3

GREEN

GUIDE TO

# ENVIRONMENTAL IMPACT ASSESSMENT TOOLS AND TECHNIQUES

GREEN RECOVERY AND RECONSTRUCTION: TRAINING TOOLKIT FOR HUMANITARIAN AID

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.

3
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# ENVIRONMENTAL IMPACT ASSESSMENT TOOLS AND TECHNIQUES

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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 environmental impact assessment tools and techniques.

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# MODULE 3: GREEN GUIDE TO ENVIRONMENTAL IMPACT ASSESSMENT TOOLS AND TECHNIQUES

## Table of Contents

# 1 INTRODUCTION

## 1.1 Module Objectives

This module describes a number of analytical tools that can be used to determine the environmental impacts of post-disaster recovery and reconstruction projects, and presents a case study using the Environmental Stewardship Review for Humanitarian Aid (ESR).

Specific learning objectives for this module are as follows:

1. Describe the value and role of environmental impact assessment tools in post-disaster recovery and reconstruction project planning.
2. List the five elements of the Environmental Impact Assessment (EIA) process.
3. Use the ESR tool with a sample project to identify and assess the adverse environmental impacts and propose mitigation measures to prevent, reduce, and compensate for the impacts.
4. Describe several tools that are used for environmental assessments in post-disaster settings.

## 1.2 The Green Recovery and Reconstruction Toolkit

This is Module 3 in a series of ten 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 advantage of opportunities to improve the environment. Module 1 provides a brief introduction to the concept of green recovery and reconstruction to help 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, 5, and 6 pertain specifically to building construction, with Module 4 focusing on site planning and development, Module 5 on building materials and the supply chain, and Module 6 on building design and construction management. GRRT Modules 7 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

Module 3 is intended for those involved in the conception, design, implementation, monitoring, or evaluation of a humanitarian aid project. It applies as well to those involved in the various planning and implementation stages of temporary camps, permanent housing, water supply projects, livelihoods interventions, or any other activity designed to assist communities that are recovering from disaster. Specific audiences may include project managers in the field or at headquarters, project designers, shelter and other construction professionals, monitoring and evaluation specialists, physical planners, logistics and procurement officers, donors, livelihood specialists, water and sanitation project designers and managers, and disaster risk-reduction planners. The staff of local and national government agencies, as well as environmental specialists involved in

the design, review, and implementation of recovery and reconstruction projects, would also benefit from the training. The module may also be used by consultants working for humanitarian aid agencies, and by specialist staff responsible for ensuring that the environmental aspects of humanitarian aid projects are addressed. This module is for national as well as expatriate staff.

## 1.4 Module Key Concepts

This module builds on six key concepts:

1. Environmental issues directly affect humanitarian activities, and the environmental impacts of disaster and conflict can threaten people's lives and livelihoods.
2. The environmental impact of a project should be considered at the earliest possible stage of the planning cycle, preferably at the project inception phase.
3. Post-disaster needs assessments should begin to address environmental issues and the linkages between human well-being and the environment at the earliest stages. Disaster recovery projects in all sectors should incorporate activities that promote environmental protection and take advantage of opportunities to further human well-being by addressing the environment.
4. An environmental impact assessment may be required by donors, government regulations, your own organization, or as part of normal due diligence.
5. The standard EIA process in humanitarian settings has five components:
    - **Screening:** deciding if an EIA is required based on information collected
    - **Scoping:** gathering environmental intelligence through consultation with relevant agencies and experts and a review of applicable laws and regulations
    - **Impact assessment:** identifying and evaluating alternatives for achieving the objective, and the associated environmental impacts of each alternative
    - **Mitigation measures:** reviewing proposed actions to prevent or minimize the potential adverse effects of the project
    - **Action:** incorporating the mitigation measures in project design and implementation
6. Several tools exist for conducting EIAs in humanitarian aid settings, including the Environmental Stewardship Review for Humanitarian Aid, the Rapid Environmental Impact Assessment in Disasters, the Flash Environmental Assessment Tool, and the Environmental Needs Assessment in Post-Disaster Situations.

## 1.5 Module Assumptions

This training module assumes that participants are generally familiar with the project management cycle for a humanitarian aid or development project, and are interested in learning how to integrate environmental considerations into this process. The module recognizes that there is a continuum of activities in support of disaster survivors from the earliest hours of emergency lifesaving functions through the permanent

reestablishment of communities. The principles of this module are intended to apply to recovery and reconstruction projects that are activated once immediate lifesaving activities have been completed. The module offers ideas for a sustainable approach to humanitarian response; it is not, however, intended to preempt or substitute for adequate consultation where expertise in environmental management issues is 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.

**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.

**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.

**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.

**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.

**Recovery:** The restoration, and improvement where appropriate, of facilities, livelihoods, and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

**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.

## 2 INTRODUCTION TO ENVIRONMENTAL IMPACT ASSESSMENT IN HUMANITARIAN SETTINGS

The immediate phase after a disaster is the period during which efforts to save human lives, alleviate suffering, and reduce economic loss take priority. During this phase, emergency needs, water supplies and sanitation, food aid, temporary shelters, and health needs must be supplied as quickly as possible. While environmental issues are often not considered during this phase, environmental damages can be caused that can negatively impact those trying to recover from the disaster. For example, debris created by disasters is often cleared into unsafe or ecologically sensitive habitats such as lagoons or wetlands that sustain livelihoods (e.g., fishing grounds) and provide other ecosystem services (e.g., clean drinking water), thereby causing additional problems for affected communities.

The longer-term recovery and reconstruction process also presents a number of environmental opportunities and challenges, such as increased demand for local natural resources (e.g., building materials) and the potential for increased air and water contamination. The planning phase for the longer-term recovery and reconstruction process represents a significant opportunity to ensure that communities are "built back safer" than they were prior to the disaster. Taking action to minimize the environmental impacts of the rebuilding process is one way to avoid the excessive exploitation of natural resources on which communities depend for their livelihoods.

This paper provides tools and guidance on how to carry out an environmental impact assessment in a post-disaster situation, and emphasizes the imperative of doing so to mitigate the short- and long-term effects of humanitarian projects on people and the environment. By understanding in full the environmental implications of proposed humanitarian projects and the linkages between people and the environment, humanitarian staff can help improve outcomes for those who are recovering from disaster – and that they are respecting the humanitarian imperative to "do no harm." The UN Office for the Coordination of Humanitarian Affairs and UN Environment Programme have summarized some key environmental issues in humanitarian response clusters, as shown in Table 1.[1]

**TABLE 1: KEY ENVIRONMENTAL ISSUES IN HUMANITARIAN RESPONSE CLUSTERS**

| CLUSTER | ENVIRONMENTAL IMPACTS THAT CAN AFFECT HUMANITARIAN ACTIVITIES | HUMANITARIAN ACTIVITIES THAT CAN CAUSE NEW ENVIRONMENTAL IMPACTS |
|---|---|---|
| **HEALTH** | • Contamination by chemicals, hazardous waste, and weapons<br>• Release of asbestos from collapsed buildings<br>• Presence of debris and carcasses<br>• Unsafe chemicals management | • Improper management of health care waste and expired medicines<br>• Improper management of chemicals required for health protection (e.g., water treatment)<br>• Improper management of waste, debris, and carcasses |

1 The cluster approach consists of groupings of UN agencies, non-governmental organizations (NGOs) and other international organizations around a sector or service provided during a humanitarian crisis. Each of the eleven clusters (Protection, Camp Coordination and Management, Water Sanitation and Hygiene, Health, Emergency Shelter, Nutrition, Emergency Telecommunications, Education, Agriculture, Logistics, and Early Recovery) is led by a designated agency. Source: Interagency Standing Committee (IASC). 2006. *IASC Guidance Note on Using the Cluster Approach to Strengthen Humanitarian Response. Geneva: United Nations.*

| CLUSTER | ENVIRONMENTAL IMPACTS THAT CAN AFFECT HUMANITARIAN ACTIVITIES | HUMANITARIAN ACTIVITIES THAT CAN CAUSE NEW ENVIRONMENTAL IMPACTS |
|---|---|---|
| **WATER, SANITATION, AND HYGIENE** | • Contamination of water sources by chemicals, hazardous waste, and weapons<br>• Damage of water and sanitation infrastructure, leading to cross-contamination<br>• Presence of debris and carcasses | • Over-pumping of groundwater aquifers<br>• Improper rehabilitation and decommissioning of wells<br>• Water contamination from sewage disposal<br>• Inappropriate/energy-intensive water, sanitation and hygeine (WASH) systems (e.g., septic tanks, desalination plants) |
| **SHELTER** | • Contamination of land by chemicals, hazardous waste, and weapons<br>• Environmental hazards (e.g., floods, landslides, volcanoes)<br>• Loss of forests resulting in reduced access to fuel wood and building materials | • Unsustainable supply of shelter construction materials<br>• Inappropriate design for a specific need, site, community, or culture, leading to misuse or nonuse<br>• Unsustainable use of timber and fuel wood in shelter construction<br>• Deforestation and soil erosion<br>• Inadequate disposal of construction and packaging waste |
| **CAMP COORDINATION AND MANAGEMENT** | • Contamination of land by chemicals, hazardous waste, and weapons<br>• Environmental hazards (e.g., floods, landslides, and volcanoes) | • Land degradation and biodiversity loss<br>• Improper management and decommissioning of pit latrines<br>• Unsustainable use of natural resources (e.g., timber, fuel wood)<br>• Contamination by fuel spills and disposal of chemicals<br>• Improper decommissioning of camps<br>• Inadequate disposal of construction and packaging waste |
| **LOGISTICS** | • Environmental hazards (e.g., floods, landslides, and volcanoes) | • Improper management and disposal of fuel, waste oil, and tires<br>• Chemicals and waste from logistics base operations<br>• Procurement of goods produced through unsustainable practices |
| **EARLY RECOVERY** | • Damage to natural resources that support livelihoods<br>• Loss of government capacity for natural resources management | • Unsustainable use of natural resources for reconstruction and livelihoods<br>• Improper land use and urban planning<br>• Failure to conduct strategic environmental assessments and environmental impact assessments<br>• Inappropriate building designs or choices of reconstruction materials<br>• Unequal access to natural resources and changes in tenure<br>• Development of unsustainable livelihoods |

Source: UNEP/OCHA Joint Unit. 2007. *IASC Leaflet Humanitarian Action and the Environment.*

## 2.1 What Is Environmental Impact Assessment?

The principle aim of an Environmental Impact Assessment (EIA) is "to give the environment its due place in the decision-making process by clearly evaluating the environmental consequences of a proposed activity before action is taken. The concept has ramifications in the long run for almost all development activity because sustainable development depends on protecting the natural resources which is the foundation for further development."[2]

An EIA aims to predict environmental impacts at an early stage in project planning and design, find ways to reduce adverse impacts, shape projects to suit the local environment, and present the predictions and options to decision makers. With the use of an EIA, both environmental and economic benefits can be achieved. For example, the EIA process can help reduce the costs and duration of project implementation, avoid treatment/clean-up costs, and comply with mandatory environmental laws and regulations.

An EIA is often mandated by law for major infrastructure, commercial, industrial, or residential development proposals. It is a widely recognized environmental management tool for mainstreaming the environment into development projects, and has been made mandatory by legal systems in many countries. In some cases, the EIA process can take two years or more to complete. The EIA tools discussed here, however, are specifically designed for use in disaster response during the relief, recovery, and reconstruction phases. While these tools follow the basic principles of the EIA model, they have been modified for a post-disaster setting so that they can be completed *within a reasonable time frame.*

Many existing assessment tools used in the humanitarian sector can be modified to include EIA components in order to streamline the process. For example, a Community Vulnerability Assessment (CVA) can include a section that clearly examines the environmental impacts of the proposed activities and suggests ways to minimize those environmental impacts.

**The Green Recovery and Reconstruction Toolkit approach presented in this module does not require adoption of new methods, but rather calls for minor adaptation to existing and commonly used methods of integrating and monitoring environmental indicators.**

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2 Gilpin, Alan. 1995. *Environmental Impact Assessment – Cutting Edge for the Twenty-First Century.* Boston: Cambridge University Press.

## 2.2 Benefits of Doing an Environmental Impact Assessment in a Humanitarian Setting

The benefits of conducting an EIA in post-disaster humanitarian settings include the following:

- **Sustainable solutions:** Conducting an EIA during the project design phase will provide information about the environmental conditions of the area. This information will allow project planners to better design and adapt their projects to ensure they do not inadvertently put people at risk from environmental degradation. For example, if project planners are designing a water supply project for a community. An EIA will help to determine if drawing from the water source will negatively impact neighboring communities who may depend on it for health or livelihoods. In another example, an EIA can determine the environmental issues associated with using clay bricks as a building material. Project managers may discover that the local clay mine is contributing to landslides, water pollution, and negative impacts on local health.
- **Mitigation of negative impacts:** A disaster and the subsequent humanitarian response can have significant negative impacts upon water, land, air, and other natural resources. If the response is not adequately managed, impacts on community health and livelihoods can also result, such as water contamination, loss of land, and conflict. Early assessment of these risks/impacts can ensure that appropriate mitigation measures and opportunities are identified and implemented. For example, conducting an EIA on an agriculture recovery project may reveal that a proposed irrigation canal would interfere with fish migration routes thereby negatively impacting the livelihoods of fishermen.
- **Reduce costs in the long term:** A short-term approach to humanitarian response can fail to consider the broader aspects – and impacts – of a disaster. Nonetheless, such approaches are often justified by demands on time and money. With donor funding windows notoriously short, implementing agencies often feel pressure to act quickly to produce tangible outcomes. A longer-term approach that includes an EIA process can reduce the likelihood of protracted negative effects and, ultimately, the overall costs of the disaster, as humanitarian assistance is intentionally linked more effectively with development processes. As noted by Concern Universal:

  *"The key issue is that all humanitarian assistance should address the immediate, medium-term and long-term needs of a community, in order to reduce the likelihood of negative effects. There needs to be a continuum, whereby relief projects feed into long-term development programmes; they are not separate entities…Good relief should have a basis in future development work, with foundations laid for future recovery".*[3]

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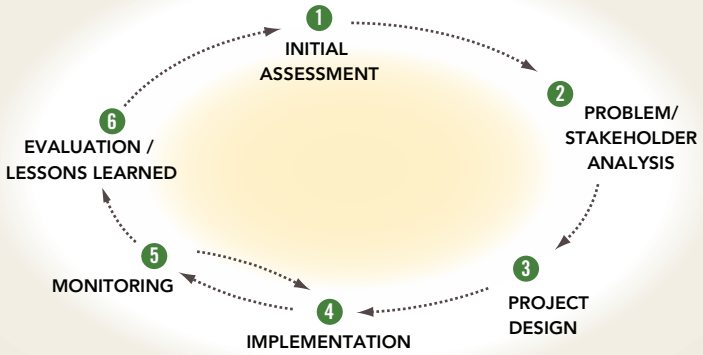
3 Cohen, Roberta and Francis Deng. 1998. *Masses in flight: the global crisis of internal displacement.* Harrisonburg: R.R. Donnelly and Sons Co.

## 2.3 Project Cycle and Environmental Impact Assessment

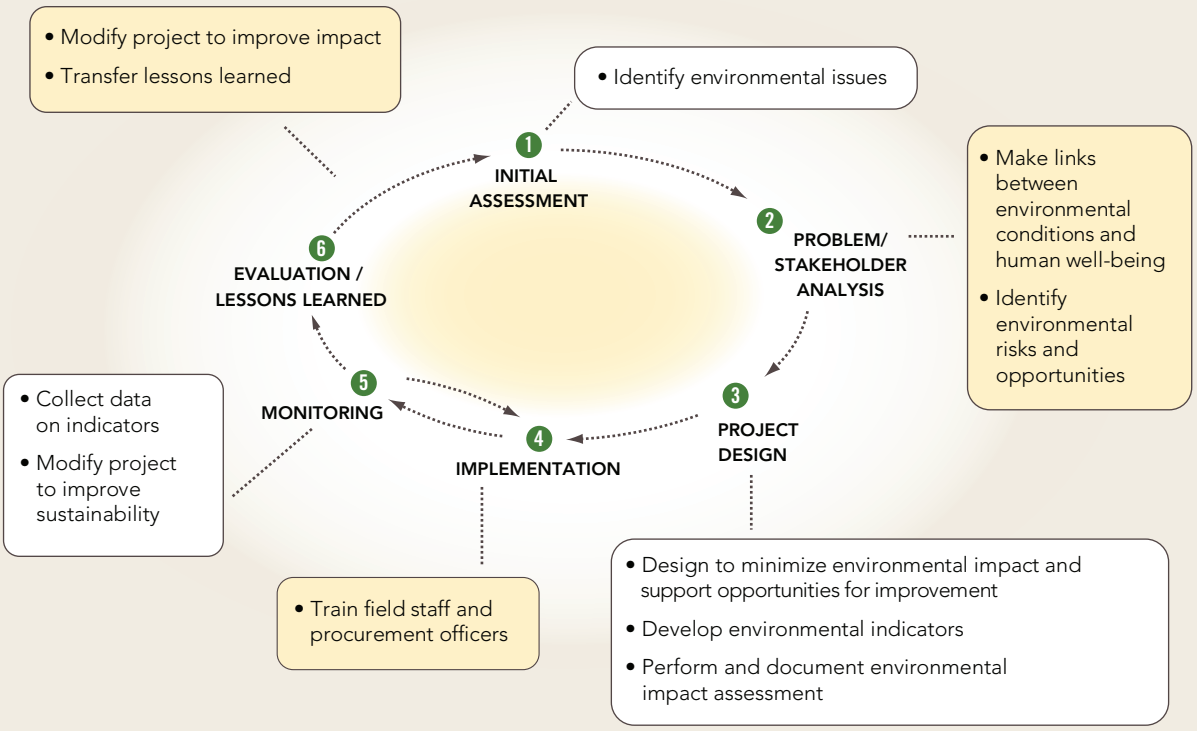
In planning and carrying out their disaster response activities, many humanitarian agencies follow a standard project management cycle as depicted in Figure 1:

**FIGURE 1: STANDARD PROJECT MANAGEMENT CYCLE**




The EIA planning process should begin by gathering information on the environmental context during the Initial Assessment and Problem/Stakeholder Analysis stages. For example, nearby rivers are being used by communities for drinking water. In the Project Design stage, once project objectives and activities have been determined, the impact assessment of the proposed humanitarian project is performed and documented. Specific environmental impact mitigation measures and action items are developed in this Project Design phase to take advantage of environmental opportunities and minimize potential human and environmental impacts. The Environmental Stewardship Review for Humanitarian Aid (ESR) described further below and included here as Annex 2 can be used along with other tools and guidelines described in this manual at this stage to determine likely environmental impacts and identify appropriate actions to protect people and communities. Action items are carried out by project teams and beneficiaries during the implementation and Project Completion phases. During these phases, specific indicators tracking environmental performance are monitored and opportunities for improvement are evaluated as shown in Figure 2.

**FIGURE 2: PROJECT MANAGEMENT CYCLE AND ENVIRONMENTAL INTERVENTION POINTS**




## 2.4 Common Problems, Shortcomings, and Solutions

While the EIA process is essential in designing projects with minimal environmental effects, some challenges to this process have been voiced.[4] An understanding of these challenges can help the humanitarian community develop solutions.

**Lack of awareness:** Many humanitarian agencies are increasingly becoming aware of the need to include environmental management in their operations. There is, however, an acknowledgment that available tools are not well-promoted or understood. It is felt by some that these tools are the domain of specialists and "too complicated" for a humanitarian relief setting.

> *Solution: Training programs such as the GRRT and tools such as the Environmental Stewardship Review (ESR) and Rapid Environmental Impact Assessment in Disasters (REA) provide practical methods for non-specialist staff and make minimal demands on time and resources. Additionally, humanitarian staff can consult environmental experts in governments, universities, and various NGOs for assistance in determining the key environmental issues associated with their projects.*

**Perceived complexity of existing tools:** Reasons sometimes given for the nonuse of EIA tools in disasters are that they are too cumbersome, time consuming, and generalized. There is a perception amongst practitioners that EIA tools are simply too complex to be readily applied in emergency situations. The need for participation by affected communities has also been seen as an impediment, it can be time consuming for a community to participate in the decision making.

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4 Barret, Eamon, Sarah Murfitt and Paul Venton. 2007. *Mainstreaming the Environment into Humanitarian Response: An Exploration of Opportunities and Issues.* Environmental Resources Management Limited.

*Solution: Several EIA tools have been designed specifically for the post-disaster setting using available information as described in Section 3.*

Also note that even in immediate relief and emergency situations there are steps that can be taken to protect the environment, even if it is not practical to complete and document the entire EIA process. For example, if fuel wood is in high demand by refugees and there is a limited local supply that cannot be sustainably harvested without negatively impacting life and livelihoods, then a few options may be considered: 1) distributing fuel-efficient stoves that reduce fuel demand; 2) ensuring that distributed food items do not require a lot of cooking and fuel; 3) analyzing and securing sustainable sources of fuel wood; and 4) adding re-greening or reforestation activities.

**Lack of evidence of success:** Another reason for the nonuse of these tools is the lack of evidence confirming the actual value and success of environmental impact assessments. There is a need to link and integrate procedures and results to ensure that assessments provide useful and effective input into crisis management operations.

*Solution: Specific environmental indicators should be included in project performance monitoring and evaluation.[5] Additionally, project teams should be sure to communicate lessons learned and case studies in order to inform future projects.*

**Integration:** Another topic of debate is whether environmental assessment should be applied in standalone assessments or integrated with the various other assessments undertaken during relief and recovery operations. Most humanitarian agencies have response protocols that are tailored for each disaster situation. Efforts to integrate environment impact into these protocols would ensure that the critical linkages between the environment and disasters are recognized and acted upon, thereby ensuring a more holistic assessment.

*Solution: Humanitarian staff can streamline the assessment process by combining multiple assessments into one; environmental considerations can be included as well. This creates efficiencies and highlights the key linkages between human well-being and the environment.*

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5 More information on developing environmental indicators is included in GRRT Module 2, Green Guide to Project Design, Monitoring, and Evaluation.

Environmental Impact Assessments can be incorporated into other assessments being conducted by humanitarian agencies, such as market assessments where survey staff ask vendors about the environmental issues they face in the day-to-day operation of livelihoods activities. Here humanitarian and environmental staff discuss fisheries issues with vendors in Sumatra, Indonesia. © Anita van Breda/WWF

## INTEGRATING ENVIRONMENTAL REVIEW INTO PROJECT PLANNING

The following table shows how the American Red Cross added the Environmental Stewardship Review to the project assessment tracking table for water and sanitation interventions in Thailand.

American Red Cross

| PROJECT NO. | VILLAGE NO. | VILLAGE NAME/ SCHOOL NAME | SUBDISTRICT | DISTRICT | PROJECT DETAIL | TYPE OF SYSTEM | WATER RESOURCES DATA | | | | | | COORDINATE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | RESERVOIR | BOREHOLE | WELL | SPRING | ROOF CATCHMENT | ESR | N | E |
| KRB1 | 7 | Ban Lang Koh | Koh Sri Borya | Nuakhlong | Pumping and distribution pipes | Community water supply | ✓ | | | | | | | |
| KRB2 | 1 | Lantarajprachautit | Koh Lanta Yai | Koh Lanta | Rainwater storage system | School water system | | ✓ | | ✓ | ✓ | ✓ | 5E+05 | 8E+05 |
| KRB3 | 3 | Ban Khuan Tor | Khlong Kamao | Nuakhlong | Rehabilitation rainwater harvesting system and water distribution system | School water system | ✓ | ✓ | ✓ | | ✓ | ✓ | 5E+05 | 9E+05 |
| KRB4 | 2 | Ban Bakan | Aoluk Noi | Aoluk | Rehabilitation rainwater harvesting system and water distribution system | School water system | | ✓ | | | ✓ | ✓ | 5E+05 | 9E+05 |
| KRB5 | 7 | Ban Sang Ga-U | Koh Lanta Ya | Koh Lanta | New toilet and hand-washing basin | School sanitation system | | ✓ | | | ✓ | ✓ | 5E+05 | 8E+05 |
| KRB6 | 1 | Ban Koh Khlang | Khlongprasong | Mueang | Rainwater storage system | Health center water supply | | | | | | ✓ | 5E+05 | 9E+05 |
| KRB7 | 1 | Ban Bagan | Aoluk Noi | Aoluk | Garbage bank (training and study trip) | Solid waste management | | | | | | ✓ | 5E+05 | 9E+05 |
| KRB8 | | Ban Koh Jum | Koh Sri Borya | Nuakhlong | Elevated water storage tanks | Community water supply | | | ✓ | ✓ | | | 5E+05 | |

## 3 STANDARD ELEMENTS OF AN ENVIRONMENTAL IMPACT ASSESSMENT

Many governments have their own laws and regulations requiring the use of EIAs prior to the implementation of projects in their countries. These governments typically have a lead ministry or agency (e.g., Ministry of the Environment) that serves as the central coordinator for the EIA process in-country. Project planners should be mindful of EIA requirements as well as other applicable environmental laws as they pertain to their project, and should contact government representatives as needed.

In some post-disaster situations, governments may choose to waive or limit requirements to comply with environmental laws and regulations in order to expedite project implementation. This may be necessary in the immediate aftermath of disasters to save lives. **During the longer-term recovery and reconstruction phase, however, the protection of the environment – and thereby protecting people and communities – should be considered an essential component of any project.** In the absence of government capacity to implement environmental requirements, project planners should address these issues directly; the ESR or other tools can be used where government-mandated tools are lacking.

A number of donor agencies – e.g., the World Bank, Asia Development Bank, InterAmerican Development Bank, Australian Agency for International Development, U.S. Agency for International Development, and the European Commission – have their own sets of environmental compliance requirements and methodologies for conducting environmental impact assessments. One such example is the USAID Africa Bureau's Environmentally Sound Design and Management Capacity Building for Partners and Programs (ENCAP) in Africa (www.encapafrica.org). ENCAP provides tools, resources, technical assistance, and capacity building to USAID's Africa missions and partners in order to strengthen environmental management and environmental compliance. In addition to written guidance documents that describe the EIA process relative to the organization, each organization may also have EIA specialists on staff that can help with meeting their requirements.

There are several standard elements in EIAs that apply regardless of the type of project – e.g., whether the EIA is for the installation of septic tanks at the household level or for the large-scale construction of an international airport.

It should be noted that the EIA process is used to identify *priority* environmental issues rather than to generate a comprehensive list of all potential environmental issues. The aim of the EIA process is to allow the project manager to be informed about the environmental issues that can be addressed – all the while acknowledging the primary humanitarian aim of saving lives and alleviating suffering.

**THE KEY ELEMENTS OF AN EIA IN POST-DISASTER SETTINGS ARE:**

1. **Screening:** deciding if an EIA is required based on information collected
2. **Scoping:** gathering environmental intelligence through consultation with relevant agencies and experts and a review of applicable laws and regulations
3. **Impact assessment:** identifying and evaluating alternatives for achieving the objective, and the associated environmental impacts of each alternative
4. **Mitigation measures:** reviewing proposed actions to prevent or minimize the potential adverse effects of the project
5. **Action:** incorporating the mitigation measures into the project design and implementation

Based on UNEP. 2002. *Environmental Impact Assessment Training Resource Manual.* 2nd Ed. Geneva.

## 4 OVERVIEW OF ENVIRONMENTAL IMPACT ASSESSMENT TOOLS IN POST-DISASTER SETTINGS

This section provides a brief overview of different Environmental Impact Assessment tools that can be used in post-disaster settings. These include:

- Environmental Stewardship Review for Humanitarian Aid (ESR)
- Guidelines for Rapid Environmental Impact Assessment in Disasters (REA)
- Flash Environmental Assessment Tool (FEAT)
- Environmental Needs Assessment in Post-Disaster Situation: A Practical Guide for Implementation (ENA)

**TABLE 2. A COMPARISON OF POST-DISASTER EIA TOOLS**

| | ENVIRONMENTAL STEWARDSHIP REVIEW FOR HUMANITARIAN AID (ESR) | RAPID ENVIRONMENTAL IMPACT ASSESSMENT IN DISASTERS (REA) | FLASH ENVIRONMENTAL ASSESSMENT TOOL (FEAT) | ENVIRONMENTAL NEEDS ASSESSMENT IN POST-DISASTER SITUATIONS (ENA) |
|---|---|---|---|---|
| **DESCRIPTION** | The ESR is designed to evaluate the environmental impacts of a proposed humanitarian aid project (e.g., installation of 100 septic tanks or providing seeds and tools for 1,000 families). It also helps users identify mitigation measures to prevent or minimize the environmental impacts of the project. | The REA is used immediately after a disaster to identify environmental issues that have resulted from the disaster, to help project designers prioritize their environmental activities, and to enable issues identified in the assessment to inform the overall recovery effort. | The FEAT tool's primary aim is to facilitate identification of existing or potential acute environmental impacts that pose risks for humans and nature following the release of chemical compounds. | The ENA is designed to address the many environmental issues that should be considered during early recovery and as part of the broader post-disaster needs assessment. |
| **USUAL APPLICATION WITHIN POST DISASTER SETTINGS** | The ESR can be used for any type of humanitarian project or activity. It is meant to be completed in one to three hours and typically includes a field visit to the proposed project site and consultation with project planners and other experts. It was designed especially for recovery and reconstruction projects but can be used during the relief phase as well. | The REA is designed for use in the first 120 days after the crisis. It includes an Organizational Level Assessment that is conducted by the agency leading the REA as well as a Community Level Assessment to capture the environmental issues from the perspective of the communities and groups impacted by the disaster. | The FEAT tool is specifically designed to be used in the hours and days immediately following a disaster. FEAT translates large quantities of scientific information on compounds, their environmental behavior, and their toxicity into basic effect types. | The ENA guide has been written with the expectation that it will be used primarily by a core group of people who might constitute an Environmental Needs Assessment Team (ENAT), with particular use by the ENA Team Leader. It is meant to address the environmental aspects of a broader post-disaster needs assessment. |

| | ENVIRONMENTAL STEWARDSHIP REVIEW FOR HUMANITARIAN AID (ESR) | RAPID ENVIRONMENTAL IMPACT ASSESSMENT IN DISASTERS (REA) | FLASH ENVIRONMENTAL ASSESSMENT TOOL (FEAT) | ENVIRONMENTAL NEEDS ASSESSMENT IN POST-DISASTER SITUATIONS (ENA) |
|---|---|---|---|---|
| **ADVANTAGES** | The ESR can be completed in a short amount of time by a nonspecialist with some expert consultation. It includes guidance on how to conduct the analysis within the worksheet itself. | Designed to be used by a nonspecialist within the first 120 days after a disaster. Includes a specific community-based component. | FEAT is a "first aid" tool to identify environmental impacts and support initial response actions in disaster contexts. The tool is focused on how to assess and address the impacts of release of chemical compounds. | The methodology is flexible and allows identification of the broader environmental issues associated with a disaster. Includes a comprehensive data-gathering component. |
| **DISADVANTAGES** | Since the tool is project focused, it is not designed for identification of broad, regional-scale environmental issues associated with a disaster. | The REA covers a broad range of environmental issues; however, it does not provide solutions for the problems that are identified. | FEAT requires a certain level of environmental expertise. It does not take the place of in-depth environmental assessments, which may be appropriate at later stages of the disaster response. | Designed to be used by a core team of around four to five people with some environmental expertise, and is expected to take three to four days to complete. |
| **EXAMPLES OF PRACTICABLE APPLICATION** | The ESR has been used by WWF, American Red Cross, CARE, Mercy Corps, ChildFund, FAO, CHF, IFRC, and IOM, among other organizations, after the Indian Ocean Tsunami (2004), Padang Indonesia Earthquake (2009), and Mozambique Cyclone Jokwe (2008). | The REA has been used after the Indian Ocean Tsunami (2004), Pakistan Earthquake (2005), Philippines Cyclone and Flooding (2005) and Mozambique Cyclone Jokwe (2008), among other disasters. | FEAT has been used in a number of disasters (Haiti hurricanes, Benin floods, Philippines typhoon) | ENA was used following the Ukraine Oil Spill (2008), as well as in several post-conflict situations, including those in Afghanistan, Macedonia, and Sudan. |
| **REFERENCES** | www.worldwildlife.org | www.proventionconsortium.org | www.ochaonline.un.org | www.oneresponse.info |

## 4.1 Environmental Stewardship Review for Humanitarian Aid

World Wildlife Fund (WWF) and the American Red Cross developed the Environmental Stewardship Review for Humanitarian Aid (ESR) as a tool for evaluating the environmental impacts of humanitarian aid projects with a focus on the recovery and reconstruction phases after the disaster. The ESR can, however, be used during the early relief phase as well as in longer-term development phases as the EIA elements are standardized. The ESR is meant to be completed in about one to three hours and typically includes a field visit to the proposed project site and consultation with project planners and other experts (e.g., government officials at the Environmental Ministry or Water Quality Department). The ESR form is included here as Annex 2. A case study applying the ESR is described in more detail in Section 5.

## 4.2 Rapid Environmental Assessment in Disasters

To help nonspecialists understand the environmental issues that immediately follow a disaster and begin planning for the response, the Benfield Hazard Research Centre at University College London and CARE International developed the *Guidelines for Rapid Environmental Impact Assessment in Disasters* (REA) for use in disasters and other crisis situations. Supported by a one-day training in the use of the Guidelines, the REA is designed to provide nonspecialists with the means to quickly identify salient environmental issues. It uses a subjective process, incorporating the perspectives of organizations (e.g., NGOs, local government) and communities on the most important environmental issues related to the crisis. The REA process is designed for use in the first 120 days after the crisis, after which routine EIA procedures should be possible.

The four main components of the REA are shown in the table below.

**TABLE 3: COMPONENTS OF RAPID ENVIRONMENTAL IMPACT ASSESSMENT IN DISASTERS**

| MODULE | OUTCOMES |
|---|---|
| **ORGANIZATION LEVEL ASSESSMENT** | Identification of critical environmental issues related to the disaster from the perspective of government, NGOs, and humanitarian agencies providing relief and recovery assistance |
| **COMMUNITY LEVEL ASSESSMENT** | Identification of critical environmental issues related to the disaster from the perspective of communities and groups affected by a disaster |
| **CONSOLIDATION AND ANALYSIS** | Integratation of organizational and community assessments for identification and prioritization of environmentally linked issues involving significant immediate threat to lives, well-being, and the environment |
| **GREEN REVIEW OF RELIEF PROCUREMENT** | A screening of the procurement activities for relief commodities and services to minimize negative environmental impacts |

Source: Kelly, Charles. 2005. *Guidelines for Rapid Environmental Impact Assessment in Disasters.* Benfield Hazard Research Centre, University College London and CARE International.

A number of sources of information can be used to support the completion of the Rapid Environmental Impact assessment.

The first two modules – Organization Level Assessment and Community Level Assessment – are designed to guide the collection of the basic information necessary for the identification of critical environmental issues. These modules focus on five areas:

1. The general context in which the disaster is taking place
2. The identification of disaster-related factors that may have an immediate impact on the environment
3. The identification of potential immediate environmental impacts of disaster
4. The identification of unmet basic needs of disaster survivors that could have an adverse impact on the environment
5. The identification of negative environmental consequences of relief operations

The two types of assessments – Organization Level and Community Level – have different methods for ranking the environmental concerns. In the Organization Level Assessment, issues are given a priority rating in order to produce a preliminary ranking of concerns from the perspective of the organizations involved. In the Community Level Assessment, a preliminary ranking of concerns is established through surveys, from focus group discussions, and/or from other assessment reports.

The Consolidation and Analysis module moves the analysis process further by providing simple procedures to help consolidate and prioritize the issues identified in the two assessment modules. The consolidation and analysis process will result in a list of priority environmental issues that can serve as a starting point for developing solutions.

The final module in the REA, the Green Review of Relief Procurement, helps relief organizations ensure that the services and material assistance they are providing in response to a disaster have the least negative environmental impact possible. This module lays out the background to green, sustainable procurement and provides a simple evaluation tool for use in emergency procurement.

**It is important that users fully complete the assessment process before taking any significant action to address environmental or disaster-related problems that have been identified. The REA is an incremental process designed to draw together many diverse aspects of disaster-environment linkages. The most significant issues requiring highest-priority action will not be fully evident until all assessment results are consolidated and analyzed.**

## 4.3 Flash Environmental Assessment Tool

The Flash Environmental Assessment Tool (FEAT) was developed for use by United Nations field teams deployed in response to natural disasters. The Tool's primary aim is to facilitate identification of existing or potential acute environmental impacts that pose risks for humans and nature, such as the release of chemical compounds. FEAT prioritizes disaster-stricken facilities on the basis of potential risk in order to prevent further impacts. It is specifically designed to be used in the hours and days immediately following a disaster. It can be used on location and is intended to cover the maximum area that could be affected by the disaster. The FEAT was developed by the National Institute for Public Health and the Environment (RIVM), the Dutch Ministry of Spatial Planning, Housing and the Environment (VROM), and DHV Engineering Consultancy.

FEAT translates large quantities of scientific information on toxic compounds, their environmental behavior, and their toxicity into three basic effect types. These are direct effects on humans, direct effects on nature and so-called life support functions (such as drinking water, agriculture, and fisheries), and long-term effects on humans and the environment. The area around the facility where possible effects can be expected is presented in the form of a risk contour area. In summary, FEAT is a "first aid" tool used to identify environmental impacts with a focus on the release of chemical compounds. It does not take the place of in-depth environmental assessments, which may be appropriate at later stages of the disaster response.

## 4.4 Post-Disaster Needs Assessment

The UNEP Environmental Needs Assessment in Post-Disaster Situations guide was commissioned to address the many environmental issues that should be considered during early recovery and as part of the broader post-disaster needs assessment.  It is intended to do the following:

- Identify environmental impacts and risks caused by the crisis and relief operations as well as potential environmental pressures of recovery efforts
- Identify the negative response-related activities or coping mechanisms resulting from an emergency that can impact the environment or create new environmental risks
- Assess institutional capacities at national and local levels to mitigate environmental risks and manage environmental recovery
- Provide a plan that aims to "build back better" by integrating environmental needs within early recovery programming and across the relevant relief and recovery clusters
- Provide a standard reference point for future environmental assessments in the post-crisis setting

# 5 CASE STUDY: ENVIRONMENTAL STEWARDSHIP REVIEW FOR HUMANITARIAN AID

In the following section, the ESR is examined in further detail with step-by-step instructions for completing the process. A completed example ESR is provided in Annex 2 based on a project done by a fictional aid agency called "Humanitarian International." Humanitarian International is proposing to relocate disaster-affected residents of an island in the Pacific island-nation of Rakudinia to a different island that was previously uninhabited. The proposed project is for the construction of 315 houses, primary school, secondary school, community administration building, community buildings, wastewater disposal system, electric network, roads, and street lighting.

## Steps A – C: Review Project Aim and Options

In steps A – C of the ESR form, the project objectives are examined. While decisions may already have been made about the major goal of the project – for example, providing shelter for 295 households – opinions on the ways to achieve this goal may vary. The point of reviewing the project objectives is to reexamine the activities that are planned in order to achieve the project's goal with an eye toward capitalizing on environmental opportunities and reducing environmental impacts. In the shelter example noted above, questions might focus on the various ways by which the project goal (e.g., providing shelter for 295 households) could be achieved and how these different approaches could have different environmental impacts. One might ask, for example:

- Is the construction of new housing required? Or can people be temporarily re-located in existing buildings?
- Is the land of value for multiple purposes (e.g., agriculture, habitat for endangered species, water catchment areas for drinking water)? Will vital natural resources be destroyed?
- What are the building materials that will be used? Can these be sourced in a way that will not cause environmental damage?

The idea here is to write down the details of the project and note the specifics that may impact the environment – such as the location of the project, the scale of the project, the building materials to be used, additional infrastructure to be built, and transport and procurement arrangements.

In most cases, there is more than one way to achieve the project goal. If planned activities are carefully examined for their potential negative environmental impacts, then it may become apparent that more environmentally acceptable alternatives are required.

## Step D: Consultation and Environmental Information Gathering

In Step D of the ESR, a list is drawn up of all the agencies or individuals that should be contacted to help project managers gain an understanding of the linkages between the project, the environment, and potential impacts to people and communities. The main point of this inter-agency coordination is to clarify the following:

1. Local, regional, national (and sometimes international) environmental issues that may be associated with the project (e.g., impact of using river sand in cement for use in building foundations)
2. Laws that apply to the project (e.g., buffer zone requirements)

3. Alternative ways to achieve project objectives in order to reduce negative environmental impacts (e.g., use of treatment wetlands instead of a septic tank and leach field in areas with a high water table)
4. The cultural, institutional, and environmental setting of the project, in order to ensure project sustainability

There are many individuals, institutions, and agencies that can provide information on environmental impacts, applicable laws, regulations, and standards. Environmental specialists exist in humanitarian NGOs, government agencies, environmental organizations, and universities. Many of these experts may specialize in one topic – such as hazardous materials, spatial planning, or sustainable sourcing of materials – so it may be worth talking to several to get a comprehensive view of the potential environmental impact of the project. Many donors have environmental requirements for the project proposals they review, and may have environmental officers on staff who may be able to assist with this stage of the EIA if necessary.

Depending upon the scale of the project and its potential environmental impacts, it may be worth hiring a consultant to conduct the analysis. This can be done in collaboration with other NGOs that may have complementary projects or projects similar to your own.

Decisions have to be made regarding how much information – both secondary and primary – should be collected to guide project directions. This includes the review of pre-disaster baseline (i.e., secondary) information before the actual on-the-ground (i.e., primary) data collection, observation, and verification is conducted.

Key sources of pre-disaster baseline information are likely to include the following:

- Environmental profiles for the country/region
- Satellite images and maps
- Project reports from national and international environmental agencies
- Local knowledge on natural resource management
- Previous environment-related assessments
- Specific databases; for example, a registry of protected areas or marine reserves within the affected area
- Wildlife and fisheries management plans
- Housing and related development plans
- Land tenure records

Engagement with a broad range of stakeholders is a fundamental part of this information gathering process. **Some consultation will naturally occur during the site assessment work, but given the importance of recording peoples' own voices and experiences as they identify their own needs and priorities, special attention should be given to this phase of work.** Consultations are an opportunity to ensure that members of the affected society have an opportunity to contribute to the process and, at the same time, to ensure that cross-cutting issues such as gender are properly addressed.

Actions to consider when engaging in stakeholder consultations include the following:

- Clarifying the purpose of each specific consultation
- Seeking permission from community leaders or heads of households before engaging in any consultation process
- Arranging group meetings at a time and venue suitable to the community representatives
- Preparing well for each consultation
- Consulting with a range of people from within the community – men and women, youth and elderly, different professions, etc.
- Obtaining information on the local environmental conditions that existed before the disaster
- Considering use of a semi-structured interviewing process (but have a mental or written checklist as a back up)
- Encouraging openness in all discussions and respecting peoples' opinions
- Encouraging people to tell stories about the environmental situation before the disaster
- Reviewing and verifying during the discussions whether there are gender differences in experiences/views and impact of disasters, and also in access to, control of, and use of natural resources
- Verifying secondary data by first-hand observations
- Being prepared to answer questions from the community
- Reviewing the line of questions and discussions before concluding the meeting: Have any new gaps been identified? Have cross-cutting issues been addressed through the discussions?

The table below highlights key actors and potential sources of information.

**TABLE 4: CONTACTS FOR ENVIRONMENTAL INFORMATION GATHERING**

| LEVEL | TYPE OF INFORMATION |
|---|---|
| **ONLINE SERVICES** | • Maps<br>• History of site and previous disasters<br>• Databases on natural resources (e.g., water sources, hazardous material sites)<br>• Information regarding risk mapping and analysis (e.g., landslide potential) |
| **SURVEY REPORTS** | • Previous Environmental Impact Assessments for projects in a similar area<br>• Other post-disaster needs assessments<br>• Other cluster-related reports (demography, livelihoods, shelter, etc.)<br>• Disaster preparedness and recovery strategies/plans |
| **LINE MINISTRIES** | • Pre-disaster status reports on the environment<br>• Presence of sites of ecological importance<br>• Regulations governing access to natural resources<br>• Information concerning possible sourcing of shelter and construction materials<br>• Information on waste management systems, policies, and practices |
| **SECONDARY DATA** | • Pre-disaster environment baseline data collection (e.g., from local environmental NGOs)<br>• Initial severity and impact information<br>• Humanitarian relief information, disaggregated by age and sex |
| **COMMUNITIES** | • Former use of natural resources by community members, disaggregated by age and sex<br>• Community level links with livelihood security before the disaster<br>• Governance issues regarding land tenure<br>• Customary regulations governing access to natural resources<br>• Main immediate and longer-term needs |
| **INDIVIDUAL – AND GROUPS OF – STAKEHOLDERS (FISHERMEN, FARMERS, PASTORALISTS, WOMEN'S GROUPS...)** | • Pre-disaster use of natural resources by men and women, old and young people<br>• Links with livelihood security before the disaster<br>• Pre-disaster and current livelihood coping strategies<br>• Trends in rural and urban activities in relation to natural resource use and management<br>• Main immediate and longer-term needs of particular groups (men and women, old and young people)<br>• Gendered division of labor (water collection, etc.); gendered pattern of land use and ownership |

Source: UNEP. 2007. *Practical Guide to Environmental Needs Assessment in Post-Disaster Situations.*

## Step E: Impact Assessment

Once you are satisfied with the quality and quantity of the information collected, the next step is to analyze how the project will impact (or be impacted by) the various environmental concerns, using the Environmental Issues Matrix in Step E. At this stage of the assessment it is important to consider and prioritize the potential negative environmental impacts of the project. The matrix can help inform decisions about which impacts are of highest priority and must be addressed. For example, a project whose construction activities are likely to stir up dust and affect air quality might not have a significant impact if those construction activities are temporary and the project's benefits outweigh the costs. On the other hand, if the project aims, for example, to install a fiberglass boat factory with recurring toxic fumes, then this could be a more significant problem. There is, unfortunately, no single magic formula for prioritizing the issues according to impact. Criteria that can be used include: 1) the severity of the environmental impact, 2) the number of people potentially impacted, 3) the size of the geographic area in which the impacts will occur, and 4) the duration of the potential environmental impact (short term versus long term). The consultations conducted in Step D (above) should assist efforts to prioritize issues and determine whether or not the impacts warrant changes to the project activities.

## Step F: Other Information

In addition to understanding the potential environmental impacts of the project, it is also important to understand the local context of the project. Step F asks if the person preparing the ESR has conducted a site visit to the project area, considered local laws and management plans, and allowed the community to provide input on the project.

As part of the ESR process, it is important to consult relevant environmental experts (ESR step D) to help identify and address key environmental issues in disaster recovery projects. In this picture, project planners are consulting with a sustainable aquaculture specialist in Indonesia following the 2004 Indian Ocean Tsunami. © Cut Desyana/WWF

**ENGAGING ENVIRONMENTAL CONSULTANTS AS PART OF PROJECT DESIGN**

The Canadian Red Cross in Banda Aceh, Indonesia, engaged an EIA specialist to review its shelter projects in order to identify potential impacts on communities and the environment after the 2004 Indian Ocean Tsunami. The construction Terms of Reference was reviewed to make sure they stipulated that wood was to be sustainably sourced. The French humanitarian aid agency Triangle Génération Humanitaire also hired a local environmental consultant. This was to ensure that its livelihoods projects addressed important issues, such as community-based alternatives to pesticide use in agriculture fields, in order to reduce risks to public health and minimize the impacts of rice paddy rehabilitation on mangroves. This would ensure that fish breeding grounds were maintained for sustainable livelihoods.

Source: Roseberry, Rachel. 2007. *A Balancing Act: An assessment of the environmental sustainability of permanent housing constructed by the international development community in post-disaster Aceh.* University of Sussex.

## Step G: Determine Need for Additional Studies

The ESR is designed to be used in the post-disaster setting and completed in a relatively short amount of time (i.e., one to three hours, not including site visits and expert consultations). Some projects, however, are of such a size, scale, and complexity that they cannot be adequately evaluated using the ESR tool. If, after completing an ESR, many unknowns about the potential impacts remain, it may be necessary to conduct additional studies to better understand the potential environmental impacts of the proposed project. Step G of the ESR will help you determine whether additional studies will be needed. Considerations include:

- **Size and scale of the project.** *If the project is of such a size and scale that it cannot be adequately evaluated in this worksheet, a more detailed EIA should be completed.*
- **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 the environment, consider preparing additional information and/or preparing a more detailed EIA.*
- **Cumulative impact.** *If the project has a relationship with other activities that, when considered cumulatively, might have a significant impact, then consider conducting additional studies and/or preparing an EIA to understand this impact. If, for example, the project involves the installation of groundwater wells in an area where other agencies are also installing groundwater wells, there may cumulatively be a significant impact on the area's groundwater supply; a groundwater resources assessment should therefore be conducted.*

Examples of additional studies include a hazardous materials survey to determine if the site has been contaminated by hazardous materials, a Solid Waste Management plan to develop a strategy for dealing with the solid waste generated by the project, fisheries management plans, biological assessments or forest management studies, and, as noted above, a groundwater study to understand the impacts of well installation on the groundwater table.

## Step H: Design Mitigation Measures and Take Action

Assessments are only valuable to the extent that they inform decision making or result in some form of action. In Step H, based on information obtained in steps A – G, the following questions are considered:

- Does the project need to be changed in order to protect people, communities, and the environment? If so, how?
- Should the project be cancelled?
- What specific actions are needed to allow the community to take advantage of environmental opportunities and minimize potential negative impacts?

The Environmental Issues Matrix (Step E) in the ESR form offers practical suggestions for situations in which a project may need to be changed. For more detailed information on sector-specific actions that can maximize environmental opportunities and minimize impacts, refer to the following sector-specific GRRT modules:

Module 4: Green Guide to Strategic Site Selection and Development
Module 5: Green Guide to Materials and the Supply Chain
Module 6: Green Guide to Construction
Module 7: Green Guide to Water and Sanitation
Module 8: Green Guide to Livelihoods
Module 9: Green Guide to Disaster Risk Reduction
Module 10: Green Guide to Organizational Operations

Additionally, UNHCR's Environmental Guidelines (Annex 3) and IUCN's Environmental Field Manual (Annex 4.1) offer a number of ideas for mitigating the environmental impacts of various response activities. And also UNEP/OCHA, Humanitarian Aid and the Environment provides essential guidance for humanitarian actors. (See Annex 4.2)

As mentioned earlier, it is crucial to follow up on any action items by establishing feedback mechanisms with the stakeholders and by regularly monitoring the project. See GRRT Module 2, Green Guide to Project Design, Monitoring, and Evaluation for more information. It is also essential to address issues raised through the monitoring and feedback process and make relevant changes and adjustments to the project. Make a note of the actions you have taken in Step H of the ESR. This is important not only as a checklist to ensure that, where possible, mitigating action has been taken but also because these documents can serve as an archive and references for future post-disaster situations.

# ANNEX 1: ADDITIONAL RESOURCES

The following organizations and publications provide a variety of tools, resources, and information that elaborate on the concepts presented in this module.

## Organizations

**Conserveonline.org:** Online library containing conservation tools and techniques. See in particular: Conservation Action Planning: Basic Practice 7. *www.conserveonline.org*

**International Association for Impact Assessment (IAIA):** Global network promoting capacity development and best practices in impact assessment across a variety of fields. A number of guidelines and best practices for social and environmental impact assessment can be found in IAIA's public documents library. www.iaia.org

**International Union for Conservation of Nature (IUCN):** Non-government organization focusing on pragmatic solutions to environmental issues. IUCN maintains guidelines and tools for environmental assessment and monitoring under the "Conservation action tools" heading on their website. *www.iucn.org*

**United Nations Environment Program (UNEP):** Functional organization within the United Nations system that focuses on environment and global sustainability issues. Through their website, UNEP provides a variety of training and guidance in impact assessment, including materials tailored to development scenarios. See in particular the *Environmental Impact Assessment Training Resource Manual. www.unep.org*

**World Wildlife Fund (WWF):** Non-government organization offering a broad array of resources on environmental issues. National and local WWF offices can serve as resources for technical expertise and insight into monitoring, evaluation and assessment of environmental issues at a local level. *www.wwf.org*

## Publications

Benson, Charlotte, John Twigg, and Tiziana Rossetto. 2007. *Tools for Mainstreaming Disaster Risk Reduction: Guidance Note 7-Environmental Assessment.* Provention Consortium.

Gilpin, Alan. 1995. *Environmental Impact Assessment: Cutting Edge for the Twenty-First Century.* Cambridge University Press.

Kelly, Charles. 2005. *Guidelines for Rapid Environmental Impact Assessment in Disasters.* Benfield Hazard Research Centre: University College London and CARE International.

UNEP. 2002. *Environmental Impact Assessment Training Resource Manual.* 2nd Ed. Geneva.

UNEP. 2008. *Environmental Post-Disaster Needs Assessment (PDNA): A Practical Guide for Implementation.*

UNEP. 2009. *Environmental Assessment of the Gaza Strip following the escalation of hostilities in December 2008 - January 2009.*

UNEP/OCHA Joint Unit. 2007. *IASC Leaflet Humanitarian Action and the Environment.*

UNEP/OCHA Joint Unit. 2008. *Flash Environmental Assessment Tool (FEAT).* www.ochaonline.un.org/ToolsServices/EmergencyRelief/Environmental EmergenciesandtheJEU/ToolsandGuidelines/tabid/5094/language/en-US/Default.aspx

UNHCR and IUCN. 2005. *UNHCR Environmental Guidelines.*

# 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**<br>*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.* | **To answer…**<br>*This column suggests ways to obtain the information needed to answer the questions at the right.* | **Yes**<br>*Check this box if the answer is "Yes."* | **No**<br>*Check this box if the answer is "No"* | **Not sure**<br>*Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.* | **Comment** | **Action Taken**<br>*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)? | ◷ Review project proposal.<br>◷ 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<br><br>*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.* | To answer…<br><br>*This column suggests ways to obtain the information needed to answer the questions at the right.* | Yes<br><br>*Check this box if the answer is "Yes."* | No<br><br>*Check this box if the answer is "No"* | Not sure<br><br>*Check this box if the answer is "Not Sure." Contact experts identified in Section D to assist with answering the question.* | Comment | Action Taken<br><br>*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.* |
|---|---|---|---|---|---|---|---|---|
| Water | 2 | Will the project result in alteration of waterways (addition of spring catchments, drainage infrastructure, placement of rock along river bank) | Review area maps.<br>Consult with local environmental organizations. | X | | | 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.<br>The waste management centre and fuel storage sites are both concrete padded, and/or bunded with grease traps to collect any wastewater.<br><br>Each house has a 2,500l rainwater harvesting tank. There are fourteen 10,000l community rainwater harvesting tanks.<br><br>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. | Promote water conservation with the beneficiaries and ensure they understand efficient use of the groundwater source and protect it being polluted.<br><br>Community sensitization programs would be required to ensure community understands their responsibility to conserve water and protect water resources.<br><br>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.<br>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.<br><br>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. |

# Environmental Stewardship Review for Humanitarian Aid

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|---|---|---|---|---|---|---|---|---|
| Water | 3 | Will the project result in pollution of rivers, streams, wetlands, or other waterways? Examples include:<br>Addition of sediment, wastewater, hazardous materials, runoff from roads. | Review area maps.<br>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.<br><br>Construction on the island has not affected the groundwater, but future activities by islanders may do so.<br><br>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.<br><br>Ensure sewer outfall is properly constructed underwater. |
| Water | 4 | Will the project restrict access to water sources or other public use areas/resources? | Review spatial planning maps.<br>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.<br><br>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 increased. |

# Environmental Stewardship Review for Humanitarian Aid

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|---|---|---|---|---|---|---|---|---|
| Hazardous Materials | 5 | Are there toxic or hazardous materials at the project site? | ◷ Ask neighboring residents about current and previous use of site.<br>◷ 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.<br><br>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? | ◷ Review project proposal. | | X | | | |
| Cultural Resources | 7 | Are there cultural, archeological, prehistoric or historic resources at the site? | ◷ Talk with neighboring residents.<br>◷ Consult local heritage organizations, museums or universities.<br>◷ 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? | ◷ Review project proposal. | X | | | The Government of the Maldives will be introducing taxes in the future.<br><br>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 | ◷ Review project proposal.<br>◷ 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

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|---|---|---|---|---|---|---|---|---|
| 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? | ◷ Talk with local environmental organizations.<br>◷ 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)? | ◷ Conduct field visits with local experts.<br>◷ 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.<br><br>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.<br><br>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? | ◷ Talk with suppliers about the source of their materials.<br>◷ 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)? | ◷ 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? | ◷ Review floodplain maps if available;<br>◷ Talk with local planning authorities;<br>◷ Speak with neighboring residents. | | X | | | |

# Environmental Stewardship Review for Humanitarian Aid

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|---|---|---|---|---|---|---|---|---|
| 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? | ◷ Talk to National Emergency Management Agency or similar agency to determine relevant natural hazards in the project area.<br>◷ 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?) | ◷ 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? | ◷ Review project proposal.<br>◷ 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? | ◷ Review project proposal.<br>◷ Conduct field visit.<br>◷ Talk with geologists or geo-technical engineers. | | X | | | |
| Spatial Planning | 19 | Is the project located within a designated Coastal Zone buffer? | ◷ 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? | ◷ Review provincial maps.<br>◷ Talk with local authorities. | | X | | | |

# Environmental Stewardship Review for Humanitarian Aid

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|---|---|---|---|---|---|---|---|---|
| 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.? | Coordinate with other donor agencies and other organizations at work in the project area.<br>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? | Review village spatial plans.<br>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? x Yes ☐ No

Did personnel visit the site? x Yes ☐ No

Have local laws been considered and applied to the project? x 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.)? x Yes ☐ No If so, list plan name(s):

If plans exist, is the project consistent with existing plans? x 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? x 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 x 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: ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES TO BE CONSIDERED IN AN EIA PROCESS

UNHCR's Environmental Guidelines[6] provide examples of the typical activities undertaken in the emergency, and care and maintenance phases of a disaster with related environmental impacts. Measures to reduce or eliminate environmental impacts are also provided. This is reproduced here in a tabular form for simplicity.

| ACTIVITIES | RELATED ENVIRONMENTAL IMPACTS | MEASURES TO REDUCE OR ELIMINATE ENVIRONMENTAL IMPACTS |
|---|---|---|
| **SUPPLIES AND LOGISTICS** | Inadequate supply of basic items, e.g., shelter materials, may force displaced people to address needs (wooden poles, branches and grasses, etc.) at the expense of the local environment. | Adequate supplies of appropriate materials must be in place as soon as possible after arrival of camp residents to minimize environmental destruction; supply of other, more environmentally friendly, items (e.g., foods requiring little cooking and fuel) should be promoted where possible and appropriate. |
| | The volume of transport traffic to a camp can damage local infrastructure (roads and bridges). | Reduce excess transport and maximize use of empty vehicles: shipments of supplies and use of transport facilities should be coordinated with other implementing agencies to minimize overall transport requirements. |
| | Where excess shipping materials such as wood or cardboard cannot be reused by the affected, they must be removed from the site, burned,or buried in waste dumps. | Consider environmental impacts during procurement:<br>Aim to reduce unnecessary packaging materials at source and/or use empty trucks to remove waste to a location where it can be recycled and/or disposed of in a more permanent dump or landfill site.<br>Promote environmentally friendlier ("greener") procurement and avoid purchasing products whose development or use may damage the environment. |

6 UNHCR and IUCN. 2005. *UNHCR Environmental Guidelines.*

| ACTIVITIES | RELATED ENVIRONMENTAL IMPACTS | MEASURES TO REDUCE OR ELIMINATE ENVIRONMENTAL IMPACTS |
|---|---|---|
| **PHYSICAL PLANNING** | Camp resident health and protection concerns will be affected by such environmental factors as prevalence of endemic diseases, weather conditions, dust, drainage and soil conditions, water quantity and quality, and exposure to man-made or natural hazards such as polluted soils, hurricanes, radiation sources, earthquakes, and volcanic activity. | When selecting a site for a camp or settlement, factors to be considered include the physical carrying capacity of the site/region; the availability of natural resources and space; proximity to environmentally sensitive areas; topographical, drainage, and soil conditions; vegetation cover; weather conditions; the existence of endemic diseases; the risk of man-made or natural hazards; and the risk of conflict with the local population. Utmost care should be taken to avoid establishment of sites in or near forest reserves, other protected or locally important areas, or national historic monuments. All of these factors should be determined through systematic site surveys. |
| | Siting refugee camps near national parks, forest reserves, wildlife reserves, areas of cultural importance, open water courses, or fragile ecological areas increases risks of damage by overuse or unmanaged exploitation of natural resources. This includes deforestation, loss of biodiversity, rangeland degradation, erosion, siltation, and the pollution of water resources. Overuse of, and/or damage to, natural resources may cause conflict with the local population. | The size of a camp/settlement should in principle be determined by the carrying capacity of a proposed site. In exceptional cases, as an environmental mitigating strategy, the number of camp residents may exceed the carrying capacity as far as available forest products are concerned, in order to confine environmental damage to areas of lower environmental value. In these cases special measures will have to be taken to provide sufficient wood resources or alternative materials. |
| | Siting camps on steep slopes can increase risk of erosion, as does the inappropriate design of camps or settlements. Likewise, inappropriate location of a camp site will increase the risk of floods, the need to construct new access roads, and transport distances. | The site plan should determine where and how to build or site different camp elements and where to take special environmental measures such as establishment of greenbelts, construction of drainage canals, and terracing. A plan of action for community-based maintenance of camp infrastructure should be included in the site plan. |
| | Inappropriate camp layout and shelter design, and poor maintenance of camp infrastructures, may lead to increased risk of soil erosion, poor sanitary conditions, water pollution, and fire hazards, and exposure to wind, dust, and extreme temperatures. | Site preparation implies the careful implementation of the site plan. If heavy equipment is used, indiscriminate bulldozing or radical clearing of ground cover has to be avoided at all costs. During construction of infrastructure and roads, existing tree and bush cover has to be protected to the extent possible. Topographical factors have to be taken into account, following contour lines. The siting of shelter areas should be done so as to respect existing vegetation to the extent possible. |
| | Excessive damage may be caused because of overcrowding and lack of care. If insufficient shelter material is supplied, camp residents will extract needed materials from areas surrounding the camps. Poles cut from young trees are often the preferred choice of support – which can quickly degrade forests and woodlands – while branches, grasses, and leaves are often gathered as roofing materials. | For shelter construction, it is important to ensure the availability of appropriate materials that are either environmentally benign or have been gathered in a sustainable manner. If this is not possible, alternative building methods have to be explored or shelter materials have to be brought in from outside the region or country. Construction waste should be recycled or properly disposed of. |
| | In urban areas, displaced people are often accommodated in communal buildings or abandoned residential buildings. | In urban and/or cold climates, priority should be given to distribution of materials that will compensate for damage to dwellings, provide additional protection against cold weather, and/or establish proactive community-based maintenance systems. |

| ACTIVITIES | RELATED ENVIRONMENTAL IMPACTS | MEASURES TO REDUCE OR ELIMINATE ENVIRONMENTAL IMPACTS |
|---|---|---|
| **WATER** | Depletion of water sources due to unsustainable extraction/collection of water. | Designate competent technical experts for assessment and development planning of water supply systems, and give special attention to assessment of safe yield and quality of available water (throughout the year), and likely environmental impacts resulting from construction and implementation of water supply structures. |
| | Impacts to local environment due to construction and operation of water supply system (physical structures and chemicals, if used), the intensity and magnitude of which would largely depend on the nature and size of the project and the sensitivity of the local ecosystem. | Maintain water sources and storage facilities and protect them against pollution (e.g., from human waste, garbage, livestock, and siltation).<br>Ensure proper control of any chemicals, such as chlorine, being used to disinfect water. |
| | Contamination of local water (surface and subsurface) regime due to improper disposal of wastewater and human waste; faulty design and operation/maintenance of piped water network; excessive extraction of groundwater (leading to saltwater intrusion in case of coastal zones and other harmful constituents in the local geological formation); and other related activities in the camp. | Ensure proper management of wastewater to avoid development of wet areas, which can become breeding grounds for mosquitoes and aid the spread of disease.<br>Employ locally appropriate soil and water conservation practices such as bio-engineering, especially in camps that are located in vulnerable areas.<br>Ensure consultations with stakeholders (including authorities/line agencies and representatives from host communities) throughout all the stages of water supply system development.<br>Sensitize and educate the beneficiaries/refugees on the need to conserve water and promote best practices in the use of water.<br>Develop environmentally friendly plans and operations for water supply and disposal systems. |

| ACTIVITIES | RELATED ENVIRONMENTAL IMPACTS | MEASURES TO REDUCE OR ELIMINATE ENVIRONMENTAL IMPACTS |
|---|---|---|
| **SANITATION** | Poor control of excreta can lead to pollution of surface water as well as groundwater. This can result in the spread of disease to a much larger proportion of the population, with resultant human and financial costs. | Design and put into operation a basic system for disposing of human excreta as soon as possible, taking into account expected needs as well as local conditions and customs. This system should be monitored and upgraded as necessary. Alternative technologies for excreta treatment should be used, to the extent possible, e.g., using excreta in biogas generation or as fertilizer, or other possibilities. |
| | Poor management of water distribution points and wastewater (i.e., if it is allowed to collect and stand in puddles) can provide breeding grounds for disease vectors. | Control wastewater at source and/or put into place drainage facilities or other remedial measures to prevent accumulation of standing water around water distribution points and camp resident shelter areas.<br>Drainage systems for wastewater can be used to capture and recycle this resource, which can then be used to water vegetable gardens or trees. |
| | Inadequate provision of solid waste storage near point of use, collection, disposal, and stabilization, or reuse and recycling, could lead to contamination of the environment and the potential spread of disease by humans, animals, insects, or vermin. | A waste management system, appropriate to the demands and local site conditions, should be put into place, monitored, and improved as necessary.<br>Special precautions need to be taken with all hazardous waste such as medical waste, empty pesticide containers, and used or expired chemicals. Implementation of a program involving the "3-Rs" (reduce, reuse, and recycle) should be part of a waste management plan. |
| | Dust carried in the air can be irritating or harmful to the eyes, respiratory system, or skin, and can contaminate food and damage sensitive camp equipment. Under some conditions, dust can be contaminated with fecal matter and may be a direct cause of disease.<br>Smoke generated as a result of poor cooking practices and the wrong design of shelters can be a concern, as it is hazardous to human health. | Camp design (including shelter for camp residents) and operation should aim to minimize the production of dust and smoke. Ground cover should be maintained or replaced, to the extent possible. |
| | Insects and rodents are primary vectors for the spread of disease within a refugee camp and between refugee and local populations. These pests can also contaminate food supplies, either before or after distribution to refugees.<br>Some measures used to control pests (i.e., chemical applications) can be toxic to humans (both beneficiaries and workers), to non-target organisms, and to the environment. | Insect and rodent control measures should be implemented, taking into account the toxicity of many pesticides and insecticides. Over the longer term, non-chemical pest-control methods should be instituted, to the extent possible. |

## ANNEX 4: GUIDANCE ON POSSIBLE MITIGATION MEASURES

Annex 4.1: IUCN Environmental Field Manual

**1: Avoid over-exploitation of natural products.**

- Ensure that fuel wood and timber are obtained according to plans set out in the contingency planning phase (where these exist).
- Ensure that natural resource extraction for shelter and food is carried out according to existing legislation.

**2: Avoid unplanned habitat change.**

- Put up shelters only in areas that have been identified for the purpose.
- Avoid clearing natural habitats if they have not already been identified for clearance.

**3: Minimize solid waste pollution.**

- Dispose of solid waste at locations identified in the contingency planning phase.
- Start a process of separating degradable from nondegradable waste and recyclable and reusable waste.
- Ensure that incineration is not used as a method of waste disposal, as this contributes to global warming and air pollution.
- Actively train persons at shelters to dispose of waste responsibly.

**4: Minimize water pollution.**

- Build toilets only in locations identified in the contingency planning phase.
- Manage wastewater only in the manner identified in the contingency planning phase.

Annex 4.2: Essential Guidance for Humanitarian Actors *(*UNEP/OCHA Joint Unit. 2007. *IASC Leaflet Humanitarian Action and the Environment.)*

1. **Hazardous substances:** All sources of acute risk (such as chemical spills from damaged infrastructure) should be identified as early as possible. The Joint UNEP-OCHA Environment Unit provides emergency assistance through rapid assessments and advice. Access should be restricted until clean-up or risk-reduction measures can be taken.
2. **Emergency waste management:** Plan the location of emergency waste disposal sites with local authorities to avoid contamination of water sources and agricultural land, and to avoid disease vectors and odors. Do not burn waste without a proper risk assessment, especially in the case of plastics. Medical and other forms of hazardous waste should be disposed of using appropriate methods, e.g., steam sterilization (autoclaves).
3. **Water use:** To determine sustainable levels of water use, an early assessment of the presence, quality, quantity, and recharge rate of groundwater sources

should be conducted. Monitor groundwater extraction to ensure that the natural recharge rate is not exceeded. Raise awareness of the importance of water conservation.

4. **Sanitation:** Take care to locate latrines downstream of wells, at least 30m from groundwater sources and at least 1.5m above the water table. Fitting pit latrines with concrete slabs eliminates the need for secondary wooden slabs or supporting beams and facilitates easy cleaning. Consider the up- and down-stream impacts of water use and sanitation, as well as its cumulative impact on a watershed.
5. **Energy consumption:** The use of wood or charcoal for domestic energy by displaced people has a major impact on the environment and livelihoods. Promote energy-saving measures, such as fuel-efficient stoves and cooking techniques, fast cooking foods, and consider using cleaner energy sources (e.g., gas and photovoltaic power).
6. **Refugee/IDP camps:** If possible, keep camp populations below 20,000 and locate camp sites at least 15km from ecologically sensitive areas and neighboring camps. Consider controlled harvesting sites or mud brick construction to avoid deforestation. Promote the "three Rs" of waste management in camps: Reduce, Reuse and Recycle. For more information, see UNHCR's Environmental Guidelines for Refugee Operations.
7. **Transport:** Well-maintained vehicles and eco-friendly driving techniques reduce air pollution and fuel consumption. Where possible, choose cleaner fuels and fuel-efficient, low-emission vehicles to minimize carbon emissions. Waste oil should be stored in plastic drums and properly disposed of or taken back to its source.
8. **Green procurement:** Smart procurement decisions are a simple way to reduce the environmental impact of humanitarian operations: Choose goods with the minimum possible packaging, especially containers that can be reused or recycled. Source materials from local or national markets to minimize travel miles and carbon emissions, and prefer recycled materials. Select suppliers with certified safe and sustainable production practices, in particular for forest products, water supply, metals, and plastics.
9. **Standards, tools, and guidelines:** Standards, tools, and guidance documents are available to assist humanitarian responders in managing environmental impacts and risks. In the absence of other guidance, the Sphere standards should be applied.
10. **UN assistance:** Humanitarian operations can be assisted on environmental issues through the Joint UNEP-OCHA Environment Unit (during the emergency phase) and the UNEP Post-Conflict and Disaster Management Branch (during the early recovery phase). Contact details: www.ochaonline.un.org/ochaunep

Source: UNEP/OCHA Joint Unit. 2007. IASC Leaflet Humanitarian Action and the Environment.

# 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 ($CO_2e$) 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 |


American Red Cross

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.