6 GREEN GUIDE TO

CONSTRUCTION

TRAINER'S GUIDE

MODULE 6: CONSTRUCTION

TRAINER'S GUIDE

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INTRODUCTION

This **Trainer's Guide** provides the information, suggested content, activities, and support materials needed to facilitate a one-day workshop. This workshop was developed as part of the Green Recovery and Reconstruction Toolkit (GRRT) under the Humanitarian Partnership program between the World Wildlife Fund and the American Red Cross Tsunami Recovery Program.

The one-day workshop covered in this guide is designed as a standalone event, but can be combined with other GRRT training materials to create a multiday workshop. When combined with other GRRT workshops, the opening session should be modified to reflect the subject matter of the combined workshops materials.

Overall Learning Objectives for a One-Day Workshop

After participating in this workshop, participants should be able to:

- Describe the key principles of environmentally sustainable building design and architecture to protect people and communities recovering from disaster.
- Describe the key principles of environmentally sustainable on-site construction management.
- Demonstrate how to apply the key principles of sustainable building design and construction management to a community-based project.

BEFORE THE WORKSHOP

As part of your workshop preparation, you will need to review each of the points below and decide how each one will be addressed. You may need to coordinate some of these issues with the workshop sponsor, host, lead facilitator, and/or the manager at the workshop venue.

Agenda

Update the agenda to incorporate changes in the workshop. A template for the agenda can be found in the electronic file of the workshop materials.

Prepare sufficient copies of the agenda to give one to each participant.

Workshop Supplies

Ensure that each participant has sufficient pens, paper, and other materials and that there are sufficient flip charts and marking pens for the workshop exercises. See guidelines for other supplies in *Module A, Toolkit Guide.*

Content Paper and Handouts

It is expected that the content paper for this module will be provided to the participants at the beginning of the workshop. The paper contains a number of references that will be used during the workshop.

The trainer should decide in advance of the workshop whether the participants will:

- Be provided with a separate workshop workbook (e.g., ring binder) or a folder for holding handouts.
- Receive thumbnail copies of the PowerPoint presentations. Note that many slides ask questions of participants and the following slides provide the answers.

Electronic Copies of Materials

Each of the Green Recovery and Reconstruction Toolkit training modules includes a CD with the files of the content paper, trainer's guide, PowerPoint presentation, and other workshop materials and reference materials.

Electronic copies of all the module materials will also be available for downloading from an Internet site. The trainer needs to confirm the site address and provide it to the participants together with the handouts.

Participant Experiences

For some of the GRRT workshops, the agenda provides 15 – 30 minutes for participants to give brief presentations of their experiences in post-disaster recovery and reconstruction related to the workshop's theme. **If at all possible, the selection of individuals to make presentations should take place before the training.** If a training needs assessment or survey is undertaken before the workshop, this would be an ideal time to also inquire of participants' interest in presenting their case study or personal experience.

These presentations, typically about seven minutes long, should focus on practical challenges that the presenter faced in dealing with environmental issues, either positively or negatively, in developing or executing activities related to this workshop topic. The presenters should be encouraged to link their presentation to one or more environmental issues. A basic format for the presentation is:

- Describe the context of the project or activity
- Summarize the problem/issue encountered
- Indicate how it related to the environment
- Explain any solutions found or which could be identified in retrospect, especially in terms of how the well-being of the affected population was impacted by the project or activity

The presentations can focus on positive as well as negative environmental impacts arising from the relevant activities. For practical reasons, each presenter should use no more than four PowerPoint slides. (The use of flip charts or other presentation tools should be encouraged in place of slides.)

While the time allocated for the participant experience sessions is relatively long given the overall time for the training, this session is an excellent opportunity to identify environment-related lessons and solicit participant experiences regarding how they encountered and address environmental issues in their work.

If a participant experience session cannot be organized, the following sessions in the agenda should be moved forward and their time increased.

Local Expertise

Perhaps as important as providing an opportunity for participants to share their experience is the value of inviting topic experts from the region to attend the workshop as resource persons. One or two individuals who have knowledge of the workshop topic, experience with the issues discussed in the workshop, and, most importantly , understand how these issues apply to the local context, can offer invaluable contributions to the workshop. "Local context" is meant to include an understanding of the implications of how to apply this knowledge and experience to post-disaster/conflict situation. In the case of this workshop, a building contractor, building materials supplier and/or a government regulator would be helpful local expertise.

Adapting Materials to the Audience

The trainer's guide and materials are designed to have as universal an application as is practical. However, some trainers may feel that the workshop will be more effective if some of the examples, case studies or other details are adapted to match the specific training needs and interests of the local audience. If so, trainers are encouraged to make those adaptations.

Slide Animation

Slide animation (i.e. the need to "click" to make materials appear) is engaged for many slides. The facilitator should feel free to change the animation as is his or her preference.

Day Before the Workshop

Make sure the data projector, computer, screen, extension cords, flip charts, markers, and all the participants' supplies are in place. Do a test run of all your PowerPoint files to make sure all animation is working properly and all changes to the files have been made that are necessary to tailor the files to your audience. Confirm that all printed materials have been copied and ready to be handed out. For additional workshop planning tips, see *Module A, Toolkit Guide.*

Review instructions for Session 4, the Synthesis Exercise. The exercise will be much more successful if you locate a site near the workshop venue and tailor the exercise to fit the specific characteristics of the site. This needs to be done at least one day before the workshop.

Small-Group Formation

A significant part of the workshop is devoted to group activities. The formation of these groups is an important consideration. You will need to balance the number of participants in the workshop with the mechanics and learning objectives for each group activity.

It is generally recommended that participants sit at large tables in groups of four to six. Whenever practical you may simply form the workgroup based on those table groupings. However, note that some activities specify either an exact number of groups or an exact number of participants to be in that group. You will need to anticipate this range of circumstances and be prepared to assign participants to groups in order to achieve the activities' objectives.

An additional consideration may be the desire for groups to reflect the diversity of the participants, i.e., each group would incorporate gender balance, and a proportionate representation of humanitarian workers with

conservation/environmental workers, government workers, and/or private-sector workers. Similarly, you might want to balance groups with people who have a lot of relevant experience with newcomers to the field. The main concern is that each group includes participants who have the skills necessary to ensure the group as a whole can complete the assigned activity.

It is up to you to decide whether to change group membership during the workshop. However, the one-day length of the workshops makes it likely that keeping workgroups together from the beginning of the workshop would be most productive, as it would allow for the progressive development of intra-group relations and mutual capacities during the workshop. For multi-day workshops, it is usually appreciated to remix the group makeup each day. One technique to do this is for you to locate participant's name card (table tent) where you choose before the beginning of the workshop.

WORKSHOP MATERIALS

The following materials need to be assembled and adequate copies made before the workshop. All of the materials for this workshop are on the CD for this module. The facilitator's materials and handouts are in the folder that includes the phrase "workshop materials."

Handouts

Session 1
Module 6 Green Guide to Construction content paper
Workshop agenda
6.1.1 Green Recovery and Reconstruction Toolkit
6.1.2 Case Study – Earthquake in Central America

Session 2
6.2.1 Case Studies: Kenya Floods, Pakistan Earthquake, Sri Lanka Tsunami, Peru Earthquake

Session 4
6.4.1 Scenario for Synthesis Exercise
6.4.2 Site map (which the facilitator may need to produce)
6.4.3 Learning Evaluation
6.4.4 Learning Evaluation Answer Key
6.4.5 Workshop evaluation
Certificates for completion of the workshop
CD with resource materials related to this workshop

Resource Materials on CD

In addition to the above materials, some documents may have been included on the CD that have been identified as particularly useful to both workshop facilitators and participants. For this workshop they include:

- All files for Module 6: content paper, trainer's guide, workshop materials, PowerPoint slides
- United Nations Environment Programme (UNEP) and Swiss Resource and Consultancies for Development (SKAT). 2007. *After the Tsunami: Sustainable Building Guidelines.*

WORKSHOP PLAN OVERVIEW				
TIMES	**ACTIVITY**	**METHODOLOGY**	**RESPONSIBLE**	**TIMING**
REGISTRATION AND GREETINGS				
8:30 – 9:00	Registration, seating, distribution of badges, table name cards, materials and welcoming remarks			30'
SESSION 1: WELCOME INTRODUCTIONS; SUSTAINABLE CONSTRUCTION CONCEPTS AND PRINCIPLES				
9:00 – 9:20	1.1 Welcome And Introductions	Presentations: welcome, individual introductions and participant expectations		20'
9:20 – 9:30	1.2 Workshop Objectives, Agenda and Ground Rules	Plenary presentation of workshop objectives, agenda, and ground rules		10'
9:30 – 10:10	1.3 Quick Case: Earthquake in Central America	Small-group discussions of case study and feedback to plenary of results		40'
10:10 – 10:30	1.4 Definitions, Principles and The "Five Pillars"	Presentation and discussion followed by paired discussions of application of sustainable construction principles		25'
10:35 – 10:50	Break			15'
SESSION 2: SUSTAINABLE CONSTRUCTION DESIGN FUNDAMENTALS				
10:50 – 11:10	2.1 Key Challenges and the "Green Baton"	Brainstorming and identification of key challenges confronting participant agencies		20'
11:10 – 11:50	2.2 Design Challenges and Solutions	Presentation and interactive discussion		40'
11:50 – 12:35	2.3 Case Studies: Minimizing Negative Environmental Impact	Small-group discussions and reports to plenary regarding the Kenya, Pakistan, Sri Lanka, and Peru cases		45'
12:35 – 1:35	Lunch			60'
SESSION 3: SUSTAINABLE CONSTRUCTION MANAGEMENT PRACTICES				
1:35 – 2:05	3.1 Better Practices: Sustainable Construction	Presentation and interactive discussion		30'
2:05 – 2:35	3.2 Managing For Sustainability	Pair (or trio) analysis and discussion of mini-cases and feedback of findings to plenary		30'

WORKSHOP PLAN OVERVIEW				
TIMES	**ACTIVITY**	**METHODOLOGY**	**RESPONSIBLE**	**TIMING**
2:35 – 2:50	Break			15′
SESSION 4: SUSTAINABLE CONSTRUCTION IN PRACTICE: SYNTHESIS EXERCISE				
2:50 – 4:20	4.1 Field Site Assessment and Planning	Small-group assessment, analysis, and discussion of field site conditions – with plenary report preparation		90′
4:20 – 5:00	4.2 Synthesis Exercise Debriefing	Team presentations of findings from field assessment accompanied by facilitated plenary discussion		40′
5:00 – 5:30	4.3 Evaluation and Closing	Quiz, evaluation, and closing comments		30′

PLAN FOR SESSION 1: WELCOME, INTRODUCTIONS; SUSTAINABLE CONSTRUCTION CONCEPTS AND PRINCIPLES

SESSION TIME	95' plus 30' for registration and greetings
OBJECTIVES	• Identify the other participants in the course and their various objectives for attending • List the ground rules that will apply throughout the workshop • Define sustainable construction • Identify the key principles of sustainable construction • List several key challenges of sustainable construction
ESSENTIAL CONTENT	The workshop host and/or facilitator should welcome the participants and introduce the course objectives. The participants will introduce themselves and present their own expectations for the day. The facilitator and participants together will then agree on ground rules for the workshop. Additional key topics include: • Concept of sustainable construction as a full construction cycle, from extraction to processing and from planning, design, and construction through final deconstruction and waste management • Principles of sustainable construction focus on local knowledge and experience, good management, appropriate techniques and risk reduction
OUTPUTS	• Participant expectations on large index cards • Workshop ground rules on a flip chart By the end of the session, participants will have listed the following on flip charts: • The possible positive and negative environmental impacts that could result from the earthquake response detailed in the session's "quick case" study • The key challenges that those organizations currently confront in implementing sustainable construction
PREPARATION	• Create signs directing participants to the workshop room if necessary. • Create a welcome sign with the name of the workshop. • Prepare a welcome statement. • Prepare flip charts where participants post sticky notes with questions raised in the introduction, which at the end of the day will be reviewed with the participants to ascertain if they have been answered. • If necessary, adapt PowerPoint photos to the region or country where the workshop is being held (the case study can be quickly adapted to another hazard type and country if necessary). • For the debriefing of the case study, prepare a flip chart with three columns (Positive Impacts, Negative Impacts, and Steps). • Review the concept of the Green Baton in the module content paper to ensure you understand it.

RESOURCES	• Data projector and screen • Four glip charts and sets of markers • Name badges and table tent cards for participants' names • Large index cards, sticky notes, etc. • Adhesive tape
HANDOUTS	• Module 6 Green Guide to Construction content paper • 6.1.1 Green Recovery and Reconstruction Toolkit • 6.1.2 Case Study: Earthquake in Central America
FACILITATOR NOTE	• Determine well in advance of the workshop what the local customs and expectations are for opening the workshop. In some locations, customs require government participation and traditional ceremonies. Make sure the appropriate people are invited, on the one hand, but endeavor to make their involvement as brief as practical. Prepare suggested opening comments for a guest speaker if appropriate. Otherwise or in addition, invite the workshop host to officially open the workshop, welcome the participants, and comment on the reason the workshop is being held. • If the opening ceremony requires more than the time shown in this Trainer's Guide, then the daily schedule will need to be modified.

Registration and Greetings

(30 minutes)

It is important to show the workshop agenda starting at least 30 minutes before the actual beginning of the formal welcome and opening remarks. Otherwise, if this is not shown on the agenda, too many participants will show up a few minutes late, then register, collect their materials, greet old friends and take several minutes before they take their seat and become prepared to start the workshop.Activity 1.1 Welcome and Introductions

(20 minutes)

Slides # 1 – 2, Welcome and Introductions. The course host or facilitator should welcome the participants and introduce the training team (including any person offering administrative or technical support). This should be an enthusiastic but short (three- to five-minute) welcome in which the host explains the importance of this workshop in relation to the current context of the participant group (post-disaster, humanitarian efforts, local environmental issues, etc.).

Slide # 3, Participant Introductions. Ask the participants to briefly introduce themselves, closely following the template on the slide. As each provides his or her chief expectation for the workshop, write these on a flip chart. Once all have presented, give a quick recap of the participant expectations. It is critical to keep on time at this point. You may set a rule that each introduction can last no more than 30 seconds.

Slides # 4 – 5, Green Recovery and Reconstruction Toolkit. It may be helpful to place this workshop within the context of the overall GRRT training project. Discuss the bullet points on the first slide and then name the other modules from the second slide. Point out that Module 6 is one of the modules that form a set of information with Modules 4 and 5 about sustainably building (or rebuilding) communities.

Distribute Handout 6.1.1 Green Recovery and Reconstruction Toolkit at the end of the presentation, indicating that more information is available in it. (If all the participants have previously taken another GRRT module and if they received this handout at that workshop, it will not be necessary to hand it out again during this workshop.)

Slide # 6, GRRT Principles. These six principles have guided the development of the GRRT modules and are foundational to the successful implementation of green recovery and reconstruction.

Activity 1.2 Workshop Objectives, Agenda, and Ground Rules

(10 minutes)

Slide # 7, Workshop Objectives. Discuss with participants that by the end of the day you expect they will be able to:

- Describe the key principles of environmentally sustainable building design and architecture to protect people and communities recovering from disaster.
- Describe the key principles of environmentally sustainable on-site construction management.
- Demonstrate how to apply the key principles of sustainable building design and construction management to a community-based project.

Slide # 8, Workshop Agenda. Review the schedule for the day and note that it will culminate in a simulation exercise that will tie together what they have learned about sustainable construction. (Revise the times on the agenda, if necessary.)

Slide # 9, Ground Rules. Go over the ground rules and ask the participants if they agree with those on the slide and if they would like to add any.

Activity 1.3 Case Study – Earthquake in Central America

(40 minutes)

Slide # 10, This Session We Will Discuss… Briefly review what will be covered in this first session:

- Definition of sustainable construction
- Key concepts of sustainable construction
- Key challenges of sustainable construction
- The concept of the "Green Baton"

Then show the *"…but first…"* slide as a way of introducing the first exercise, the case study.

Slides # 11 – 12, Earthquake in Central America and Mini-Case. Divide the participants into small groups (three or four participants in each), distribute Hand Out for 6.1.2 Earthquake in Central America, and present the instructions. Tell the participants they have 20 minutes to read it and as a team, brainstorm the possible environmental impacts – both positive and negative – of VPP's approach. VPP is the NGO in the case study.

After about 20 minutes, ask each team to provide one positive impact and one negative impact. Write these on the flip chart under the appropriate heading (Positive Impacts/Negative Impacts). Use a "round robin" approach, going around the room until teams have provided all their responses, but only one at each turn. Review and recap their responses. If the groups have not done so already, note the following issues when wrapping up this activity:

POSSIBLE POSITIVE IMPACTS	POSSIBLE NEGATIVE IMPACTS
Reuse of salvaged building materials: • The repair kits are configured with the understanding that many of the reparable houses will make use of building materials salvaged from debris piles before they are cleared. • The plan to use wood for framing and doors may well be a positive action to help with the transition to more permanent housing.	Repair kits: • We do not know much about the source or quality of the vouchered materials. The plastic could be substandard and without UV treatment, which means it will degrade in a couple of months and be unusable – and therefore wasted. • If the voucher program distributed corrugated sheets instead of plastic sheeting, the families would likely have been able to reuse the metal sheets for their permanent home and no plastic would have had to be used – and subsequently thrown away. • We do want to know the source of the wood, especially the hardwood for the doors (in particular, whether or not there could be deforestation and flooding impacts from a sudden increase in demand for wood for construction). • The wood is measured as a cubic meter, so we don't know the dimensions of each of the planks or other pieces and whether they are appropriate for construction or not.
Debris clearing: Removing unsalvageable debris may help minimize the impact of hazardous materials on the residential site.	Debris clearing: We want to know what kind of debris is being cleared in VPP's program, where it is being dumped, and if there could be negative impacts on the local watershed from the waste.
	Tents: Tents are often the immediate, knee-jerk response to an emergency, but most families would prefer to seek housing with host families first (indeed, the fact that many of the tents are empty may imply they have already done so). • It is common for there to be an oversupply of tents; this wastes energy transporting them to the community and diverts money that could be used for transition or permanent housing. • The case speaks of "low-cost" Chinese tents; it is important to know if transport costs were included in that pricing assessment. • The disposal of tents also presents environmental concerns, depending upon the materials.

If there is time after reviewing the possible environmental impacts (do not spend more than 40 minutes on the entire activity), ask the participants to consider the negative impacts that are noted on the flip chart and to suggest possible steps that might be taken to avoid or at least minimize such impacts.

Wrap up the activity by noting that this module will focus on the type of environmental impacts and considerations noted in the case and will provide opportunities for participants to consider how to avoid such impacts.

Activity 1.4 Definitions, Principles, and the "Five Pillars"

(25 minutes)

Slides # 13 – 14, Definitions. Present the definition of sustainable development. Then show the title on slide 14 and ask the participants for a definition of sustainable construction. After taking several responses, show the definition and focus on the "life cycle" aspect of the definition. Remind them that the case they just studied sought to consider the full life cycle of the NGO's response – from extraction (where did the wood come from?) to final disposal of the waste from the debris-clearing project. Also note the use of the words "holistic" and "harmony" in the second bullet; emphasize that sustainable construction (SC) practices do not separate the build structure from the natural environment. Rather, they attempt to identify the linkages and potential impacts between them.

Slide # 15, What Do We Need to Support Sustainable Construction? Ask the question, then note, with the first click of animation, that some regard sustainable construction as having five pillars. Review each of the five pillars of SC, stressing that each pillar suggests a focus area that SC project managers should consider when planning a construction project. With each click, one of the pillars appears. Ask participants if they understand the significance of the components of each pillar. The following text gives you examples to cite. The final pillar, "Environmental," is shown on screen.

- **Technical:** practical, robust, technically feasible solutions aiming to construct durable, reliable, functional structures, and seeking to ensure quality
- **Economic:** cost-effective solutions that ensure financial affordability for beneficiaries, promotion of employment to support livelihoods, selection of environmentally responsible suppliers and contractors, and investments to maximize knowledge transfer
- **Institutional:** ensuring that laws and regulations are properly designed and are enforced to promote sustainability, and that institutions responsible for protecting the environment are supported, engaged, capable, and funded
- **Social:** efforts seeking to improve quality of life, facilitate culturally specific construction planning, and fairly distribute the social costs and benefits of construction
- **Environmental**: environmental considerations incorporated into all aspects of construction; construction decision-making process supports actions to minimize environmental impact, resource extraction, and the use of energy, water, materials, and land; prefers renewable resources over nonrenewables; construction process seeks to maintain and restore ecological diversity

In the interest of time, this workshop will focus on the environmental pillar.

Slides # 16 – 17, Principles of Sustainable Construction. Note that there are a number of principles that should guide SC efforts. Show this slide and note that the focus areas of those principles are listed here: local knowledge and experience, good management, and appropriate techniques, including reuse of materials and risk reduction. Now use the next slide to provide instructions for the next small-group discussions.

Form the participants into pairs or trios. The purpose of these discussions is twofold: to encourage participants to review the SC principles and to encourage them to think about how their organizations can or should apply some or all of the principles guiding SC (as listed in the content paper for this module and summarized in Section 3.1 What Is Sustainable Construction?).

Encourage them to produce concrete examples of application of one or more of the principles, which can then be shared with the larger group during the feedback. Give them about ten minutes for the discussions; use another ten minutes to go around the room and ask each pair/trio to offer one concrete example of how their organization applies one of the SC principles in practice.

Slide # 18, Break. When the discussion is completed, announce that it is time to take a break.

PLAN FOR SESSION 2: SUSTAINABLE CONSTRUCTION DESIGN FUNDAMENTALS	
SESSION TIME	105'
OBJECTIVES	By the end of this session, participants should be able to discuss: • Key challenges of sustainable construction • The concept of the "Green Baton" • The importance and value of several fundamental sustainable construction design concepts • Using fundamental design concepts to analyze and recommend solutions to several sustainable construction case study challenges
ESSENTIAL CONTENT	• Importance of the Green Baton concept: Sustainability and environmental awareness should receive attention at all stages of construction cycle. • Focus should be placed on the design concepts of the material life cycle, material use and reuse, material sourcing and procurement, energy and climate, waste handling, and the need for local community acceptance.
OUTPUTS	By the end of the session, participants will produce a set of flip charts with a variety of responses to the question *"How can the negative environmental impacts of reconstruction be minimized?"* (with regard to their small group's particular country case study).
PREPARATION	• If necessary, adapt PowerPoint slides (especially photos) to the region or country where the workshop is being held. • Review the four case studies. If necessary, feel free to generate one or more case studies with hazards and impacts more appropriate to the local setting.
RESOURCES	• Data projector and screen • Flip charts (four) and markers • Note cards – about 50
HANDOUTS	• 6.2.1 Case Studies
FACILITATOR NOTE	Review session activity descriptions below.

Activity 2.1 Key Challenges and the "Green Baton"

(20 minutes)

Slides # 1 – 2, Learning Objectives. Show the slides to introduce the topic of the session and to review the issues to be discussed.

During the following presentation, encourage participants to ask questions and offer comments throughout. This should be an open discussion, not a lecture.

Slide # 3, Key Challenges. Use this slide to brainstorm a list of SC challenges that confront post-disaster reconstruction efforts. Pair off the participants and have them discuss these challenges with a partner, and then write on note cards (one per card) the challenges that grow out of or are generated by these basic challenges. Post these cards on the wall or on a flip chart, making an effort to categorize them (e.g., "similar to the pillars," "planning challenges," "resource challenges," "technical challenges," "social challenges," etc.).

After about ten minutes – or once the participants have finished generating the cards – ask a participant to review the challenges presented by his or her colleagues. Leave these challenges in view; you will use them again in the following session.

Slide # 4, The "Green Baton" Concept. (Before the workshop, review the section in the content paper that discusses the green baton.) Present the concept. Stress that one of the greatest challenges in SC is ensuring that all stakeholders, throughout the life cycle of the project, bring the same environmental or "green" focus to their portion of the project. Note that it is not sufficient to expect contractors simply to hand off responsibility at the end of their portion of the project and hope that subsequent actors bring the same degree of awareness to their project activities. It is critical for SC project managers to plan for and oversee each handoff of the Green Baton – from the initiation of the project concept to project implementation and completion. This requires project managers to draft project documents (e.g., contracts, Terms of Reference) in such a way that environmental responsibilities are clarified for all project stakeholders – clients, design team members, and contractors.

Slide # 5, Picking up the Baton. The most important part of the green baton concept is to discuss it with the participants. Bring up the following questions and encourage a discussion in plenary.

- What experiences have you had that illustrate the baton being dropped? When and how? How did you recover, or how could you have recovered?
- Why do stakeholders drop the Green Baton? What stages of construction are most vulnerable?
- **How can we pick up the baton? Or not let it fall?** What actions need to be taken, at different stages, by different stakeholders?

Activity 2.2 Design Challenges and Solutions

(40 minutes)

Slide # 6, Design Challenges and Solutions: Choice of Materials. Show the slide and ask the participants how the choice of materials can pose environmental challenges for the SC project design as well as for the host community. (If the participants have already had Module 5 on Green Guide to Materials and the Supply Chain, this should be a quick two- or three-minute review; if not, spend a bit more time.) Take two or three responses, such as:

- Material extraction: extraction of materials (ore, wood, sand, etc.) can negatively impact the environment and cause pollution of ground water.
- Material reuse and recycling: use of materials obtained from previous projects and/or from prior stages of this project can minimize waste.
- Disposal: the eventual disposal of the material (after the life cycle and eventual destruction of the building is complete) has an important impact on the environment, and can lead to pollution.

Then quickly move to the next slide.

Slide # 7, Impacts of Materials Choices. Use this slide to explain or review the materials life cycle concept and the critical need for the SC project manager to weigh the potential environmental impact at each stage of the cycle. Ask participants to provide examples of potential environmental impact at each of the stages. These could include, for example:

Extraction, mining, harvesting	Leaching of dangerous substances from mines into watersheds Deforestation and resulting erosion, mudslides, and flooding
Processing and production	Air and water pollution from production processes
Transportation and distribution	Air pollution from transportation and the burning of fossil fuels
Packaging	Use of nondegradable packaging resulting in excess waste buildup
Building	Impact on the immediate surroundings of the construction: air and water contamination from unprotected site activities, waste buildup
Disposal	Leaching into soils of hazardous materials, destruction of habitats

Slide # 8, Design Challenges and Solutions: Use of Existing Materials. For those that attended the workshop on Materials and the Supply Chain, it will be helpful to introduce this slide by pointing out that in that workshop we focused on the three Rs: reduce, reuse, and recycle. But in this workshop we will go deeper into the strategies, as the topic of construction poses more issues. Review the various strategy options of the six Rs, stressing that project managers should consider all options to reduce negative impacts. (Refer to the module's content paper for definitions of each solution.)

Slide # 9, Berge's Cycle of Materials. Review Berge's Cycle of Materials (the slide makes use of custom animation, so review it carefully beforehand as a slideshow). Suggest that the participants look at the diagram in their content papers in order to better see the text. Point out the green boxes and stress that reuse and recycling are, in many construction design plans, clear options for reducing the waste stream that is produced by the project.

Slide # 10, Design Challenges and Solutions: Sourcing and Procurement. Use the slide to indicate the importance project managers should place on sourcing and procurement of building materials. Stress the ***do no harm*** concept, noting that it is not enough to ensure that the building itself is environmentally neutral; the project manager should invest time and effort to ensure that the sources of the materials obtained for the project, as well as the way that they are procured, do not cause unacceptable harm to the environment.

Slide # 11, Challenge versus Solution. This slide illustrates illegal wood on the left and certified legal wood on the right, supporting the previous slide's first bullet point: "Support legal and sustainable practices."

Slide # 12, Design Challenges and Solutions: Energy and Climate Concerns. Use the slide to generate discussion about the importance and value of energy and climate concerns in the SC project. The orientation of the building with regard to the sun, the energy efficiency of the structure, the amount of insulation and proper ventilation, and the type of climate in which the project is carried out will all have profound impacts on the use of energy throughout the life of the building. Ask participants if they have experience with energy or climate design challenges and how they dealt with them. Note that the SC project manager should include these factors in the initial design stage: *It may not be possible to change the solar orientation of the structure after construction has begun.*

Slide # 13, Design Challenges and Solutions: Water and Wastewater. Use the slide to generate discussion about the importance and value of planning for the impacts of water and wastewater both during and after construction. Ask participants if they have experience with water or wastewater design challenges and, if so, how they dealt with them. Note that the SC project manager should meet with the appropriate technical experts during the design stage to ensure that potential challenges are considered.

Slide # 14, One Solution: Constructed Wetland. This slide illustrates one way to improve site drainage and wastewater treatment problems.

Slide # 15, Design Challenges and Solutions: Getting Local Community Acceptance. Use the slide to generate discussion about the importance and value of working with the local community before, during, and after the construction to ensure that their knowledge and experience are factored into design plans. Stress that this may be the most important consideration of all with regard to design issues. If the community is not on board, it is unlikely that the project will meet its construction and/or maintenance goals. There have also been many cases where humanitarian assistance agencies did not adequately consult local populations and then built houses that the people rejected – never occupied. This represents a large waste of resources.

Slide # 16, Design Challenges and Solutions: Existing Traditional Practices: Stress that an understanding of traditional practices is essential; they may present solutions to many of the construction challenges or they may constitute challenges themselves. (Traditional building practices that, for example, rely on grass or wood extraction may pose additional challenges in settings where flooding has become more frequent and more destructive.) Ask participants if they have experience working with communities on construction projects, and how they obtained (or why they did not obtain) good participation by those communities. Ask those participants for their advice on working out the SC project details with communities.

A related challenge is how international organizations can overcome the reluctance to abandon "bad" environmental practices in favor of new ideas with which they are unfamiliar and which they tend to reject for that reason.

Slide # 17, Design Failure versus Success. The photo on the left is a proposed emergency shelter that is claimed by the designers to be earth-friendly, nontoxic, and assembled easily and quickly in disaster areas. But it would not meet basic human needs nor likely be accepted by a community.

The photo on the right is a new school constructed with community involvement after the tsunami.

Activity 2.3 Case Studies: Minimizing Negative Environmental Impact

(45 minutes)

Slides # 18 – 21, Case Studies. [Before the session begins, select three of the case studies out of the proposed four in the materials. Choose the three most relevant to your audience. Delete the slide of the case study that you will not use.]

Use the slides to briefly introduce the three case studies that will be analyzed during the activity. Form three small groups (you can either form the groups yourself or have the participants self-select the case they would like to work on) and distribute the case study handouts accordingly. Give the participants 20 minutes to discuss and respond to the questions. The following assignment is the same for each case (but note the two exceptions).

As a group, discuss the case and answer:

- What solutions might you propose now that minimize impact on the environment and provide for positive and sustainable reconstruction outcomes for the affected population?
- What are the key challenges confronting the affected people? The government? The international community? What are your priorities now?

For the Kenya case study, this group is also asked to answer this question:

- How do the proposed solutions for the relatively small population in the village relate to any possible proposed solutions for the much larger populations in the camps?

For the Pakistan case study, this group is also asked to answer this question:

- How do specific cultural concerns (traditional roles of women in particular) impact the proposed interventions?

Be sure to tell the groups to write their responses to the questions on flip charts; 15 minutes into the activity, remind them that someone in the group should be writing their responses.

At the 20-minute mark, decide if they need more time; if so, give them another five minutes, but no more. You will need the time for debriefing the exercise.

Slide # 22, Case-Study Reports. Following the 20 or 25 minutes of case-study work, show the slide and announce that the debriefing will now begin. Use the rest of the session to debrief the case-study results. Proceed as follows:

- Have all the participants stand up and approach the first flip chart. Ask the group reporter to give a very concise summary of the case (one or two minutes) and then present the group's findings (e.g., challenges, solutions, and proposals).
- After the presentation, take questions and comments from the plenary group.
- Repeat this process with the two other case-study groups. If there is time left in this session, ask the participants to return to their seats and then take any remaining questions or comments.

Possible focus points for group reports include the following (be sure to raise these points if the group presenters do not):

- Understanding the value of traditional techniques used by communities to construct houses
- Gaining access to most affected
- Use and reuse of materials from destroyed homes
- Impact on the immediate environment and local natural resources of reconstruction proposals, particularly of wood and grass that may be in short supply
- Impact on the wider environment of proposals to bring materials from abroad
- Energy requirements and considerations (e.g., solar orientation, approach of winter, wood burning)
- Reconstruction in vulnerable zones (e.g., mountainsides, coastal areas)
- Laws and policies that appear to raise risks to already vulnerable populations and habitats

Slide # 23, Lunch. Inform participants where they will be eating lunch and announce the time that they should be back in their seats ready to begin the next session.

PLAN FOR SESSION 3: SUSTAINABLE CONSTRUCTION MANAGEMENT PRACTICES	
SESSION TIME	60'
OBJECTIVES	By the end of this session, participants will be able to identify a number of environmentally sensitive "better practices" that should be followed when managing a construction project.
ESSENTIAL CONTENT	The better practices with regard to SC are focused on the following areas: • Site planning and layout • Materials and equipment • Waste and pollution • Workforce practices • Sustainable community-based construction
OUTPUTS	Participants will produce a set of flip charts with a listing of better sustainable construction practices.
PREPARATION	This session will be enhanced if you or someone else can take photos of local construction sites that either illustrate positive examples of construction-site management discussed in this session or illustrate inappropriate/bad practices. Add these photos to the PowerPoint presentation.
RESOURCES	• Data projector and screen • Flip charts (four) and markers • Sticky notes, etc.
HANDOUTS	None
FACILITATOR NOTE	This is a relatively brief (60-minute) session intended to provide participants with sufficient content to carry out the field exercise planned for the next session.

Activity 3.1 Better Practices: Sustainable Construction

(30 minutes)

Many slides in this session make use of custom animation, so review them carefully beforehand as a slideshow.

Slides # 1 – 2, Learning Objectives. Introduce the session and present the focus of the discussion, i.e., a number of environmentally sensitive better practices that should be followed when managing a construction project.

Slide # 3, Session 3 Overview. Use this slide to provide an overview of the session (presentation on better SC practices with regard to site planning and layout, materials and equipment, waste and pollution, workforce, and sustainable community-based construction).

Encourage participants to ask questions and offer comments throughout the presentation. This activity should be an open discussion, not a lecture.

Slide # 4, Better Sustainable Construction (SC) Management Practices: Site Planning and Layout. Show the slide. Ask participants to brainstorm what concerns a project manager should address when planning and laying out a site. Write their answers on a flip chart. Once they have finished, stress that a project manager intending to apply better SC practices to site planning and layout should be concerned with how the built structures will impact populations and the surrounding site. Now show the content on the slide:

- Potential health hazards identified
- Environmental guidelines written into project documents
- Site boundaries and work areas identified, communicated, cordoned off
- Measures taken to minimize construction site soil erosion and water run-off
- Plans made for restoring site to natural state

[Note: The photos on slides # 5, 6, and 8 were all taken from across the street of the venue for a GRRT workshop in Sri Lanka. You are encouraged to replace these with photos taken in the community of the workshop of similar examples of good and bad site management practices.]

Slide # 5, Better SC Management Practices: Materials and Equipment. Show the slide and ask participants to brainstorm what concerns a project manager should address when planning for construction materials and equipment. Again, write their responses on a flip chart. Once they have finished, stress that a project manager intending to apply better SC practices should be concerned with how the procurement, use, and maintenance of project materials and equipment will impact populations and areas on and surrounding the site. Now show the content on the slide:

- Storage
- Wet materials and liquids
- Water and wind protection
- Vehicle and equipment maintenance and cleanup

Stress that the simple construction activities of storing materials and maintaining and cleaning equipment can have serious effects on the quality of air, land, and water on and around the site. Measures such as those proposed in the content paper offer guidance for minimizing impacts.

Slide # 6, Better SC Management Practices: Waste Handling. Ask participants to brainstorm what concerns a project manager should address when planning for handling waste generated by the construction project. Again, they should write their responses on a flip chart. Once they have finished, stress that a project manager intending to apply better SC practices should be concerned with minimizing the waste produced by the project and with handling the waste stream properly. Now show the content on the slide:

Site waste (solid and water) management plan:

- Waste cleanup: labor and/or covered receptacles
- On-site sanitation facilities
- Proper disposal
- Possible recycling or reuse?

Note that waste management also requires planning – and preferably before the waste is actually generated! Note as well that before waste disposal is carried out, better practices call for consideration of the options for recycling and reuse.

Slide # 7, Waste Handling? Berge's Cycle of Materials. Remind them of Berge's Cycle of Materials; stress that there may be many options for recycling or reusing materials from a construction site. Ask participants to provide examples of reused "waste" materials (reuse of the wood from pallets for construction is one).

Slide # 8, Better SC Management Practices: Pollution Prevention. Ask participants to brainstorm what concerns a project manager should address when planning for pollution prevention on and around the construction site.

- *What types of pollution are potentially produced?*
- *How might these pollutants be minimized?*

Again, they should write their responses on a flip chart. Once they have finished, show the content on the slide:

- Runoff
- Cleanup
- Dirt and grading
- Tracking controls
- Hazardous materials

Slide # 9, Pollution Prevention. Emphasize that with hazardous materials, it is incumbent upon the project manager to put in place an effective reporting system so that any unforeseen contamination or leakage of hazardous substances is immediately reported. Again, better practices call for ensuring that any hazardous materials are well cordoned off from environmentally sensitive populations and areas. To ensure that the audience understands the issue, ask them to identify examples of environmentally sensitive areas where this applies.

Slide # 10, Example of Perimeter Sediment Control. Stress that the project manager should take steps to cordon off the site in order to effectively minimize contact with the surrounding environment. Ask if participants need clarification on any of these concerns. Refer participants to the Pollution Prevention section in the content paper for guidance on preventing pollution at the construction site.

Slide # 11, Better SC Management Practices: Sustainable Community-Based Construction. Show this slide and stress the need for project managers to understand the importance and value of a community's input into the construction planning and implementation. Ask participants to brainstorm how a construction project might benefit from local knowledge, resources, customs, and laws. What are the likely results if these are ignored? Write their responses on a flip chart. Once they have finished, show the content on the slide:

- Use of local knowledge
- Participatory approach
- Use of local resources
- Compatibility with local norms
- Provision of environmental education
- Working with local officials, policies, and laws

Stress that a willingness to work closely with the community and with local officials may be the project manager's best insurance that the project will be accepted and maintained by those who will use the built structures.

If there are no more questions, go to the next activity.

Activity 3.2 Managing for Sustainability

(30 minutes)

This activity consists of quick responses to four mini case studies. However, if you are running behind schedule, you can reduce the number of case studies discussed in the workshop to fit the time available. It is more important to allow plenty of time for the exercise in Session 4.

Slides # 12 – 15, Mini-Cases One through Four. Tell the participants that they will now view four quick mini-cases and that they should discuss with a partner the better practice for dealing with the concerns raised by each case. (Try to ensure, after each slide is shown, that the participants actually do engage in discussions with their partners; the aim here is to have all participants thinking about the possible better practices – not just the ones whose hands will immediately show that they have the answers.)

The cases, and some possible better construction practice recommendations, follow:

MINI-CASE	POSSIBLE BETTER CONSTRUCTION PRACTICES RESPONSES
1. The southern edge of the NGO's housing reconstruction site – a previously uninhabited area where 2,000 families, whose houses were destroyed by the cyclone, are to be relocated – is situated about 300m from a marshland that is also their fishing grounds.	• Efforts should be made to minimize contamination of soil and water resources. • Proper management of storm water and wastewater to prevent drainage into the marsh is essential. • Site erosion and sediment runoff should be prevented via effective perimeter sediment-control measures. • Hazardous materials should be stored as far from the southern edge as possible.
2. Many trucks visit the NGO's housing site daily. Most come from the port on the north side of the city where they load up with various building supplies: concrete, sand, wood, creosote, paint, asphalt. They drive onto the site, unload wherever they can find room, and leave.	• Trucking subcontractors should be informed in advance of proper site entry and delivery procedures. • Measures should be taken to restrict traffic and direct the trucks to planned, secure, safe laydown and storage areas on the site. • Trucks should be cleaned in appropriate washout areas before leaving the site; this will help prevent runoff of liquids. • If the trucks must remain on-site overnight or for a long period, tarps should be placed beneath them.
3. The NGO's housing reconstruction project procured more materials than were needed. Several plastic barrels of creosote, dozens of paint cans (many of them opened), and a number of opened containers of atrazine herbicide used to clear vegetation from the building site are sitting near the road, although it is unclear what is to be done with them.	• Toxic materials such as creosote, paint, or herbicides should be contained and sealed in hazardous-material drums, which should then be properly disposed of in a hazardous-materials disposal site. • Unopened cans of paint can potentially be sold by the project.
4. Some of the community members just to the east of the site used to grow vegetables on the site, but the village leader said that was illegal and not a concern; the site was then provided for the NGO's housing project.	• Land tenure and traditional rights issues could be, despite the village leader's comment, a real concern here. • Steps should be taken to meet with the community members and discuss how their views might be considered in the planning process

Slide # 16, Break. After the participants have exhausted their comments, go to break.

PLAN FOR SESSION 4: SUSTAINABLE CONSTRUCTION IN PRACTICE: SYNTHESIS EXERCISE	
SESSION TIME	160'
OBJECTIVES	By the end of this session, participants will be able to: • Apply many of the concepts and better practices studied in the Module 6 workshop in a field-based assessment, analysis, and planning exercise. • Identify many of the complex linkages among various construction site planning and implementation details.
ESSENTIAL CONTENT	Sustainable construction concepts and practices
OUTPUTS	By the end of the session, participants will produce a set of flip charts with recommendations for better construction practices pertaining to the field site and project proposed by the facilitation team.
PREPARATION	• Adapt PowerPoint slides (especially photos) to the region or country where the workshop is being held. • Identify a site near the training venue (which participants can visit if convenient) and assess it as a potential location for a mock housing construction project for a population of disaster-displaced individuals. Prepare a simple map of the site. Take five or 10 photos of the site and add them to the PowerPoint presentation and to the handouts for this session. • If a site is not available within easy walking distance (or another form of convenient transportation cannot be used), then select a site in the general area of the workshop venue, take several photos of the site, and draw a simple map of the site and immediate neighbors. • Adapt "Scenario for Session 4 Synthesis Exercise" and "Sample Map for Session 4 Synthesis Exercise" in the electronic file of workshop materials as needed to fit the disaster you chose and the task(s) that you assigned. The original text for the Synthesis Exercise should be modified and expanded to fill in useful details about the nature of the specific disaster you chose for the scenario and about the characteristics of the site, e.g., how many housing units it can realistically accommodate.
RESOURCES	• Data projector and screen • Flip charts (four) and markers
HANDOUTS	• 6.4.1 Scenario for Session 4 Synthesis Exercise • 6.4.2 Map for Session 4 Synthesis Exercise," one per participant. (The map has to be created for this workshop.) • Photos of the site used for the exercise • 6.4.3 Learning Evaluation • 6.4.4 Learning Evaluation Answer Key • 6.4.5 Workshop evaluation

FACILITATOR NOTE	This is an exercise intended to enable participants to apply many of the concepts studied throughout the Construction workshop (as well as Modules 4 and 5 if they have also attended those workshops). Try to find a nearby site that poses a number of potential sustainable construction challenges (such as drainage issues; air, soil, and water contamination concerns; local community issues; climate concerns; waste handling; etc.) that participants should consider in their team planning. The site should be a plausible location for building a number of houses, at least 20. You should feel free to create additional details that are not apparent at the site but add richness to the exercise (e.g., "There is a wetland to the north of the site" or "The surrounding community will accept the new structures if there is some benefit to the larger population, such as a new road or community center" or "The displaced families have already received building materials – corrugated roofing sheets, wood framing, etc. – at their transitional shelters that could potentially be reused"). Details provided with regard to the proposed site should be sufficiently multifaceted to generate complex discussions among team members.

Activity 4.1 Field Site Assessment and Planning

(90 minutes)

Slide # 1 Sustainable Construction Management Practices and Slide # 2 Session Goal. Introduce the session and present the goal for the session. Stress that the next two hours will be an opportunity to apply many of the concepts and better practices studied during the workshop to a fictional SC project.

Slide # 3 Quick Review. Use the slide to remind participants of the areas of better construction practice that you have covered.

Slides # 4 – 11, Sustainable Construction Synthesis Exercise. The slides in the Module 6 materials for Session 4 are provisional, and are only an illustration of how this exercise was set up and run at a GRRT workshop. It is suggested that you replace these with the slides that you prepared for the specific site selected for the exercise.

[For your information, slides 4 and 5 are borrowed from the role-play exercise in Module 5, Green Guide to Materials and the Supply Chain. If the participants also attended Module 5, it would be helpful to use this scenario again to save time. Slide 6 is a screenshot of a daily newspaper in Colombo, Sri Lanka, taken the day of the workshop. The yellow banner, photo, and caption were superimposed over the screenshot to give the appearance of an actual news account. Slides 7 through 9 are screen shots of Google Earth of the actual site selected for the exercise. Slides 10 and 11 are photos taken from the actual site, which was about 10 km from the workshop venue and therefore too far away for a visit by the participants. This orientation served as a "virtual site visit" and the participants were given photocopies of the photos.]

Use the first slide to provide instructions for the activity. Tell the participants where they will be going to conduct a field site assessment if it is within easy walking distance or other convenient transportation arrangements can be made. Distribute the site map you have generated, which can be a simple sketch on A4 size paper.

Handout 6.4.1 Scenario for Synthesis Exercise.

Slide # 12 In Your Small Group, Please Answer the Following Questions. Review the required tasks, which are also on the handout, with the participants. These include responding to the following questions:

1. What type of construction materials will be needed? What sources will you propose?
2. What type of design would you choose to address energy, climate, and community concerns?
3. What other site management considerations should be addressed?
4. What are the likely environmental impacts of the project? What particular actions should be considered to ensure that the construction project is conducted in a sustainable fashion?

Form the participants into three or four teams – ideally of four or five participants each. Note that the tasks are quite demanding and that the teams should think about delegating certain tasks to certain team members. Advise them to appoint a team leader and someone who will be responsible for presenting the team's results during the debriefing.

Give them 85 minutes to visit the site (if possible, or to review the photos and map) and prepare their responses to the questions on the handout.

If the exercise includes visiting an actual site, you or another facilitator should accompany the teams to the mock construction site to answer participant questions about the context of the relocation and the proposed construction project. When asked questions that you have not anticipated (e.g., how many of the relocating families are intact, and how many are single-female-headed households?), make up a reasonable answer on the fly. Be sure to write down these "last-minute" creations, as other teams should receive the information as well (unless, of course, you are planning to give different bits of information to different teams).

Advise the teams to spend half the time assessing the site and gathering information, and half the time preparing their responses to the questions and writing them on a flip chart back at the training center.

Activity 4.2 Synthesis Exercise Debriefing

(40 minutes)

Since the debriefing part of the exercise is at the end of a long day, it needs to be dynamic, fun, and fast moving, and should highlight lessons learned from the workshop.

Slide # 13, Sustainable Construction Synthesis Exercise Debriefing. Show the slide to guide the reports. Then proceed as follows:

- Have all the participants stand up and approach the first flip chart. Ask the first team's reporter to present the team's findings (approximately five minutes).
- After his or her presentation, take questions and comments from the other teams (approximately five minutes) to clarify the presenter's ideas.
- Repeat this process with the other teams until all reports are complete and all questions and comments are exhausted.

As the facilitator, you need to keep notes of the pros and cons of each presentation. (If there is a local expert there as a resource person, he or she should also do the same.)

Then open the discussion to the whole group. Ask them to discuss which of the solutions seem to be the most appropriate. Your responsibility is to critique this discussion and to correct any misunderstandings or offer your judgment on controversial differences of opinion. When appropriate, you might point out which team's solution would likely to have the best outcomes, and bring up the potential pitfalls of weak proposals.

Facilitator Debriefing Guidance Notes:

Be on the lookout for the following issues and concerns. Raise them only if the participants do not:

QUESTION	ISSUES AND CONCERNS
What type of construction materials will be needed? What sources will you propose?	• Are the proposed materials traditionally used in local housing construction? If not, why are nontraditional materials being proposed? Because of shortages? Technical improvements? Why the difference? • Are the construction materials proposed by the teams to be sourced locally? If so, are they easily procured without detriment to the environment from which they are to be taken? • Alternatively, are the materials to be imported? Why? From where? At what cost in terms of transport? What cost will their extraction imply?
What type of design would you choose to address energy, climate, and community concerns?	• What is the prevailing climate at the site? • How can heat from the sun be minimized or used? How might solar energy be used in the project? • What is the proposed solar orientation of the construction? • If this is a wet climate, what is the likely impact of heavy rains on the site?
What site management considerations should be addressed? *Related questions are:* What types of waste will likely be generated? Where and how will you dispose of it? What types of pollution are likely to be generated by the project? How might this be minimized?	• What types of construction wastes would likely be generated? Other wastes (e.g., material wastes, hazardous materials)? • What opportunities for reuse or recycling have been identified? • How might wastes be stored until they are disposed of? • Where might unusable wastes be dumped/disposed of? • Is air, soil, or water pollution likely? From what processes? • What plant or animal populations could be impacted by this pollution? • What steps might be taken to minimize soil and water runoff? • How is the site aligned vis a vis other populations? • How might the site and surrounding areas be protected from any construction project hazardous materials? What sort of barriers or procedures would help protect the immediate environment?

After each team has presented and responded to questions, thank the participants for their hard work throughout the day and move to the next activity.

Activity 4.3 Learning Evaluation

(10 minutes)

Slide # 14, Another Review. Asking participants to take the Learning Evaluation (quiz) is optional. If you decide to do it, explain that the chief value is in helping the workshop planners and facilitators see how well the information was presented and communicated. We are not trying to evaluate the participants, but ourselves. Pass out 6.4.3 Learning Evaluation and allow about 10 minutes for completion. Collect the quizzes and distribute Handout 6.4.4 Learning Evaluation Answer Key, and move on to the workshop evaluation.

Activity 4.4 Evaluation and Closing

(20 minutes)

Slide # 15, Workshop Evaluation. Ask the participants to fill out 6.4.5 Workshop Evaluation and hand it in.

Slide # 16, Closing. Conclude the session by presenting and thanking the hosting team, thanking the participants for their efforts, and encouraging all of them to be greener in their current and next reconstruction projects. Ask if any of the participants or host organization have comments they would like to share. If certificates are required these can be handed out at this time, along with the resource CD of workshop related materials.