to minimize the impact of the construction process on the environment. This includes 1) improving the efficiency of the construction process; 2) conserving energy, water, and other resources during construction; and 3) minimizing the amount of construction waste. A "green building" is one that provides the specific building performance requirements while minimizing disturbance to and improving the functioning of local, regional, and global ecosystems both during and after the structure's construction and specified service life. Source: Glavinich, Thomas E. 2008. *Contractor's Guide to Green Building Construction: Management, Project Delivery, Documentation, and Risk Reduction*. Hoboken, New Jersey: John Wiley & Sons, Inc.

Green Purchasing: Green Purchasing is often referred to as environmentally preferable purchasing (EPP), and is the affirmative selection and acquisition of products and services that most effectively minimize negative environmental impacts over their life cycle of manufacturing, transportation, use, and recycling or disposal. Examples of environmentally preferable characteristics include products and services that conserve energy and water and minimize generation of waste and release of pollutants; products made from recycled materials and that can be reused or recycled; energy from renewable resources such as biobased fuels and solar and wind power; alternate fuel vehicles; and products using alternatives to hazardous or toxic chemicals, radioactive materials, and biohazardous agents. Source: U.S. Environmental Protection Agency. 1999. Final Guidance on Environmentally Preferred Purchasing. *Federal Register*. Vol. 64 No. 161.

Greening: The process of transforming artifacts such as a space, a lifestyle, or a brand image into a more environmentally friendly version (i.e., "greening your home" or "greening your office"). The act of greening involves incorporating "green" products and processes into one's environment, such as the home, workplace, and general lifestyle. Source: Based on: Glavinich, T. 2008. *Contractor's Guide to Green Building Construction: Management, Project Delivery, Documentation, and Risk Reduction*. Hoboken, New Jersey: John Wiley & Sons, Inc.

Hazard: A potentially damaging physical event, phenomenon, or human activity that may cause the loss of life or injury, property damage, social and economic disruption, or environmental degradation. Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydrometeorological, and biological) or induced by human processes (environmental degradation and technological hazards). Source: UN International Strategy for Disaster Reduction. Terminology of disaster risk reduction. www.unisdr.org/eng/terminology/terminology-2009-eng.html (Accessed on April 1, 2010)

Impact: Any effect caused by a proposed activity on the environment, including effects on human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments, or other physical structures, or the interaction among those factors. It also includes effects on cultural heritage or socioeconomic conditions resulting from alterations to those factors. Source: United Nations Economic Commission for Europe. 1991. *The Convention on Environmental Impact Assessment in a Transboundary Context*. www.unece.org (Accessed June 22, 2010)

Indicator: A measurement of achievement or change for the specific objective. The change can be positive or negative, direct or indirect. They provide a way of measuring and communicating the impact, or result, of programs as well as the process, or methods used. The indicator may be qualitative or quantitative. Indicators are usually classified according to their level: *input* indicators (which measure the resources provided), *output* indicators (direct results), *outcome* indicators (benefits for the target group) and *impact* indicators (long-term consequences). Source: Chaplowe, Scott G. 2008. *Monitoring and Evaluation Planning*. American Red Cross/CRS M&E Module Series. American Red Cross and Catholic Relief Services: Washington, DC and Baltimore, MD.

Integrated Water Resources Management: Systemic, participatory process for the sustainable development, allocation, and monitoring of water resource use in the context of social, economic, and environmental objectives. Source: Based on: Sustainable Development Policy Institute. Training Workshop on Integrated Water Resource Management. www.sdpi.org (Accessed June 22, 2010)

Life Cycle Assessment (LCA): A technique to assess the environmental aspects and potential impacts of a product, process, or service by compiling an inventory of relevant energy and material inputs and environmental releases; evaluating the potential environmental impacts associated with identified inputs and releases; and interpreting the results to help make a more informed decision. Source: Scientific Applications International Corporation. 2006. *Life Cycle Assessment: Principle's and Practice*. Report prepared for U.S. EPA.

Life Cycle Materials Management: Maximizing the productive use and reuse of a material throughout its life cycle in order to minimize the amount of materials involved and the associated environmental impacts.

Life Cycle of a Material: The various stages of a building material, from the extraction or harvesting of raw materials to their reuse, recycling, and disposal.

Livelihoods: A livelihood comprises the capabilities, assets (including both material and social resources), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and can maintain or enhance its capabilities and assets both now and in the future, without undermining the natural resource base. Source: DFID. 1999. *Sustainable Livelihoods Approach Guidance Sheets*. London: Department for International Development.

Logframe: Logical framework, or logframe, analysis is a popular tool for project design and management. Logframe analysis provides a structured logical approach to the determination of project priorities, design and budget and to the identification of related results and performance targets. It also provides an iterative management tool for project implementation, monitoring and evaluation. Logframe analysis begins with problem analysis followed by the determination of objectives, before moving on to identify project activities, related performance indicators and key assumptions and risks that could influence the project's success. Source: Provention Consortium. 2007. *Logical and Results Based Frameworks*. Tools for Mainstreaming Disaster Risk Reduction. Guidance Note 6. Geneva, Switzerland.

Primary Wastewater Treatment: Use of gravity to separate settleable and floatable materials from the wastewater. Source: National Research Council. 1993. *Managing Wastewater in Coastal Urban Areas*. Washington DC: National Academy Press.

Project Design: An early stage of the project cycle in which a project's objectives and intended outcomes are described and the project's inputs and activities are identified.

Project Evaluation: Systematic and impartial examination of humanitarian action intended to draw lessons that improve policy and practice, and enhance accountability. Source: Active Learning Network for Accountability and Performance in Humanitarian Action (ALNAP). Report Types. www.alnap.org (Accessed June 25, 2010)

Project Monitoring: A continuous and systematic process of recording, collecting, measuring, analyzing, and communicating information. Source: Chaplowe, Scott G. 2008. *Monitoring and Evaluation Planning*. American Red Cross/CRS M&E Module Series. American Red Cross and Catholic Relief Services : Washington, DC and Baltimore, MD.

Reconstruction: The actions taken to reestablish a community after a period of recovery subsequent to a disaster. Actions would include construction of permanent housing, full restoration of all services, and complete resumption of the pre-disaster state. Source: UNDP/UNDRO. 1992. *Overview of Disaster Management*. 2nd Ed.

Recovery: The restoration, and improvement where appropriate, of facilities, livelihoods, and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. Source: UN International Strategy for Disaster Reduction. Terminology of disaster risk reduction. www.unisdr.org/eng/terminology/terminology-2009-eng.html (Accessed on April 1, 2010)

Recycle: Melting, crushing, or otherwise altering a component and separating it from the other materials with which it was originally produced. The component then reenters the manufacturing process as a raw material (e.g., discarded plastic bags reprocessed into plastic water bottles). Source: Based on: Glavinich, Thomas E. 2008. *Contractor's Guide to Green Building Construction: Management, Project Delivery, Documentation, and Risk Reduction*. Hoboken, New Jersey: John Wiley & Sons, Inc.

Resilience: The capacity of a system, community, or society potentially exposed to hazards to adapt, by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures. Source: UN International Strategy for Disaster Reduction. Terminology of disaster risk reduction. www.unisdr.org/eng/terminology/terminology-2009-eng.html (Accessed on April 1, 2010)

Response (also called Disaster Relief): The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety, and meet the basic subsistence needs of the people affected.

Comment: Disaster response is predominantly focused on immediate and short-term needs and is sometimes called disaster relief. The division between this response stage and the subsequent recovery stage is not clear-cut. Some response actions, such as the supply of temporary housing and water supplies, may extend well into the recovery stage.

Source: UN International Strategy for Disaster Reduction. Terminology of disaster risk reduction. www.unisdr.org/eng/terminology/terminology-2009-eng.html (Accessed on April 1, 2010)

Reuse: The reuse of an existing component in largely unchanged form and for a similar function (e.g., reusing ceramic roof tiles for a reconstructed house). Source: Based on: Glavinich, Thomas E. 2008. *Contractor's Guide to Green Building Construction: Management, Project Delivery, Documentation, and Risk Reduction*. Hoboken, New Jersey: John Wiley & Sons, Inc.

Secondary Wastewater Treatment: Use of both biological (i.e., microorganisms) and physical (i.e., gravity) processes designed to remove biological oxygen demand (BOD) and total suspended solids (TSS) from wastewater. Source: National Research Council. 1993. *Managing Wastewater in Coastal Urban Areas*. Washington DC: National Academy Press.

Site Development: The physical process of construction at a building site. These construction-related activities include clearing land, mobilizing resources to be used in the physical infrastructure (including water), the fabrication of building components on site, and the process of assembling components and raw materials into the physical elements planned for the site. The site development process also includes the provision of access to basic amenities (e.g., water, sewage, fuel) as well as improvements to the environmental conditions of the site (e.g., through planting vegetation or other environment-focused actions).

Site Selection: The process encompasses many steps from planning to construction, including initial inventory, assessment, alternative analysis, detailed design, and construction procedures and services. Site selection includes the housing, basic services (e.g., water, fuel, sewage, etc.), access infrastructure (e.g., roads, paths, bridges, etc.) and social and economic structures commonly used by site residents (e.g., schools, clinics, markets, transport facilities, etc.).

SMART Indicator: An indicator that meets the SMART criteria: **S**pecific, **M**easurable, **A**chievable, **R**elevant, and **T**ime-bound. Source: Based on: Doran, G. T. 1981. There's a S.M.A.R.T. way to write management's goals and objectives. *Management Review*: 70, Issue 11.

Sustainable Construction: Sustainable construction goes beyond the definition of "green construction" and offers a more holistic approach to defining the interactions between construction and the environment. Sustainable construction means that the principles of sustainable development are applied to the comprehensive construction cycle, from the extraction and processing of raw materials through the planning, design, and construction of buildings and infrastructure, and is also concerned with any building's final deconstruction and the management of the resultant waste. It is a holistic process aimed at restoring and maintaining harmony between the natural and built environments, while creating settlements that affirm human dignity and encourage economic equity. Source: du Plessis, Chrisna. 2002. *Agenda 21 for Sustainable Construction in Developing Countries*. Pretoria, South Africa: CSIR Building and Construction Technology.

Sustainable development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Source: World Commission on Environment and Development. 1987. *Report of the World Commission on Environment and Development: Our Common Future*. Document A/42/427. www.un-documents.net (Accessed June 22, 2010)

Tertiary Wastewater Treatment: Use of a wide variety of physical, biological, and chemical processes aimed at removing nitrogen and phosphorus from wastewater. Source: National Research Council. 1993. *Managing Wastewater in Coastal Urban Areas*. Washington DC: National Academy Press. p. 58

Vulnerability. Human vulnerability is the relative lack of capacity of a person or community to anticipate, cope with, resist, and recover from the impact of a hazard. *Structural or physical* vulnerability is the extent to which a structure or service is likely to be damaged or disrupted by a hazard event. *Community* vulnerability exists

when the elements at risk are in the path or area of the hazard and are susceptible to damage by it. The losses caused by a hazard, such as a storm or earthquake, will be proportionally much greater for more vulnerable populations, e.g., those living in poverty, with weak structures, and without adequate coping strategies. Source: UNDHA. 1997. *Building Capacities for Risk Reduction*. 1st Ed.

Watershed: An area of land that drains down slope to the lowest point. The water moves through a network of drainage pathways, both underground and on the surface. Generally, these pathways converge into streams and rivers that become progressively larger as the water moves downstream, eventually reaching a water basin (i.e., lake, estuary, ocean). Source: Based on: Oregon Watershed Enhancement Board. 1999. *Oregon Watershed Assessment Manual*. www.oregon.gov Salem.

ACRONYMS

The following is a comprehensive list of the acronyms used throughout the Green Recovery and Reconstruction Toolkit.

ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Center
ADRA	Adventist Development and Relief Agency
AECB	Association for Environment Conscious Building
AJK	Azad Jammu Kashmir
ALNAP	Active Learning Network for Accountability and Performance in Humanitarian Action
ANSI	American National Standards Institute
BMPS	best management practices
BOD	biological oxygen demand
CAP	Consolidated Appeals Process
CEDRA	Climate Change and Environmental Degradation Risk and Adaptation Assessment
CFL	compact fluorescent lamp
CGIAR	Consultative Group on International Agricultural Research
CHAPS	Common Humanitarian Assistance Program
CIDEM	Centro de Investigación y Desarrollo de Estructuras y Materiales
CO	Country Office
CRISTAL	Community-based Risk Screening Tool – Adaptation and Livelihoods
CRS	Catholic Relief Services
CVA	community vulnerability assessment
DFID	Department for International Development
DRR	disaster risk reduction
EAWAG	Swiss Federal Institute of Aquatic Science and Technology

ECB	Emergency Capacity Building Project
EE	embodied energy
EIA	environmental impact assessment
EMMA	Emergency Market Mapping and Analysis Toolkit
EMP	environmental management plan
ENA	Environmental Needs Assessment in Post-Disaster Situations
ENCAP	Environmentally Sound Design and Management Capacity Building for Partners and Programs in Africa
EPP	environmentally preferable purchasing
ESR	Environmental Stewardship Review for Humanitarian Aid
FAO	Food and Agriculture Organization
FEAT	Flash Environmental Assessment Tool
FRAME	Framework for Assessing, Monitoring and Evaluating the Environment in Refuge Related Operations
FSC	Forest Stewardship Council
G2O2	Greening Organizational Operations
GBCI	Green Building Certification Institute
GBP	Green Building Programme
GIS	geographic information system
GRR	Green Recovery and Reconstruction
GRRT	Green Recovery and Reconstruction Toolkit
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
GWP	Global Water Partnership
HQ	headquarters
HVAC	heating, ventilation, and air conditioning
IAS	International Accreditation Service
IASC	Inter-Agency Standing Committee

IAIA	International Association for Impact Assessment
IBRD	International Bank for Reconstruction and Development
ICE	Inventory of Carbon and Energy
ICT	information and communication technology
IDA	International Development Association
IDP	internally displaced peoples
IDRC	International Development Research Centre
IFC	International Finance Corporation
IFRC	International Federation of Red Cross and Red Crescent Societies
IFMA	International Facilities Management Association
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
IRC	International Rescue Committee
ISAAC	Institute for Applied Sustainability to the Built Environment
ISDR	International Strategy for Disaster Reduction
ISO	International Standards Organization
IT	information technology
ITDG	Intermediate Technology Development Group
IUCN	International Union for the Conservation of Nature
ISWM	integrated solid waste management
IWA	International Water Association
IWMI	International Water Management Institute
IWRM	integrated water resource management
IWQA	International Water Quality Association
IWSA	International Water Supply Association

KW H	Kilowatt hour
LCA	life cycle assessment
LEDEG	Ladakh Ecological Development Group
LEED	Leadership in Energy & Environmental Design
M&E	monitoring and evaluation
MAC	Marine Aquarium Council
MDGS	Millennium Development Goals
MSC	Marine Stewardship Council
NACA	Network of Aquaculture Centers
NGO	non-governmental organization
NSF-ERS	National Science Foundation - Engineering and Research Services
NWFP	North Western Frontier Province
OCHA	Office for the Coordination of Humanitarian Affairs
PDNA	Post Disaster Needs Assessment
PEFC	Programme for the Endorsement of Forest Certification
PET	Polyethylene terephthalate
PMI	Indonesian Red Cross Society
PVC	Polyvinyl chloride
PV	photovoltaic
REA	Rapid Environmental Assessment
RIVM	Dutch National Institute for Public Health and the Environment
SC	sustainable construction
SCC	Standards Council of Canada
SEA	Strategic Environmental Impact Assessment
SIDA	Swedish International Development Agency

SKAT	Swiss Centre for Development Cooperation in Technology and Management
SL	sustainable livelihoods
SMART	Specific, Measurable, Achievable, Relevant, and Time-bound
SODIS	solar water disinfection
TRP	Tsunami Recovery Program
TSS	total suspended solids
UN	United Nations
UNDHA	United Nations Department of Humanitarian Affairs
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Organization
UNEP	United Nations Environment Program
UNGM	United Nations Global Marketplace
UN-HABITAT	United Nations Human Settlements Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	The United Nations Children’s Fund
USAID	United States Agency for International Development
USAID-ESP	United States Agency for International Development- Environmental Services Program
VROM	Dutch Ministry of Spatial Planning, Housing and the Environment
WEDC	Water, Engineering, and Development Centre
WGBC	World Green Building Council
WHO	World Health Organization
WWF	World Wildlife Fund



Soon after the 2004 Indian Ocean tsunami, the American Red Cross and the World Wildlife Fund (WWF) formed an innovative, five-year partnership to help ensure that the recovery efforts of the American Red Cross did not have unintended negative effects on the environment. Combining the environmental expertise of WWF with the humanitarian aid expertise of the American Red Cross, the partnership has worked across the tsunami-affected region to make sure that recovery programs include environmentally sustainable considerations, which are critical to ensuring a long-lasting recovery for communities.

The Green Recovery and Reconstruction Toolkit has been informed by our experiences in this partnership as well as over 30 international authors and experts who have contributed to its content. WWF and the American Red Cross offer the knowledge captured here in the hopes that the humanitarian and environmental communities will continue to work together to effectively incorporate environmentally sustainable solutions into disaster recovery. The development and publication of the Green Recovery and Reconstruction Toolkit was made possible with support from the American Red Cross.