



Environmentally Responsible Disaster Recovery and Reconstruction Recommendations



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International, national, and local laws require compliance with environmental policy and regulatory frameworks. At the international level, the Sphere Handbook, the Code of Conduct for The International Red Cross and Red Crescent Movement and NGOs in Disaster Relief, and the Sendai Framework for Disaster Risk Reduction address the need to prevent over-exploitation, pollution, and degradation of the environment and encourage sustainable use and management of ecosystems.

This guidance highlights key environmental issues throughout the recovery and reconstruction process and is designed for humanitarian agencies, government officials, and community groups involved in supporting affected populations for recovery and longer-term reconstruction.

LAND USE AND INFRASTRUCTURE: PLANNING AND PREPARATION

Prior to selecting sites for infrastructure or development, project managers should consider the following factors to improve site safety and environmental sustainability:

- a. Consider climatic factors, including hurricanes, coastal floods, heavy rains, temperature extremes and drought in planning; allow for the intensification and increased frequency of climate extremes as climate change advances.
- b. Identify safe areas protected from natural hazards such as landslides, floods, earthquakes, and wildfire. Whenever practical, try to avoid green field sites, or sites that have not previously been developed. Instead prioritize infill sites in existing developments or neighborhoods.

- c. Plan any new developments well outside current or future hazardous areas such as floodplains, parks or protected areas; ensure that infrastructure is not located close to ecologically sensitive areas or protected areas, or religious/cultural sites and directs future development away from these areas; and as practical connect to existing infrastructure and transportation networks.

- d. Identify areas for building that have acceptable soil bearing capacity for foundations and are stable and reasonably flat.

- e. Consider drainage and surface water flows by observing flows after storms and/or consulting with local people.

- f. Ensure that sites for housing projects meant for lower-income or vulnerable groups are given equal emphasis and not allotted near landfills, unstable slopes or other areas which will pose health and safety risks for them.

- g. Promote water retention and infiltration onsite to reduce flooding by incorporating vegetation on the site and reducing runoff from roads.

- h. Retain vegetation and forest cover around and uphill from the site as much as possible, to improve water quality, natural resources, conservation value, shade, and protection from landslides and floods.

WATER AND SANITATION

- a. Use a watershed management approach. To ensure the long-term environmental sustainability of water and sanitation intervention, activities should be accompanied by a watershed management component. Protecting and managing the watershed can help sustain the water source, and provide other services such as water retention and filtration.

b. Use technologies that reduce demand on water supplies, decrease the inflow of harmful nutrients to water bodies, provide communities with higher water quality and quantity, and decrease maintenance effort and costs.

c. Develop environmentally responsible solid waste management plans for all disaster debris and construction projects in the affected areas at the municipality and community levels in consultation with district and local government.

CONSTRUCTION AND ENVIRONMENTALLY RESPONSIBLE SOURCING OF BUILDING MATERIALS

a. Only support sound and legal sourcing of materials. Project managers should be aware of the sources of their building materials and make sure that they establish contract specifications for the use of sound and legally sourced materials. Material sourcing, processing, and use should be socially equitable and should not disturb established local markets. Procure sand, clay, gravel, boulders and other construction materials from legal areas that do not cause increased safety and environmental risks such as landslides, increased flood hazards, damage to infrastructure, downstream sedimentation, or degradation of wetlands. Using materials that have been officially certified is one strategy for ensuring that materials have been sourced responsibly.

b. Evaluate the building material life cycle including origination, production, use, and disposal; select materials that are environmentally responsible with low embodied energy requirements.

c. Design to use fewer materials and use building materials, including local materials, that increase safety and reduce environmental and health impacts, including sustainably harvested timber, lightweight materials, and advanced technologies such as compressed stabilized earth blocks.

d. Train construction workers in good practices to ensure quality work and efficiency in use of construction materials to avoid duplication and waste.

e. Environmentally responsible construction should actively account for and address flexibility of use, building and material life span, local climate variability, energy efficiency, solid-waste management, and waste and wastewater systems.

f. On-site construction management should include attention to the handling of materials, equipment, and waste; pollution prevention; workforce education; and environmentally aware construction site planning and layout.

DEBRIS AND WASTE MANAGEMENT

a. Reuse, recycle, and repurpose construction and disaster debris as much as possible for building materials and to reduce the amount of solid waste in landfills.

b. Dispose of waste and debris, including hazardous materials, in designated areas away from streams, wetlands, and development. Consult with local authorities on safe and environmentally responsible disposal areas.

ENERGY EFFICIENCY AND RENEWABLE ENERGY

a. Promote energy efficiency by orienting buildings to limit solar heating); provide wind protection if needed; and take advantage of shade to offset roof heating.

b. Consider opportunities for large-scale wind or solar power farms to reduce reliance on traditional fuel sources.

c. Promote the use of energy efficient fixtures, appliances and solar panels in rebuilding homes and businesses.

URBAN AND TOWN PLANNING AND DESIGN

- a. Account for increased surface runoff from the addition of impervious surfaces, such as roads and sidewalks, limit where possible by retaining existing vegetation, introducing green roofs, and using permeable pavements, and manage runoff through bioretention and conserving natural, open space.
- b. Improve urban air quality by promoting public transportation options and street networks that are pedestrian friendly.
- c. Use lighter colored building materials that reflect heat where possible to reduce urban air temperatures.
- d. Include safe, open spaces in site planning for multi-purpose community use, especially for women. Include open spaces for household use where feasible. Under normal situations, open spaces can be used for social activities, children's playgrounds, and livelihood activities such as community gardens and craft activities. In case of disaster, the space can be used for evacuation.
- e. Incorporate public safety and accessibility considerations into planning and design by mixing housing alongside businesses and providing for well-lit streets and roads, bus stops, locations for vendors, rest areas, and public transportation in urban areas.
- f. Incorporate locally and culturally appropriate designs as well as features and appliances that are energy and water efficient, such as solar panels and rain water harvesting.

RECONSTRUCTION PRACTICES

- a. Provide training to the workforce including construction operatives about the best construction practices and methods, sustainability, and basic behavioral aspects of the structures under the action of natural forces including seismological activity.
- b. Check that construction workers follow minimum standards for health, safety, and environment (HSE), especially if communities are involved in reconstruction. Provide training on HSE where needed.

REFERENCES

- 1.Green Recovery and Reconstruction Toolkit:
<http://envirodm.org/green-recovery>
- 2.Building Material, Use, and Selection: An Environmental Guide (BMEG):
<https://buildingmaterialguideblog.wordpress.com/>
- 3.Timber as a construction material in humanitarian operations: <http://www.humanitarian timber.org/>
- 4.WWF Keep It Legal: Best Practices for Keeping Illegally Harvested Timber out of Your Supply Chain:
www.panda.org/forests/keepitlegal/



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