2
GREEN
GUIDE TO

PROJECT DESIGN, MONITORING, AND EVALUATION

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.

2 GREEN GUIDE TO

PROJECT DESIGN, MONITORING, AND EVALUATION

Sharon Pailler, World Wildlife Fund

Paul Thompson, InterWorks LLC

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

ACKNOWLEDGEMENTS

Project Manager Jonathan Randall, World Wildlife Fund

Training Specialist Paul Thompson, InterWorks LLC

Creative Director Melissa Carstensen, QueenBee Studio

Advisory Committee
Erika Clesceri, U.S. Agency for International Development
Veronica Foubert, Sphere
Christie Getman, American Red Cross
Ilisa Gertner, American Red Cross
Chris Herink, World Vision
Emma Jowett, Consultant
Charles Kelly, Consultant
Robert Laprade, American Red Cross
Anita van Breda, World Wildlife Fund

Expert Reviewers
Joseph Ashmore, Consultant
Rick Bauer, Oxfam-UK
Gina Castillo, Oxfam-America
Prem Chand, RedR-UK
Scott Chaplowe, International Federation of Red Cross and Red Crescent Societies
Marisol Estrella, United Nations Environment Programme
Chiranjibi Gautam, United Nations Environment Programme
Toby Gould, RedR-UK
Tek Gurung, United Nations Environment Programme
Yohannes Hagos, American Red Cross
James Kennedy, Consultant
Earl Kessler, Consultant
John Matthews, World Wildlife Fund
Andrew Morton, United Nations Environment Programme
Radhika Murti, International Union for Conservation of Nature
Marcos Neto, CARE
Jacobo Ocharan, Oxfam-America
Judy Oglethorpe, World Wildlife Fund
Robert Ondrusek, International Federation of Red Cross and Red Crescent Societies
Adrian Ouvry, Danish Refugee Council
Megan Price, RedR-UK
Catherine Russ, RedR-UK
Graham Saunders, International Federation of Red Cross and Red Crescent Societies
Ron Savage, U.S. Agency for International Development
Hari Shrestha, Save the Children
Rod Snider, American Red Cross
Margaret Stansberry, American Red Cross
Karen Sudmeier, International Union for Conservation of Nature
Nigel Timmins, Tearfund
Muralee Thummarukudy, United Nations Environment Programme
Anne-Cécile Vialle, United Nations Environment Programme

Special Thanks
The development of the GRRT has truly been a collaborative process and could not have been done without an extraordinary team of international experts from the humanitarian and environmental sectors. Over the course of a two-year development process, the GRRT was built on the diverse experiences of over 15 technical authors and training specialists, over 30 expert reviewers, and a dedicated team of graphic designers and copy editors. Special thanks go to Paul Thompson whose depth of experience in humanitarian training helped to shape this project and whose commitment made it a reality. Thanks to Anita van Breda, Robert Laprade, and Ilisa Gertner for their insight, ideas, and time spent reviewing many rounds of drafts. Special acknowledgement goes to the participants of the GRRT pilot workshops in Sri Lanka and Indonesia for all of their excellent feedback. Special thanks also goes to Gerald Anderson, Marcia Marsh, Alicia Fairfield, Achala Navaratne, Julia Choi, Bethany Shaffer, Owen Williams, Brad Dubik, Leah Kintner, Tri Agung Rooswiadji, Tom Corsellis, Eric Porterfield, Brittany Smith, Sri Eko Susilawati, Jan Hanus and Manishka de Mel. *–Jonathan Randall, WWF*

MODULE 2: GREEN GUIDE TO PROJECT DESIGN, MONITORING, AND EVALUATION

Table of Contents

1 INTRODUCTION

1.1 Module Objectives

This module provides guidance on how project design, monitoring, and evaluation can better incorporate and address environmental issues within the typical project cycle of a post-disaster humanitarian aid project. This includes the development and analysis of project designs that incorporate sustainable environmental factors, the selection of appropriate indicators and targets to measure and monitor environmental impact, and practical guidance on how to monitor and evaluate environmental impact.

Specific learning objectives for this module are as follows:

1. Understand why it is important to incorporate environmental considerations into project design, monitoring, and evaluation in order to improve outcomes for people and communities recovering from disaster.
2. Integrate environmental indicators into the project strategy and the key steps of the project cycle's development and implementation.
3. Select and measure environmental indicators using the same criteria as other indicators (e.g., SMART indicators).
4. Demonstrate that integrating environmental monitoring into a project does not have to be difficult, costly, or time consuming.

The Green Recovery and Reconstruction Toolkit approach presented in this module does not require the adoption of new methods of responding to disasters, but rather requires minor adaptation of existing and commonly used methods with the goal of integrating and monitoring environmental indicators.

1.2 The Green Recovery and Reconstruction Toolkit

This is Module 2 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 to make communities stronger and more resilient to future disasters. GRRT Module 3 builds upon Module 2, focusing specifically on assessment tools that can be used to determine the environmental impact of humanitarian projects regardless of the type of project or sector. GRRT Modules 4 through 10 provide sector-specific information to complement Modules 2 and 3, including livelihoods, disaster risk reduction, water and sanitation, and greening organizational operations.

1.3 Intended Audience

This module is intended for anyone involved in the conception, design, implementation, monitoring, or evaluation of a humanitarian aid project. It is to be used by people across various sectors, including organizations working with temporary camps, permanent housing, water and sanitation, livelihoods and income generation, or any other activity designed to assist communities recovering from a disaster. Specific audiences may include project managers and designers in the field or at headquarters, construction engineers, monitoring and evaluation specialists, physical planners, contractors, logistics and procurement officers, donors, livelihood specialists, water and sanitation project designers and managers, field engineers, 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. It is for both national and expatriate staff.

1.4 Module Key Concepts

This module builds on four key concepts:

1. Disaster response and recovery projects can impact the environment both positively and negatively.
2. Disaster response and recovery projects need to be assessed and designed to ensure that environmental issues are identified, negative environmental impacts are minimized, and positive environmental opportunities are supported.
3. Monitoring of disaster response and recovery projects needs to include indicators that identify and measure achievement of or changes to for specific environment-related objectives or sub-objectives.
4. These projects need to be evaluated to determine if the environment-related actions were appropriate and what their impact was, and to draw lessons for future projects.

1.5 Module Assumptions

This module assumes that users are familiar with the project management cycle for humanitarian assistance projects; have a basic understanding of how to design, monitor and evaluate their projects and programs; and are interested in learning how to integrate environmental considerations into this process. The module recognizes a continuum of activities in support of disaster survivors from the earliest hours of emergency life-saving functions through the permanent reestablishment of communities. The focus of this module is on the recovery and reconstruction phases. However, the principles can also apply to the emergency life-saving period after a disaster; addressing environmental issues need not delay project activities. The module is intended to provide ideas for a sustainable approach to humanitarian response, and is not intended to preempt or substitute for adequate consultation when 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.

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).

SMART Indicator: An indicator that meets the SMART criteria: **S**pecific, **M**easurable, **A**chievable, **R**elevant, and **T**ime-bound.

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 Monitoring: A continuous and systematic process of recording, collecting, measuring, analyzing, and communicating information.

Project Evaluation: Systematic and impartial examination of humanitarian action intended to draw lessons that improve policy and practice, and enhance accountability.

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.

Environmental indicators for water quality are being monitored in a wetland. The results will be used to determine how projects should be adapted to reduce erosion, sedimentation, and contamination that can impact water supplies and fishing grounds. © Brent Stirton/Getty Images/WWF

2 PROJECT CYCLE AND THE ENVIRONMENT

2.1 Why Address the Environment?

Environmental issues have both direct and indirect impacts on human life and livelihoods. For example, if water sources are contaminated with chemicals such as mercury (used in mining) or pesticides (used in agriculture and aquaculture), there can be direct, negative impacts on human health. These may include poisoning, birth defects, or even death. Negative impacts are not only the result of industrialization or globalization; if clay is removed from hillsides to be used as a building material for post-disaster shelters, it can increase the risk of landslides and flooding and thereby indirectly endanger human populations. The overexploitation of natural resources, such as fish or timber, may directly benefit the fishermen or logger when he or she sells a product, but indirectly harm future generations who will need these natural resources for their own livelihoods and well-being over the long term. Humans rely on healthy ecosystems for the goods and services that are essential to human life, such as clean air, water, and the raw materials that are processed into food products, clothing, and building materials.

Environmental issues are not often addressed in a humanitarian setting. This may be due to the following reasons:

1. Planners are not fully aware of the environmental impacts of their projects
2. They may believe that the environment is of secondary importance to the goals of their project, or
3. They may believe that addressing the environment is too costly or too troublesome.

It is important to acknowledge that the humanitarian imperative to save lives and reduce suffering must take precedence over other considerations. However, the humanitarian imperative does not have to be achieved at the expense of the environment and, ultimately, of the people who depend upon its health. Humanitarian projects can serve as a platform not only for avoiding environmental degradation, but for improving environmental conditions in order to benefit people's health and livelihoods.

APPROACHES TO CONTROLLING DEFORESTATION AROUND REFUGEE CAMPS

Increased demand for fuel wood from large refugee populations can lead to shortages and scarcity. As refugees and people from local communities are forced to walk longer distances to retrieve fuel wood, the supply becomes further depleted. The search for wood rapidly changes from the relatively benign collection of dead wood to the cutting of live trees and deforestation. In areas of conflict, competition for the decreasing supply of fuel wood can create hostilities and place refugees at greater risk of attack. A similar phenomenon is also seen in association with water sources.

A typical response to this problem is to supply and distribute fuel wood from more remote or "surplus" areas. However, in some instances this approach has proven costly and relatively ineffective. Having obtained the minimum quantity of fuel wood required, refugees continue to collect wood either for additional consumption or to barter for other items. This is illustrated by the situation that arose in the Kagera camps in western Tanzania. Despite provision of US$1.2 million to supply fuel wood, deforestation by the refugee population remained well above normal (pre-refugee) levels.

A number of factors contribute to the pattern of fuel wood use, including the degree of fuel wood scarcity, the types of food refugees receive and cook, traditions, availability of improved stoves, and cultural acceptability of shared family cooking. Environmental objectives can be achieved more efficiently if, for instance, instead of fuel wood being freely distributed, the wood supplied to refugees is exchanged for their participation in environmental activities (e.g., environmental restoration work, such as tree planting). This approach has been used, with some success, in the Dadaab camps in eastern Kenya under the GTZ-RESCUE project.

Source: United Nations High Commissioner for Refugees (UNHCR). 2002. *Refugee Operations and Environmental Management: Selected Lessons Learned.* Geneva.

2.2 Scoping the Environmental Context

The environment affects humanitarian assistance projects. In turn, humanitarian assistance projects affect the environment. The environment must be considered within recovery and reconstruction activities in order to:

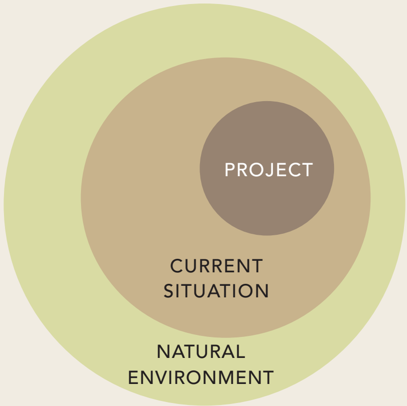
1. **Systematically detect changes in dynamic situations.** Humanitarian organizations work in very dynamic situations. Awareness of environmental issues helps build awareness of changes in these contexts. For example, environmental monitoring could detect the slow onset of a drought, which would adversely affect not only environmental factors such as vegetation but humanitarian factors such as food security.
2. **Systematically measure these changes and determine potential cause-effect relationships between a project and the environment.** In the case of a drought the impact on vegetation could lead to loss of ground cover, causing degradation of the soil, pollution of streams and rivers, and downstream flooding. This could ultimately lead to loss of food sources, starvation, and displacement.
3. **Make informed decisions regarding if and how a project should change to mitigate negative impacts on the environment and maximize positive impacts.** The ultimate project objective is a more appropriate and sustainable impact upon the people that are themselves part of and dependent upon the environment. In the above-mentioned drought, activities would need to be developed to identify alternative sources of water, and to protect the ground cover, stream channels, and different sources for food.

4. **Identify where there are specific threats to the environment and strategic opportunities to address them.** The ability to address environmental threats often depends on the timeliness with which those threats are identified. Projects designed with appropriate indicators can serve as early warning systems, providing sufficient time for agencies to mobilize resources and respond to environmental threats.

The environment is an inseparable part of the intervention context in all disasters and conflicts. Indeed, both natural and technological disasters may have major consequences for the environment and people. (Sometimes, however, natural phenomena like fires and floods are disasters only for people – not for nature.) Different degrees of human access to environmental resources (e.g., water, timber, diamonds, or oil) may result in conflict that can lead to negative a negative impact on the natural environment. Therefore, post-disaster assessments should include the identification of the environmental impact, whether direct or indirect. Sometimes this is expressed in non-environmental terminology, such as "quality of water," "available wood for cooking fuel," or "available land for kitchen gardens," all of which reflect the underlying issues of environmental quality and impact.

As Figure 1 below illustrates, the **Current Situation** occurs within the **Natural Environment**, and the **Project** occurs within the **Current Situation**. When considered as a whole, the **Project, Current Situation**, and **Natural Environment** make up the entire **Intervention Context**. It is essential to consider the role that the **Natural Environment** plays here, because the **Current Situation** (and any associated **Project**) is directly affected by the **Natural Environment**. For example, a disaster may create a temporarily high demand for building materials such as timber (**Current Situation**). Looking beyond the **Current Situation** at the **Natural Environment,** it can be seen that forest resources in the project area have been harvested unsustainably for the past decade. Therefore, in order for a **Project** to be sustainable, we may want to look for ways to minimize the use of timber and reduce demand on local forest resources.

FIGURE 1. INTERVENTION CONTEXT

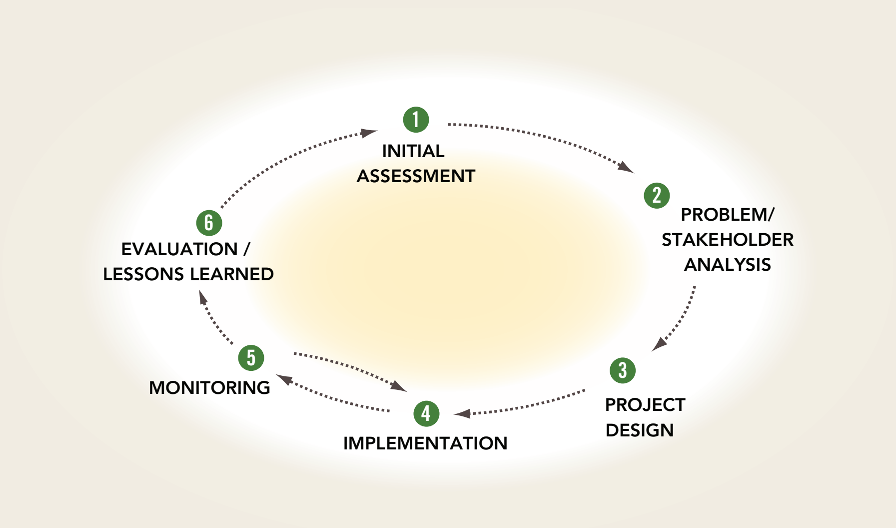


Recovery and reconstruction projects use or impact natural resources, and therefore affect the environment. To be aware of the overall impact and effectiveness of the project, organizations must understand what environmental resources are being used or impacted. This requires that they be addressed throughout the project. Thus, it is useful to develop environmental indicators that are integrated into the monitoring and evaluation (M&E) plan.

2.3 Environmental Considerations in the Project Cycle

In planning and carrying out their disaster response activities, many humanitarian agencies follow a standard project management cycle as depicted in Figure 2:

FIGURE 2: STANDARD PROJECT MANAGEMENT CYCLE

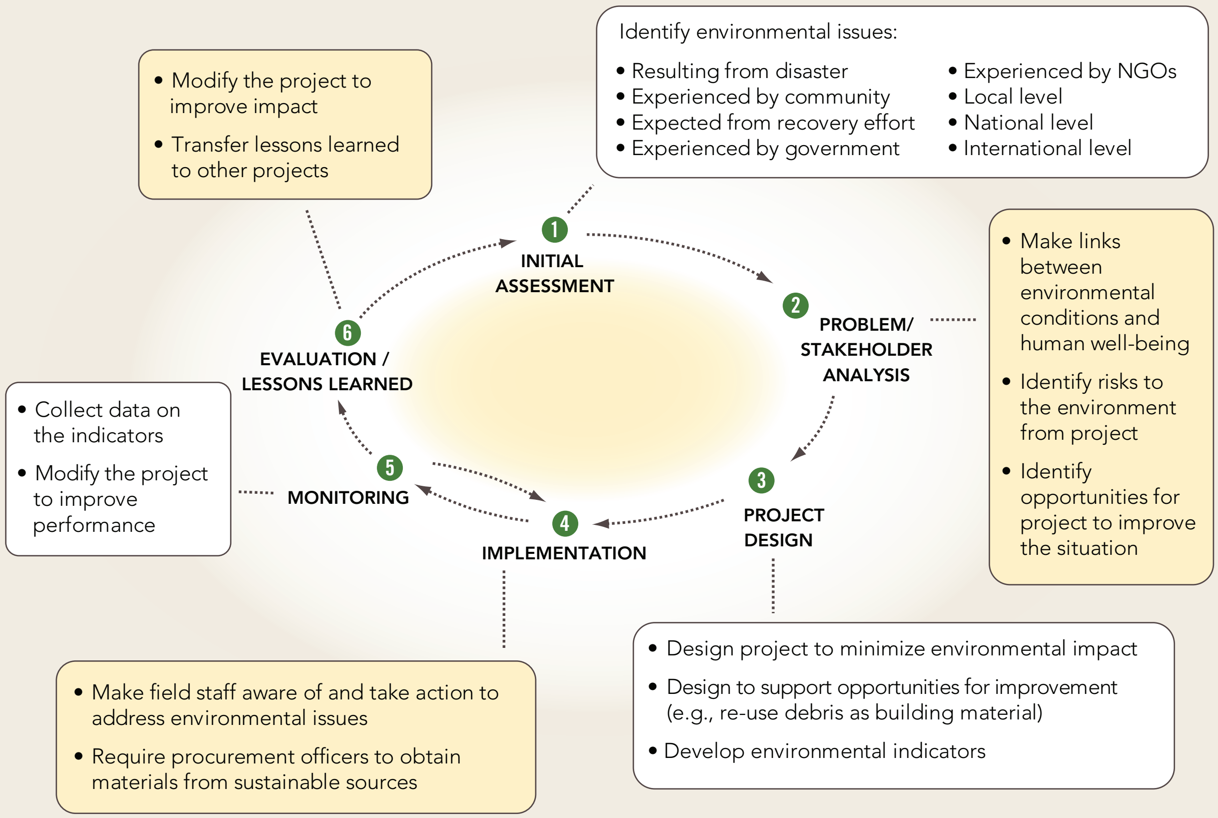


Incorporation of environmental factors into the project cycle allows organizations to better plan for and then gauge the environmental impact of recovery and reconstruction projects. Therefore, it is useful to review the key steps in a typical project management cycle.

Figure 3 provides a visual summary of the project cycle, highlighting key environmental considerations at each stage. Table 1 summarizes the key actions of the project cycle and their links to the environment.

It is important to understand that in emergency settings, the steps presented in the project cycle do not necessarily happen in an orderly sequence. For instance, implementation of the emergency delivery of food and shelter may happen before a project is fully designed. However, the general project cycle is useful in the discussions of the incorporation of environmental considerations.

FIGURE 3. PROJECT MANAGEMENT CYCLE AND ENVIRONMENTAL INTERVENTION POINTS



The initial assessment of the project context is a key opportunity to incorporate environmental considerations into the project. In a post-disaster context, an assessment seeks to identify needs, critical issues, problems, opportunities, potential obstacles, available resources, and, most important, how to address needs and improve the situation. Such assessments can and should include environmental factors. The initial assessment is an opportunity to identify potential areas where project activities may have positive or negative consequences on the environment. Literature reviews, document analysis, data collection, and various rapid and/or participatory rural appraisal tools are used during this stage. An important aspect during this phase of the assessment is identification of the environmental status or benchmark that a project planner may seek to maintain. GRRT Module 3, Environmental Impact Assessment Tools and Techniques, provides additional information on relevant assessment tools.

A stakeholder analysis is an important part of the initial assessment. The stakeholder analysis involves identifying the opinions, priorities, and concerns of key stakeholders, such as community members, government officials, NGOs, conservation environmental specialists, and donors. The stakeholder analysis is an important opportunity to incorporate environmental considerations that inform the project design by asking stakeholders to identify key environmental factors. These may include any current environmental problems (e.g., drought, desertification) and potential threats that humanitarian intervention may pose to the environment (e.g., invasive species), as well as the current fragile environmental states that a project should consider (e.g., delicate mangrove systems that may be harmed by the project's activities). It is important to engage relevant environmental actors such as environmental NGOs, government officials such as ministries of natural resources and environment, and others familiar with and working with relevant environmental issues in that particular area. Conservation and environmental specialists operating in an agency's intervention area will be best equipped (and likely keen) to offer specific advice regarding how humanitarian activities will impact the environment based upon the project's activities and the geographic area in which the agency is working.

The project design, implementation, monitoring, and evaluation stages build upon the information and analysis from the assessment stage. This will be discussed in the forthcoming sections of this module.

TABLE 1. PROJECT MANAGEMENT CYCLE ACTIONS AND LINKS TO ENVIRONMENT

STEP	ACTION	DEFINITION	LINK TO ENVIRONMENTAL MONITORING
1	**INITIAL ASSESSMENT**	Initial assessments provide an understanding of the emergency situation and a clear analysis of threats to life, dignity, health, and livelihoods to determine, in consultation with relevant stakeholders, whether an external intervention is required and, if so, what response is appropriate	The assessment needs to explicitly include environmental issues such as water quality, proximity to protected habitats, dependency on locally obtained fuel wood, farming systems, etc.
2	**PROBLEM / STAKEHOLDER ANALYSIS**	Identify the problem, consider alternative approaches to addressing the problem, and prioritize solutions.	Interpreting assessment results needs to explicitly include the analysis of observed impact on the environment or possible risks to the environment, as well as identify opportunities to improve environmental conditions.
3	**PROJECT DESIGN**	Determine what is required to implement the solution in terms of human and material resources, including work plan and project inputs. This also includes identifying logframe objectives, assumptions, and indicators, as well as the means to measure them.	The design of activities to implement a project needs to consider including sub-activities to mitigate environmental damage or support opportunities for sustainable practices.
4	**IMPLEMENTATION**	Put the plan and related activities into effect, resulting in outputs and outcomes.	Identify the outputs that address environmental goals. Take action to ensure that plan implementation (e.g., construction of a school) does not result in negative environmental impacts.
5	**MONITORING**	A continuous and systematic process of recording, collecting, measuring, analyzing, and communicating information.	Use environmental indicators in project monitoring.
6	**EVALUATION**	Systematic and impartial examination of humanitarian action intended to draw lessons to improve policy and practice and to enhance accountability.	Use environmental indicators in project evaluation.

2.4 Constraints to Addressing Environmental Issues

Incorporating environmental factors into the project cycle is not always easy. One of the more formidable challenges is misunderstanding of and resistance to such initiatives among project managers and key stakeholders who may argue that addressing environmental issues is too time consuming, too costly or simply not important. This can be addressed by carefully explaining and demonstrating the benefits of incorporating the environment into the project cycle. This module and the others in this GRRT series provide resources to address this challenge and build understanding of and ownership for environmental issues.

Other important challenges to consider include the following:

Lack of data: It can be difficult to establish environmental baselines, norms, and thresholds, especially in pre- and post-disaster situations. It can also be difficult to compare environmental data, and, depending on the source of data, it is often necessary for project planners to collect data.

Time: Environmental change is long term and may not be measured within a project's life span.

Scale: Often, environmental impacts and change occur beyond a project area or may be due to factors outside the project area.

Cause-effect: It is not always possible to determine definitive "cause and effect" relationships, since factors other than the studied intervention can contribute to the measured changes (attribution).

However, none of these constraints negate the importance of addressing the environment in order to improve outcomes for people and communities recovering from disaster. Furthermore, these challenges are also encountered in data collection and analysis for other intervention areas, whether related to the environment or not. Therefore, there are methodological approaches and tools that can help to address and minimize these constraints, as discussed further below.

This image shows an environmental monitoring specialist conducting a site visit at a dump site where medical waste is being improperly disposed of at a newly constructed health center. Following the 2004 Indian Ocean tsunami, several new health centers were constructed in Sri Lanka. This is an example of how environmental problems, such as solid waste management, can persist even after building construction ends. Project planners must consider the longer-term consequences of their humanitarian interventions during the early project design phase. © Vimukthi Wiratunga

3 INTEGRATING THE ENVIRONMENT INTO PROJECT DESIGN

The project-design phase is the period in which the project designer identifies and prioritizes needs and issues, and envisions how and where an organization may most effectively intervene. During project design, the task is to identify the problem the organization is interested in addressing, as well as all of the direct and indirect contributing factors to that problem, in order to develop an approach to addressing the problem. In a logframe, the approach is usually expressed in terms of "project objectives," which identify the overall goal and the intended results to achieve it.

Logical Framework (Logframe): There are different frameworks used to design and manage a project. This module adopts the vocabulary of the logframe table (goal – outcomes – outputs – activities) that is presented by the American Red Cross and Catholic Relief Services in *Monitoring and Evaluation Planning: Guidelines and Tools*. Logframe terms are defined as the following:

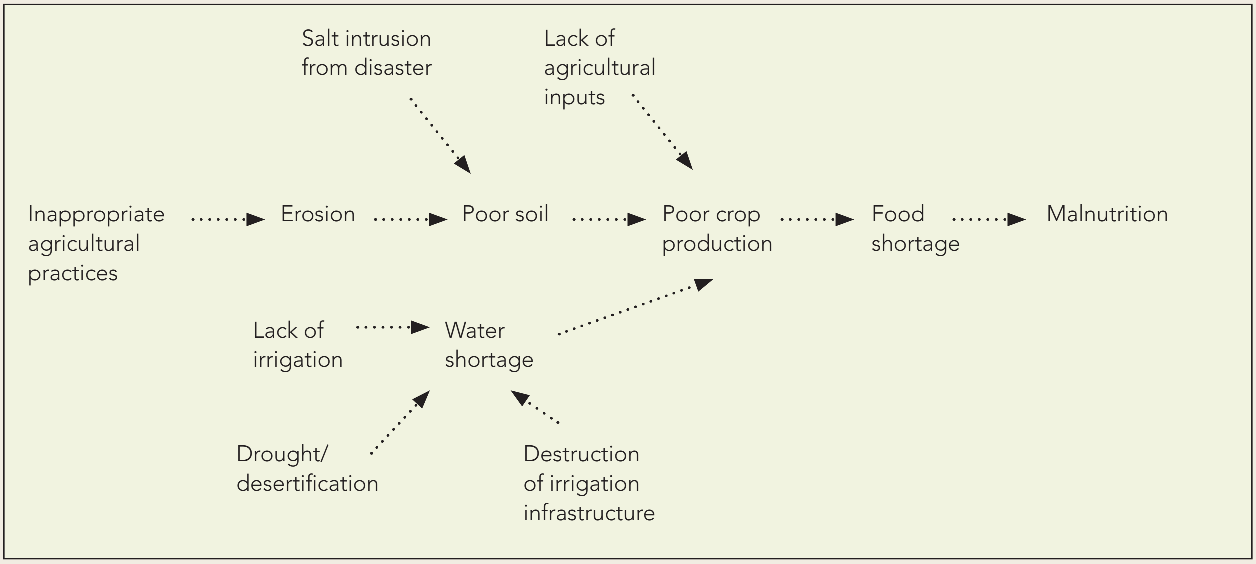
- **Goals** are simple clear statements of the impact or results to be achieved by the project.
- **Outcomes** are a set of changes needed to achieve the goal (usually knowledge, attitudes and practices).
- **Outputs** are products or services needed to achieve the outcomes.
- **Activities** are efforts needed to produce the outputs.

Oftentimes, the greatest environmental opportunities occur at the project design phase. For example, the decision to use construction debris as a building material has the potential to greatly reduce demand on local natural resources and thereby help communities achieve their own sustainability objectives. Similarly, the inclusion of household level composting of organic waste as part of shelter construction can reduce the amount of waste material being produced. The application of compost as fertilizer in home gardens can result in a healthier environment and reduce the need to purchase fertilizer.

3.1 Causal Analysis

Causal analysis is the process of using data from the initial assessment to identify key factors to change in order to improve conditions. The causal analysis informs the selection of a project's goals and the desired changes they seek to realize. Figure 4 illustrates how environmental factors relate to the causal analysis. It shows how the project context and the interrelated problems are embedded in the environment and are therefore affected by and, in turn, affect the environment. An example of a problem that may have emerged from this analysis is malnutrition following a drought. At first glance, one may think that the environment has little to do with malnutrition; however, a closer look at the post-disaster situation reveals several environmental issues that contribute to malnutrition.

FIGURE 4. EXAMPLE OF CAUSAL ANALYSIS INCORPORATING ENVIRONMENTAL FACTORS



The above causal analysis shows the following:

1. Poor soil fertility is contributing to malnutrition. This finding provides an opportunity to improve malnutrition rates by improving environmental conditions (for example, rehabilitating soil that has been contaminated by salt intrusion from a disaster).
2. Water is currently insufficient for good crop production. Stakeholders (during the stakeholder analysis) reported that drought and desertification are an issue that will directly affect an agriculture-based program and should therefore be considered in the analysis. A cycle of drought and inappropriate natural resources management practices, coupled with climatic change, may lead to desertification.

This example illustrates a causal chain in which malnutrition is caused by a food shortage, which is caused by poor crop production, which is caused by a combination of factors including lack of inputs, poor soil, and water shortage. Poor soil is caused by soil erosion and salt intrusion, which are caused by inappropriate agricultural practices. Water shortage is caused by lack of irrigation, drought, and desertification.

3.2 Plan the Response: Developing the Strategy

After identifying the problem(s) to address, it is possible to identify the overall goal and key outcomes of the project. These higher-level objectives are linked to the problem(s) identified in the causal analysis. The next step is to identify the outputs needed to attain the outcomes, and then the activities needed to achieve the outputs.

The logical framework approach helps to clarify how changes in conditions will lead to attainment of the overall goal. Each level in the logframe – goal, outcomes, outputs, and activities – involves identification of the needed results to realize the changes and the impacts necessary to achieve the overall goal. That is, the project designer can describe an improvement in the "problem" or "condition" identified in the causal analysis through a series of "if – then" statements. This is where the strategy is developed and the project comes to life. For example, if the problem of soil erosion is addressed through the introduction of better management practices (*activity*), then farming will become more sustainable (e.g., will minimize slash and burn agriculture) (*output*), more topsoil will remain within agricultural areas (*outcome*), the soil water-holding capacity will increase (*outcome*), crop yields will improve (*outcome*), more food will be available (*outcome*), and the incidence of malnutrition will be reduced (*goal*).

TABLE 2: TEMPLATE FOR LOGICAL FRAMEWORK

PROJECT OBJECTIVES	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
GOAL			
OUTCOME			
OUTPUT			
ACTIVITIES			
INPUTS			

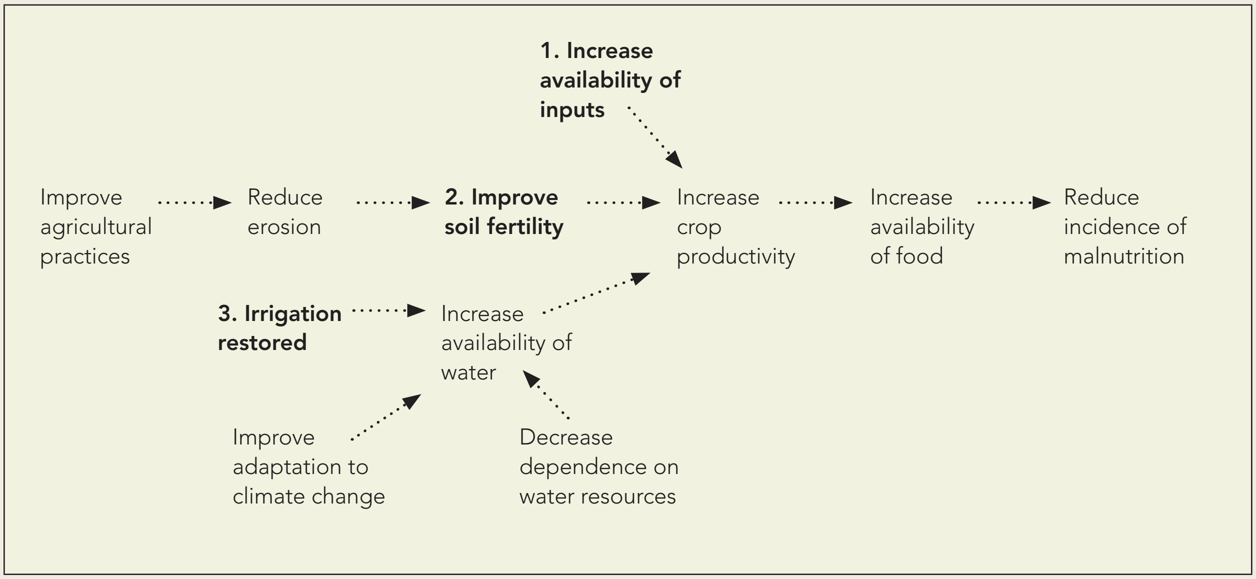
Where the Environment Comes In

When the project designer identifies the root cause of the problem he or she also identifies opportunities for points of entry for solutions. For example, the project designer can solve the problem of malnutrition by importing more food. But that doesn't address the underlying cause of poor crop production. The activities therefore need to address the causes of poor crop production, and may take the project designer through the intermediary causes all the way back to the root cause of inappropriate agricultural practices.

The next step is to identify activities that address the specific problems in this causal chain. This requires the identification of all the potential inputs and processes that go into implementing those activities. Here is where environmental impact considerations enter the picture. The project manager should consider the potential environmental impacts for each of the identified activities. GRRT Module 3, Environmental Impact Assessment Tools and Techniques, provides specific details on how to conduct these assessments. This step will be very helpful in identifying the potential negative impacts on the environment of the proposed activity. In addition, the environment is contributing to the current state the project is trying to improve, and therefore needs to be monitored and considered in the project design. Project designers may identify opportunities to improve environmental conditions in order to achieve the overall goal of the project.

Building upon the initial causal analysis, Figure 5 illustrates objectives for each problem area identified.

FIGURE 5. EXAMPLE ENVIRONMENTAL OBJECTIVES FOR THE CAUSAL ANALYSIS



The following three activities have been identified from the above model:

1. INCREASING THE AVAILABILITY OF AGRICULTURAL INPUTS

		POTENTIAL ENVIRONMENTAL IMPACTS
ACTIVITY	Supply seeds and tools	Spread of invasive/non-native species
OUTPUT	Increased farming activity	Destruction of forest for agricultural uses
OUTCOME	Increased crop yields	None

2. IMPROVED SOIL FERTILITY

		POTENTIAL ENVIRONMENTAL IMPACTS
ACTIVITY	Supply fertilizer	Increased energy requirements and chemical pollution from the processing, transportation, and use of chemical fertilizers (note: can be mitigated if organic fertilizer is used)
OUTPUT	Increased application of fertilizer	Health impacts on farmers if chemical fertilizers are used
OUTCOME	Increased soil fertility	None

3. IRRIGATION RESTORED

		POTENTIAL ENVIRONMENTAL IMPACTS
ACTIVITY	Supply materials to restore damaged channels (shovels/ wheelbarrows)	None
OUTPUT	Digging channels	Improper disposal of excavated materials (e.g., in wetlands); disruption of water flow and water quality in rivers
OUTCOME	More water provided to fields	Depletion of freshwater resources

ADDRESSING THE ENVIRONMENT IN POST-TSUNAMI RESETTLEMENT IN SOMALIA (2004)

In Xaafuun, Somalia, a team of experts from UN-HABITAT determined that the best strategy for reducing health and livelihood risk for people living along the coast was to move houses and living spaces away from the seasonally shifting sand dunes in the aftermath of the destructive tsunami. Strong, sand-laden winds would regularly hit the village during the monsoon season, often burying structures and causing health problems, particularly for women, children, and the elderly. After careful integration of development goals with post-disaster reconstruction, UN-HABITAT and its partners outlined plans that would allow for the restoration of fragile dune habitat adjacent to the damaged settlement area. Reconstruction plans called for the creation of a buffer zone of public space between human settlements and the dune. This in turn allowed for stabilization and recovery of the natural dune ecosystem. Other components of the project that addressed the environment included recycling of construction materials and replanting. A full case study of Xaafuun is contained in Annex 3 of GRRT Module 4, Green Guide to Strategic Site Selection and Development.

Source: Decorte, Filiep. 2008. *Paving the Way for Sustainable Development in a Post-Disaster Situation – the Case of the Tsunami-Damaged Village of Xaafuun North Eastern Somalia*. Nairobi: UN-HABITAT.

Now that the general environmental condition has been assessed with respect to the project, project designers know WHAT to be on the lookout for in terms of potential environmental impacts.

FAILED ENVIRONMENT FAILED PROJECT

Sometimes disaster or emergency response projects fail to integrate the environment into project planning and implementation, ultimately causing negative effects for the project **and** the environment. An example of this would be a project that fails to consider the environmental impacts of house rebuilding. If the building materials have not been sustainably sourced, local construction of houses is likely to lead to massive deforestation. With destruction of the forests, livelihoods based upon non-timber forest products are destroyed as well. Water resources may also be adversely affected, since the extraction of the natural protection that the forest once provided vanishes and sediment in water sources builds up.

3.3 Steps for Integrating the Environment into Project Planning

The following are changes project designers can make to a project monitoring system to better integrate environmental issues. Although they are listed as "steps," they do not have to be completed in the order listed below. Also note that if one of the steps has been missed, **environmental concerns can still be effectively addressed at any stage in the project cycle.**

Step 1. Adapting the Goal Statement to Include Environmental Conditions

Every aspect of a project builds from its overall goal. When the environment is considered in the overall goal of a project, the environment should be automatically considered in all other aspects (such as activities and outputs). If environmental factors are considered in the goal statement, then it will be easier to integrate environmental monitoring into many facets of the project.

However, even if the environment is not reflected explicitly in the overall goal, environmental concerns can still be incorporated into a project at the other levels of the project hierarchy, or even through a designated outcome focusing just on environmental considerations (e.g., monitoring key environmental indicators).

Following the previous drought and malnutrition example, if the goal is to *improve food security of vulnerable populations,* it will be difficult to incorporate activities, outputs, and related indicators that address the environment, because the environment is not a clearly defined aspect of this goal. As a result, environmental issues such as *depletion of freshwater resources, introduction of invasive species*, and *increasing forest conversion to agriculture* will not be explicitly accounted for.

Adaptation of the goal statement's wording is a subtle but powerful tool that can be used to integrate environmental issues into the project strategy, plan, and monitoring activities. Adaptation of this statement so that it considers environmental issues will enable project designers to address these issues throughout every aspect of the project.

Here the goal statement has been modified to incorporate environmental concerns: *Improve food security of vulnerable populations* ***without compromising integrity of local natural resources.*** Now that the overall goal addresses the sustainability of local natural resources, the related activities, outputs, and indicators can directly address those issues.

Since the addition of the "environmental clause" creates a compound goal, project designers may opt to capture the environmental goal as a secondary goal or as a lower level outcome.

Step 2. Adapting the Outputs to Reflect Environmental Priorities

In order to achieve the outcomes and overall goal of a project, the project designer must identify a number of outputs. By addressing environmental conditions in the output statements, the manager can achieve the following goals:

1. Highlight environmental considerations to inform project design and implementation
2. Identify the environmental priorities, elements, and factors that should be measured in indicators

As shown in Figure 5, outputs could include:

- *Seed-exchange networks established to serve target communities (the indicator could be the number of communities participating in a seed-exchange network)*
- *Intercropping techniques implemented*
- *Irrigation ditches or drip irrigation established*

While these actions are directly related to the identified *goal* (improve food security of vulnerable populations in post-conflict areas), they do not address related environmental issues. Because the clause "without compromising integrity of local natural resources" has been included in the goal (or sub-goal) statement, this element must be acknowledged in the outputs. This can be achieved by improving the statements as follows:

- *Established seed-exchange networks serving target communities,* ***distributing only noninvasive local seeds.***
- *Implemented intercropping techniques* ***without use of harmful chemicals.***
- *Established irrigation ditches or drip irrigation,* ***increasing availability of sustainably sourced water for crop production.***

Step 3. Integrating the Environment into the Project Activities

Activities are carried out with an expectation that planned outputs will be achieved; so once the desired environmental results have been defined the designer is ready to construct the project activities. Since the outputs have been revised to include environmental considerations, the project activities may need to be adapted. For instance, if the original outputs included *implement intercropping techniques,* without the added environmental clause, environmental damage could have resulted. For example, project designers may distribute fertilizers that contaminate the local water supply and disrupt the ecosystem.

This is the benefit of reformulating goal statements to consider the environment: it leads the project team to reconsider and adapt activities so that they are more supportive of the environment. Because the outputs incorporate environmental elements into the results, those elements are integrated into project activities, which may change accordingly:

- *Train members of seed-exchange networks on how to identify noninvasive seeds.*
- *Train local farmers in intercropping techniques that utilize only environmentally sustainable fertilizers.*
- *Plan, map, and construct appropriate small-scale irrigation systems where sufficient water sources exist.*

Step 4. Considering the Role of Environment in Assumptions and Risks

A critical aspect of the project design is the identification of assumptions. Assumptions are external conditions necessary to achieve the project goals, outcomes, outputs, and activities, but beyond the control of the project. Assumptions are actually risks stated as positive statements, i.e., what needs not to happen in order for the project to succeed. For example, if an activity is to import sustainably grown timber, there is a risk that inflation and rising fuel prices may increase transport costs beyond the budget of the project. This can be restated as an assumption: "Transport costs will remain within the budget of the project." Therefore, it is important to identify assumptions so that they can be monitored and contingency plans can be developed.

Assumptions and risks should include the consideration of environmental factors. This is particularly important because environmental factors (e.g., water quality, presence of hazardous materials, and availability of natural resources) need to be regularly monitored. The identification of key risks begins at the assessment stage, and it is important to list potential risks throughout the assessment and design stages of a project. For instance, the stakeholder analysis discussed earlier identified drought and desertification as environmental risks that may influence a project focused upon agricultural production. These can be restated as assumptions to be monitored.

The identification of risks not only informs conditions to monitor, but can inform the actual project design and objectives. For instance, if an environmental risk for a water provision project is that the water table may drop due to increased consumption, then the project may want to include a component that limits household water consumption (i.e., user fees). In the crop production example discussed earlier, if water scarcity is identified as a risk, then the project manager may select a more efficient irrigation system (e.g., drip irrigation) to conserve water resources.

Step 5. Integrating Environmental Indicators into Project Monitoring

Once environmental factors are incorporated into the project's goals, outcomes, outputs, and activities, the next step is to identify or develop environmental indicators to monitor the environmental aspect of the project. These indicators will help monitor progress toward objectives and identify unintended consequences and areas in which a project may need to be modified. Environmental indicators follow the same standards as do indicators for other sector areas. Primarily, they should be SMART:

1. **Specific:** The indicator clearly and directly measures a specific result for the goal, output, or outcome it is measuring.
2. **Measurable:** The indicator is unambiguously specified so that all parties agree about what it covers and so that the indicator can be measured in practical ways.
3. **Achievable/Available:** The measurement of the indicator is feasible and realistic, within the resources and capacity of the program, and the data are available.
4. **Relevant:** The indicator provides appropriate information that is best suited to measuring the goal, output, or outcome.
5. **Time-bound:** The indicator specifies the time frame during which it is to be measured.

Here is an example of a SMART indicator for measuring whether an agricultural activity is sustainably using water: *the number of liters of water per hectare used during the farming season pre- and post-intervention, as compared to freshwater availability.*

Environmental indicators can measure each level in the logframe:

- **Inputs indicators** measure resources used for the activities, e.g., *Number of kilos of native, local seeds distributed.*
- **Output or process indicators** measure the activities pursued to achieve the outputs, e.g., *Percent increase in area of farmland planted with native, local seeds.*
- **Outcome or impact indicators** measure the key changes in the project necessary to achieve the outcomes and goal, e.g., *Percent increase in metric tons of crop yield* or *number of people whose nutrition status improved to an acceptable minimum.*

Often, there are industry standard indicators that can help in the identification of SMART indicators for the project's objectives. These indicators can be useful not only because they will save time, but because careful thought has gone into their development, and since they are recognized in the industry, there may be secondary data on them for the project area. The following is a list of predefined environmental indicators that measure common environmental issues associated with various domains of humanitarian activity.

TABLE 3. PREDEFINED ENVIRONMENTAL INDICATORS

SECTOR	COMMON EFFECTS OF HUMANITARIAN ACTIVITIES ON THE ENVIRONMENT	INDICATOR (NOTE: THESE ARE INTENDED TO BE GENERAL GUIDANCE INDICATORS THAT MAY BE TAILORED TO THE PROGRAM AND MADE SMART)
WATER AND SANITATION (SEE GRRT MODULE 7)	Increased stress and demand on existing water resources	• Change in supply/quality of freshwater • Separate water points for humans and livestock • Latrines and fenced livestock located downstream from water sources
	Decrease in water quality	• Dirty water disposal separate from clean water supplies • Incidence of waterborne diseases such as diarrhea, pneumonia, and typhoid decreasing • Incidence of skin disease decreasing
LIVELIHOODS (SEE GRRT MODULE 8)	Presence of toxic chemicals, or fertilizer or pesticide use	• The purchase and use of chemical pesticides classified by WHO as being in toxicity classes 1A and 1B is discontinued. • Animal manure is recycled for use as fertilizer. • Inorganic fertilizers are used. • Evidence exists of pesticide/fertilizer runoff into water supplies.
	Loss of soil fertility or erosion	• Agricultural activities are taking place on slopes steeper than 20°. • Rainwater/irrigation water runoff is controlled. • Crops are rotated regularly. • Livestock carrying capacity is determined. • Measures to mitigate erosion have been implemented.
	Unsustainable resource use (e.g., fish extraction, fuel wood collection)	• Change in extraction rate. • Agricultural land is allowed to lie fallow. • Environmentally sustainable local agricultural activities are practiced.
SHELTER / CONSTRUCTION (SEE GRRT MODULES 4, 5, AND 6)	Land degradation (loss of forest, mangrove, or wetland)	• Forest products are harvested at a rate that exceeds replacement capacity. • Vegetation important for erosion control, windbreaks, or shade is being protected. • Areas prone to soil erosion have been identified. • A drainage network has been constructed. • Construction project has resulted in the draining of wetlands or other habitats.
	Unsustainable material resource use (e.g., sand, timber)	• Change in extraction rate of resource (sand/timber).

SECTOR	COMMON EFFECTS OF HUMANITARIAN ACTIVITIES ON THE ENVIRONMENT	INDICATOR (NOTE: THESE ARE INTENDED TO BE GENERAL GUIDANCE INDICATORS THAT MAY BE TAILORED TO THE PROGRAM AND MADE SMART)
HEALTH (SEE GRRT MODULE 7)	Increased hazardous waste production, inappropriate storage of hazardous waste	• Change in amount and type of hazardous waste produced. • Health of staff and local population.
	Groundwater contamination from health-related products and waste	• Change in water quality.
LOGISTICS (SEE GRRT MODULE 5)	Energy and fuel consumption	• Change in fuel consumption • Distance from where supplies are procured • Fuel storage tank leaks
	Pollution	• Incinerators are used for disposal of hazardous materials. • Procurement strategies favor packaging without metal bands. • Cardboard/paper materials are recycled or composted.
	Goods procurement is unsustainable	• Quantity of materials originating from unsustainable sources • Environment-friendly procurement policy exists

Some donors require the use of their own predetermined set of indicators as a condition of project funding. One way to address this issue is to incorporate environmental criteria into the indicator **definition**. For example, a donor may require the following indicator: Percent increase of farmland planted. The project designer may choose to define this indicator in such a way that a piece of land would not be counted unless it was planted with native, local seeds. In fact, the project designer could further specify what types of seeds and farming techniques must be used so that the piece of land can be considered successfully "planted."

All logframes or other project plans should be accompanied by an M&E plan that describes exactly how the data will be collected, and gives more detail on these indicators are defined. As the following indicator matrix from UNHCR illustrates (Table 3), it is important to not only identify an indicator but to have clear guidelines for the measurement of the indicator.[1] The goal for this indicator in Table 3 is stated as *An overall goal of domestic energy-related programs should be to reduce the amount of fuel used.* Five clear guidelines are provided to clarify the monitoring objectives, and three methods are given for measuring the indicator. The indicator is expressed as *Percent Reduction in Average Fuel Consumption*, and a scorecard is included for rating the relative success of objective achievement.

1 United Nations High Commissioner for Refugees. 2002. *Environmental Indicator Framework: A monitoring system for environment-related activities in refugee operations.* Geneva.

TABLE 4. INDICATOR GUIDANCE: PERCENT REDUCTION IN AVERAGE FUEL CONSUMPTION.

This example from UNHCR demonstrates how data can be collected to determine the status of an indicator. In this case, the indicator is "percent reduction in fuel consumption." The guidance explains how the indicator can be measured and given a performance score of 0-5.

REFERENCE #	C3
INDICATOR TITLE	REDUCTION IN FUEL CONSUMPTION
INDICATOR TYPE	Output
RATIONALE AND OBJECTIVES	The overall goal of domestic energy-related programs should be to reduce the amount of fuel used. Solutions such as the use of fuel-efficient stoves and energy-saving practices are designed to reduce pressure on the environment and improve the well-being of refugees by relieving them of a high burden of fuel collection. It is important to try to encourage the maximum possible number of people to use fuel-efficient practices and devices, and to ensure that those who are doing so are satisfied with the process.
GUIDELINES	1. Clear and measurable targets must be established at the outset regarding the number of families (refugees and villagers) the project intends to reach – for a given time frame. 2. Baseline data on the quantity of fuel consumed (i.e., per household per month, per person per week, per camp block per month, etc.) must be collected so that the percent reduction in fuel consumption can be measured. 3. Emphasis should be on reaching the maximum number of people and on ensuring that those interested in the techniques and principles are convinced of their worth and continue to use them over a long period of time. Follow-up support is essential. 4. Special attention should be given to disadvantaged groups, such as single-headed households, the elderly, and the disabled. 5. Particular attention should be given to families that begin to use fuel-efficient stoves and practices only to later abandon them.
METHODS TO BE APPLIED	1. Spontaneous, random sampling by camp enumerators, project teams, and outreach officers 2. Wood intake surveys at camp level – frequency and time spent gathering wood, weight of wood collected, type of wood, etc. 3. Regular fuel wood weighing at household level – pre-selected homes and random sampling
DATA INTERPRETATION	1. Changes in the number of households using fuel-efficient stoves and practices 2. Alterations in the amount of fuel used at household and camp level, over time

C3 REDUCTION IN FUEL CONSUMPTION

PERCENT REDUCTION IN AVERAGE FUEL CONSUMPTION	Score
0-4	0
5-9	+1
10-19	+2
20-34	+3
35-50	+4
>50	+5

Note: if no target group objective has been established, the overall score is zero.

Step 6. Integrating the Environment into Project Evaluation

When a humanitarian assistance project has been completed, it is the implementing organization's responsibility to conduct an evaluation to determine if it met the project's objectives and to identify the project's impacts. For longer projects, an annual or midterm evaluation may also be conducted. Therefore this section is concerned with the *additional* elements that a focus on environmental impact may bring to project evaluation.

This module has thus far focused on ways to design projects that better address environmental issues associated with the project intervention. **Project monitoring** includes the collection of data that involves the progress made against the indicators. **Project evaluations** use this data to form the basis for identification of and judgments about the relative positive and negative impacts on the environment, and related consequences for the beneficiary population. The differences between monitoring and evaluation are summarized in Table 5.

TABLE 5. THE DIFFERENCES BETWEEN MONITORING AND EVALUATION IN HUMANITARIAN ASSISTANCE

	MONITORING	EVALUATION
DEFINITIONS	A continuous and systematic process of recording, collecting, measuring, analyzing, and communicating information	Systematic and impartial examination intended to draw lessons to improve policy and practice and to enhance accountability
OBJECTIVES	To collect information to inform management decisions and eventual evaluation of the intended program	To collect information to determine the general relevance, effectiveness, efficiency, impact, and sustainability of a project or program A formative or midterm evaluation is used to inform ongoing implementation and decision making. A final evaluation is used to inform future projects.
MAIN USERS	Internal managers, evaluators, donors	Wider groups of decision makers and stakeholders, including donors
TIMING	Continuous during implementation	Occasional, before, during, and/or after implementation

With environmental indicators, project designers will be attempting to measure impacts on the environment, including whether the project was able to minimize environmental impact. Therefore, as discussed in the previous section, it is useful to establish targets or thresholds from which to compare a project's intended, or unintended, changes. Targets are the intended changes for which a project strives, while thresholds indicate any substantial declines in environmental quality.

It can be difficult to absolutely determine positive or negative impacts. For example, it is not easy to quantify or measure what constitutes a substantial improvement in soil fertility. Similarly, some environmental indicators can be affected by seasonality and timing. Water quality measurement, for example, may change between wet and dry months. In such instances, it is useful to have the assistance of technical expertise in the field to determine if the thresholds and targets for the environmental indicators measured for monitoring are appropriate and have been met.

The evaluation report should include clear statements that inform the reader of the project's impacts in the environment – positive and negative, intended and unintended. The evaluation report should also relate the environmental impacts to the resultant impacts on the project's objectives, and ultimately on the target population. This information needs to be presented in the evaluation findings, discussed in the evaluation conclusions and lessons learned, and used to create concrete recommendations to inform environmental conservation in future programming.

An evaluation should specifically determine the following:

- **If** the project addressed the environment
- **If** the project had an environmental impact
- **What** effect the environmental impact had on human populations
- **What** was the extent of the impact
- **What** lessons can be learned from the environmental impact to inform future programming

The Terms of Reference (ToR) is an extremely important tool for ensuring that environmental issues are addressed in the planning, implementation, and monitoring of the project. The ToR for an evaluation should include these key objectives, and should specify the appropriate expertise required to make observations about the environmental linkages in the sector. Project planners should consider adding environmental specifications to the ToRs and contracts of their consultants and contractors.

3.4 Methods and Tools to Monitor Environmental Effects

The previous section discussed how to develop environmental indicators and how to integrate them into the project management cycle.

This section briefly presents the methods and the sources used to obtain the data required to determine the status of the indicator.

The GRRT approach does not require the adoption of new methods, but rather requires adaptation of existing methods to include environmental indicators. Various tools and methods can be adopted for use in monitoring environmental indicators, including:

- Comparison of the project status to the project plan as described in a logframe, workplan, budget, and staffing table
- Project outputs at the current stage of the project
- Before and after (or pre/post) comparisons of environmental conditions
- Rapid rural appraisal tools
- Interviews
- Remote sensing[2]
- Household surveys
- Market surveys
- Production/consumption data
- Direct observation (and measurement)
- Physical testing/sampling (soil and water)

Some tools and methods that have been developed specifically for monitoring environmental indicators include the following:

- **Environmental Report Card:** The Report Card is introduced in the GRRT Module 3, *Environmental Impact Assessment Tools and Techniques.* It provides a score of "Superior," "Adequate," or "Deficient" based on a project's environmental performance. Improvement or decline in the overall score of a project can serve as an indicator of the overall environmental performance of a project.[3]
- **Environmental Stewardship Review for Humanitarian Aid:** This is an expanded version of the Report Card that is used at the beginning of the project design phase in order to determine what environmental issues may be associated with the proposed project. It also includes suggestions on how to determine what the environmental impacts are likely to be, as well as how to mitigate these impacts.
- **UNHCR Environmental Indicator Framework:** This handbook is designed to help field staff and managers working in refugee and related situations apply a basic system of monitoring and evaluation to environment-related activities through the use of indicators.

Monitoring for environmental indicators can also be facilitated by coordinating with other organizations that are collecting data, e.g., UN agencies and government ministries. Of course, when using data that have not

---

2 Remote sensing provides digital models of the earth's surface using special cameras on airplanes or satellites. It's increasingly used in the humanitarian field for project planning and monitoring, with useful applications for environmental monitoring.

3 The Environmental Report Card, the Environmental Stewardship Review for Humanitarian Aid, and the UNHCR Environmental Indicator Framework are included on the CD of resources for this module.

been collected by the project designer (secondary data), it is critical to make sure the data are relevant and reliable for the project's needs.

In the previous section, it was proposed that environmental indicators should be developed using the basic standards of SMART: Specific, Measurable, Achievable, Relevant, and Time-bound. Of these standards, the process and methods of monitoring focus on the task of measuring the indicators. **Methods for measuring environmental indicators** are no different than those used for any other indicator for any other indicator. Methods to measure indicators should be:

- Accurate
- Reliable
- Cost-effective
- Feasible
- Appropriate
- Timely

The monitoring methods should help a monitor to measure what needs to be measured in the most efficient, cost-effective, and reliable manner. The more costly and complicated it is to measure environmental indicators, the less likely it is that the measurements will be done.

Often, there are indicators that are already being measured by the project that can double as environmental indicators. For instance, one could be *Quantity of water provided to rural farmers via irrigation system.* In this example, the project designer may already be studying this information to see how much of a service the project is providing farmers. The water quantity information can also be used to monitor impact on that water resource. If withdrawals are greater than replenishment, then the extraction rate is unsustainable. The same indicator can be used to monitor project performance as well as environmental impact.

Environmental indicators may also be measured along with other monitoring mechanisms. For instance, if the project designer is conducting household surveys to evaluate beneficiaries' food security, he or she may also note in the survey whether or not the household is actively composting. This has no added cost and can still help with the monitoring of environmental indicators.

Finally, remember that the use of reliable and relevant secondary data can go a long way toward reducing data-collection costs, not to mention reducing the burden on communities from which data are collected.

3.5 Analyzing the Data for Evaluation

It is not enough to collect the data. Data must be analyzed and interpreted to evaluate the project and inform project management decisions. In relation to the environmental factors measured in the project, a good starting point is to determine what is "appropriate," what is an "improvement," and what is "degradation," and to use that information to make comparisons with changes that can be attributed to the project. Environmental changes related to the project can be compared with:

- **Baseline:** What was measured at the beginning of the project.
- **Threshold:** The tolerable limit for negative impacts.
- **Target:** The minimum desired level of positive impact.
- **Norm:** What the "usual" state is.

- **Before-after:** It is often difficult to compare pre-disaster with post-disaster conditions, but this comparison may be possible if a pre-disaster baseline is obtained.
- **Impact (comparison to control):** Compare similar areas with and without intervention; this is much easier to do in the intervention time frame of most humanitarian efforts.

Data analysis can be enhanced through communication with key stakeholders who live in the project area, or who are for some other reason (e.g., a local scientist) familiar with the environmental norms and how and why they have changed.

Tools like remote sensing are making it increasingly feasible to look at befores and afters and to gather a greater understanding about what the norm is or was.

Again, it will be helpful to have the input of experts familiar with the project context and with environmental issues. Even if the project designer knows, for instance, what the pre-disaster state is, he or she may not know the following:

- If that state is good or bad
- If a particular change in state can be considered substantial and outside of the normal range
- If that change is good or bad

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. As a part of their Monitoring and Evaluation Initiative, IUCN maintains reports, tools, and training materials to promote effective monitoring and evaluation. *www.iucn.org*

United Nations Environment Program (UNEP): Functional organization within the United Nations system that focuses on environment and global sustainability issues. UNEP provides a variety of publications and policy guidelines in the field of monitoring and evaluation that can be accessed by using the search function provided by their website. *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

Chaplowe, Scott G. 2008. *Monitoring and Evaluation Planning.* American Red Cross and CRS M&E Module Series. American Red Cross and Catholic Relief Services: Washington, DC and Baltimore, MD.

European Commission. 2007. *Handbook on Environmental Integration in EC Development Cooperation.*

Kessler, J.J. 1998. *Monitoring of Environmental Qualities in Relation to Development Objectives.* Netherlands Development Organization.

Linster, Myriam. 2003. *Environmental Indicators – Development, Measurement and Use.* Paris: OECD.

The Nature Conservancy. 2007. *Conservation Action Planning: Developing Strategies, Taking Action, and Measuring Success at Any Scale.*

United Nations High Commissioner for Refugees. 2002. *Environmental Indicator Framework: A monitoring system for environment-related activities in refugee operations.* Geneva.

United Nations High Commissioner for Refugees and CARE International. 2005. *Framework for Assessing, Monitoring and Evaluating the Environment in Refugee-related Operations: Toolkit for practitioners and managers to help assess, monitor and evaluate environmental circumstances, using mainly participatory approaches.* Geneva.

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

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.