



ANNOTATED GUIDING PRINCIPLES FOR POST-TSUNAMI REHABILITATION AND RECONSTRUCTION

Introduction

The global problem and the need for principles

The recent tragedy of the tsunami in the Indian Ocean has generated an unprecedented amount of relief and support from the donor community and private organizations, and extraordinary generosity from neighbouring communities adjacent to those devastated. Because of the scale of the impact and the immediate humanitarian needs, actions were initially focused on emergency needs for shelter, food, and medical care. Another priority has been to begin immediately to design and build a warning system for such disasters. The biggest and most protracted challenge will be to rebuild and rehabilitate hundreds of kilometers of devastated coastline, and re-establish livelihoods for over a million displaced people.

This is a huge challenge since many of the affected shorelines are densely populated - in most cases by poor people. Before the rebuilding begins we must commit to avoid needlessly repeating the mistakes of the past – for example, forms of coastal development that pushed the poor into the most unhealthy and hazardous corners of the coast and produced patterns of construction that are inefficient, inequitable, and unsustainable.

To guide the massive coastal reconstruction effort, the United Nations Environment Programme (UNEP) Tsunami Disaster Task Force in cooperation with the UNEP Coordination Office of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (UNEP/GPA) convened a meeting on February 17, 2005 in Cairo to discuss coastal zone rehabilitation and management in the tsunami-affected region. Attendees from the affected nations and supporting international institutions¹ endorsed twelve key principles (hereafter referred to as the Guiding Principles) consistent with an advance to more sustainable forms of coastal development and the United Nations Millennium Development Goals.

If adopted and applied throughout the affected region, the Guiding Principles will:

- Allow those involved to sequence their actions following a common set of priorities;

¹ The participants to the meeting included Senior Government Officials from Indonesia, Malaysia, Thailand, Myanmar, Bangladesh, India, Maldives, Sri Lanka, Kenya, Seychelles, Tanzania, Yemen; representatives of Regional Seas Programmes, South Asian Seas, East Asian Seas, PERSGA, ROPME, Mediterranean Action Plan, Caspian Environment Programme, Wider Caribbean; representatives of countries and international organizations and institutions, DEFRA/UK, DFID/UK, FAO, UNESCO, World Bank, Islamic Development Bank, League of Arab States, IUCN, WWF and UNEP

- Strengthen our collective commitment to rehabilitate and protect coastal communities and increase the efficiency of our actions;
- Provide the basis for regional workshops and discussions to pinpoint local needs and priorities;
- Facilitate the exchange of experience and the rapid dissemination of emerging good practices.

The Purpose of This Document

This booklet expands on the twelve principles formulated in Cairo by incorporating suggestions on the original draft text made before and during the Cairo meeting by the World Bank, UNEP, the World Conservation Union (IUCN), the Food and Agriculture Organization (FAO), the International Maritime Organization (IMO) and others. It borrows from related texts subsequently released by IUCN, UNEP, the Consortium to Restore Shattered Livelihoods in Tsunami-Devastated Nations (CONSRN) and WorldFish. This is an initial version that will be revised and amplified through a round of workshops in the region at which attendees will be invited to share their experience, identify priority needs and offer specific examples of successes and difficulties in applying the principles in a wide range of settings. After the workshops, a corrected and amplified version of this booklet will be prepared with short examples and case studies that reflect the realities being encountered by those most directly involved in rehabilitation and restoration efforts. Our purpose is to create a living document that incorporates and builds upon our collective experience and knowledge. In early 2006, UNEP proposes to reassemble representatives of the affected nations and supporting international organizations to review progress and lessons learned a year after the principles were adopted.

The Guiding Principles

1. (Overarching principle) Reduce the vulnerability of coastal communities to natural hazards by establishing a regional early warning system; and applying construction setbacks, greenbelts and other no-build areas in each nation, founded on a science-based mapped “reference line”.

Using concepts of integrated coastal management, including public engagement in local decision-making, employ a rapid assessment zoning and planning process to:

2. Promote early resettlement with provision for safe housing; debris clearance; potable water, sanitation and drainage services; and access to sustainable livelihood options.

3. Enhance the ability of the natural system to act as a bioshield to protect people and their livelihoods by conserving, managing and restoring wetlands, mangroves, spawning areas, seagrass beds and coral reefs; and by seeking alternative sustainable sources of building materials, with the aim of keeping coastal sand, coral, mangroves and rock in place.

4. Promote design that is cost-effective, appropriate and consistent with best practice and placement of infrastructure away from hazard and resource areas, favouring innovative and soft engineering solutions to coastal erosion control.

5. Respect traditional public access and uses of the shoreline, and protect religious and cultural sites.

6. Adopt ecosystem based management measures; promote sustainable fisheries management in over-fished areas, and encourage low impact aquaculture.

7. Promote sustainable tourism that respects setback lines and carrying capacity, benefits local communities and applies adequate management practices.

How things are done is as important, sometimes more important, than what is done. Local knowledge and insights are critically important to successful planning and decision-making, and local citizens must be engaged in the rehabilitation and reconstruction process at every stage. It is essential that the application of the construction setback line and the boundaries of bioshields are defined in consultation with the local communities coastal reach by coastal reach.

8. Secure commitments from governments and international organizations to abide by these Principles and build on and strengthen existing institutional arrangements where possible.

9. Ensure public participation through capacity building and the effective utilization of all means of communication to achieve outcomes that meet the needs and realities of each situation.

10. Make full use of tools such as strategic environmental assessment, spatial planning and environmental impact assessment, to identify trade-offs and options for a sustainable future.

11. Develop mechanisms and tools to monitor and periodically communicate the outcomes of the reconstruction through indicators that reflect socio-economic change and ecosystem health.

12. Widely disseminate good practices and lessons learned as they emerge.

Applying the Principles Place by Place

A feature critical to the successful practice of coastal management is the ability to tailor principles such as those adopted in Cairo to the unique needs and conditions present in a specific locale. For example, on low lying shores like those in Bangladesh and the Maldives, a construction setback may not be effective in reducing the vulnerability of people to rising sea level, waves and flooding. In such places, focusing on building cyclone shelters and community-based emergency plans is the best approach. However, in other situations relocating damaged roads, railroads and dwellings to higher ground is both feasible and sensible. Setbacks, greenbelts and no-build zones have repeatedly been shown to be effective in reducing hazards and enhancing environmental qualities in a wide diversity of settings within the region affected by the tsunami and elsewhere. In all cases, protecting and restoring coral reefs, dunes, estuaries and seagrass beds makes coastal systems more resilient and capable of sustaining a diversity of livelihoods and a flow of benefits to the people of the place.

It has been learned repeatedly that successful implementation of a set of principles and a plan of action rests on the active and sustained participation, support and understanding of the affected communities. Without such support, investments in planning and implementation are likely to be ignored or resisted and will not generate a sustained flow of benefits. In this booklet, we use the term “coastal reach by coastal reach” and “reach by reach” to describe a process of planning and decision making that addresses stretches of coastline with similar characteristics and of an appropriate size to make the engagement of local people practical and possible. A coastal reach typically extends between headlands or demarcates a length of shoreline with similar rural or urban characteristics typically extending 5 to 20 kilometers. For the purposes of coastal management, reaches often need to be smaller for intensely utilized coasts where a diversity of activities are competing for space.

Thus, while it is the responsibility of national governments to set the policies and procedures that require setbacks, bioshields, priorities for settlement and re-establishing livelihoods, the details of how such policies will be applied in a specific locale must make provision for local consultations and tailoring to existing conditions and needs. The precise delineation of a construction setback and identification of additional no-build areas within bioshields requires soliciting local knowledge and responding to local needs and local conditions.

The principles adopted in Cairo and the more detailed guidance offered in this booklet are divided into two groups. Principles 1 through 7 focus on the priority technical measures. These address **what** must be done in order to better prepare shorefront communities for future change and to design and implement a rehabilitation and reconstruction process that, where possible, creates conditions superior to those that were present before the tsunami struck. They draw on the scientific knowledge that has evolved in recent decades as coastal processes and their interaction with human activities have been analyzed. The lessons learned from the reconstruction and rehabilitation following other natural disasters form the substance of the first seven principles.

In any emergency, the order in which actions are taken is important. The delineation of construction setbacks and improving the long-term conditions of the poor are top priorities and are, therefore, addressed first in both the Cairo Principles and the guidance offered in this booklet.

Principles 8 through 12 deal with **how** to apply the principles. These principles draw upon the experience in dozens of nations over the past forty years in the evolution of what has come to be called “integrated coastal management” (ICM). These principles address the processes of public participation, the usefulness of setting unambiguous goals at both national and local scales, the evaluation of results, and the dissemination of experience and new knowledge.

I. PRIORITY TECHNICAL MEASURES

Principle 1 (Overarching Principle)

Reduce the vulnerability of coastal communities to natural hazards by establishing a regional early warning system; and applying construction setbacks, greenbelts and other no-build areas in each nation, founded on a science-based mapped “reference line”.

It is not possible to sustain any development in coastal areas if the huge energy and natural dynamics of coastal systems are ignored. Many of the adverse social and economic impacts of the tsunami have occurred because people have been made more vulnerable to natural hazards through poor planning and the ineffective management of coastal development. The technical difficulties and financial costs of opposing the natural dynamics of coastal systems far outweigh the long-term benefits that can be gained by working with the natural processes that create and maintain healthy ecosystems and a flow of social and economic benefits to humankind.

At a time when human populations are becoming increasingly concentrated along coastlines, sea level is rising and long established weather patterns are changing. We therefore know that hazards created by storms, the reshaping of coastlines by processes of erosion and accretion, instabilities produced by new patterns of land use as well as such relatively rare occurrences as tsunami will together make shorelines increasingly hazard-prone.

- The nations of the region and several international organizations are working together to develop an effective tsunami early warning system that will reach the entire regional community, particularly the most vulnerable groups.
- What is known about past and future coastal change can be applied to define a *reference line* showing where the shoreline is anticipated to be, for example, by 2050. Detailed aerial photographs could be prepared reach by reach for all of the region’s shoreline, showing conditions as they were before and after the tsunami. A reference line could be drawn on such photographs showing the mean high water mark anticipated by the 2050 median projection for a sea level rise of 30cm made by the Intergovernmental Panel on Climate Change (IPCC). This reference line should be modified by other tectonic and coastal data affecting anticipated coastal change in specific areas. Where information is available, data on the anticipated effect of historical trends in erosion and accretion to 2050 and the inland extent of flooding in past storms should also be integrated into estimates of the future position of shorelines.
- A recommended construction setback line should be established by each government as a set distance and/or elevation inland of the reference line. The area seaward of the setback line should be designated as a strictly enforced “no-build” zone. It is essential that such setbacks are incorporated into the existing regulatory system and are applied equitably to the wealthy and the poor.
- On low-lying shorelines with little topographical relief, practical disaster preparedness plans should be developed and tested that feature speedy evacuation of people to protected shelters.

- The width of the no-build zone determined by the setback should be greater in as-yet-undeveloped shores than in already urbanized areas.
- Designate setback lines with permanent on-site markers and enforce them uniformly as a regulatory measure.
- Exceptions for building structures seaward of the setback line should be granted only where required to support such water-dependent activities as fishing and navigation (not tourist facilities or permanent settlements). Where such exceptions are granted, structures should be temporary or built to withstand flooding by strengthened structural members and elevated first floors that permit flood waters to flow through unimpeded. Attention should be given to the impact of such structures on adjacent coastal areas, and mitigation actions taken.
- The granting of such exceptions for construction seaward of the setback line should be based on clear and uniform criteria and applied through a highly transparent process with opportunities for comment by the local community.

Principle 2

Promote early resettlement with provision for safe housing; debris clearance; potable water, sanitation and drainage services and access to sustainable livelihood options.

Putting people first in rehabilitation requires moving quickly to resettle those displaced by the tsunami in a manner that provides the poor with living conditions and services that are better than those that existed before the disaster. Those that have lost property and cannot rebuild because their properties are within the no-build zone must be adequately compensated.

- Where practicable, identify sites beyond the “no build zone” for permanent housing for those displaced by the tsunami, and for reconstruction of essential infrastructure, such as access to roads, water supply and sanitation, waste water treatment and solid waste disposal.
- Avoid or minimize involuntary resettlement—in accordance with the Guiding Principles on Internal Displacement presented to the UN Commission on Human Rights and the General Assembly. A “no build zone” applied to a settled coastline may have severe consequences for those deprived of land tenure or rights of residence. Where relocation is judged to be in the best long-term interest of those affected, provide adequate compensation for land and property. Also, establish channels for grievance resolution at the appropriate levels of government.
- Adopt appropriate building codes for all structures, including seismic codes in earthquake prone areas.
- Provide potable water, sewage collection and treatment, and adequate drainage systems in all new and reconstructed communities.

- Favor standardized, modular systems with interchangeable components to achieve cost savings and reduce future maintenance costs.
- Encourage the use of local labor in all phases of the reconstruction process thereby generating employment and enhancing the marketable skills of the poor.

Principle 3

Enhance the ability of the natural system to act as a bioshield to protect people and their livelihoods by conserving, managing and restoring wetlands, mangroves, spawning areas, seagrass beds and coral reefs; and by seeking alternative

Natural barriers to flooding and coastal erosion, such as coral reefs, near-shore rock outcrops, sandbars, and sand dunes should be protected from construction activity and uses that compromise their structural integrity. They reduce, absorb and redirect waves and floodwaters. Wetlands, lagoons, river estuaries, and reefs are essential to sustaining fisheries, public health and the many livelihoods that support coastal populations. They contribute to a healthy and aesthetically pleasing environment for a seaside holiday. A portion of the funds for rehabilitation should therefore be assigned to protect and restore these habitats.

Reconstruction will require thousands of cubic meters of sand for cement and for fill, and building materials of every description. Traditionally, many of these materials have been taken from the coast itself. When sand is mined from beaches, dunes and coastal rivers, mangroves are cut for timber, and wetlands filled as building sites coastal settlements become more vulnerable to hazards of every description.

- Conduct rapid assessments that involve local people in the identification of natural areas important to fisheries production, the recycling of wastes, shoreline stabilization and scenic quality, including coastal wetlands and mangroves, seagrass beds, and coral reefs. The aerial photographs and maps used for establishing setback lines can be used in this process of identifying critical areas.
- Incorporate these natural features and habitats into a designated coastal bioshield that maximizes the protection from coastal hazards and the associated benefits provided by these natural features. Adopt measures to protect bio-shields from activities that compromise their natural qualities. Protect them from future disturbance and, where feasible, restore them.
- Where feasible, plant trees seaward of the setback line to form a greenbelt that buffers the shore from waves, floods and erosion.
- Prohibit the mining of sand, coral and stone from coastal waters within the 20-meter depth contour.
- Regulate sand mining from rivers.
- Declare wetlands and mangroves as off limits for harvest of wood.
- Prohibit the filling of wetlands and estuaries.

Principle 4

Promote design that is cost-effective, appropriate and consistent with best practice and placement of infrastructure away from hazard and resource areas, and favouring innovative and soft engineering solutions to coastal erosion control.

The reconstruction is an unprecedented opportunity to relocate communities away from hazardous and unhealthy areas, rectify badly designed infrastructure and services, and reduce previous inequities in their availability and distribution.

- Place arterial roads, railroads and other transportation infrastructure well inside the setback line, and site access-ways perpendicular to the coast.
- Limit investments in erosion control to those situations where pre-existing infrastructure or settlements make it cost-effective, and where it is considered environmentally justifiable; favor soft solutions (placement of sand, planting vegetation) over hard solutions (breakwaters, groins, shoreline armoring).
- Identify natural barriers to flooding and coastal erosion, specifically coral reefs, near-shore rock outcrops, sand bars, and sand dunes; protect them from construction activity and uses that compromise their structural integrity.

Principle 5

Respect traditional public access and uses of the shoreline, and protect religious and cultural sites.

- Identify with permanent on-site markers and preserve public rights of way to the shore. All coastal development initiatives should respect the customary rights of local communities to the coastline, and recognize these areas as public domain.
- Assure that landing sites for local fishers and associated facilities for cleaning catches and storing fishing gear are restored or relocated to an equivalent or better nearby location.
- Identify with permanent on-site markers and preserve religious or cultural sites valued by local residents. Coastal development should keep these special coastal features accessible and protect their visual integrity.

Principle 6

Adopt ecosystem based management measures; promote sustainable fisheries management in over-fished areas, and encourage low impact aquaculture.

The rehabilitation of hundreds of kilometers of shoreline should generate many opportunities for more diversified and more sustainable livelihoods. A primary concern must be the future prospects of communities dependent upon fishing. These same communities contain a high proportion of the region's poorest people. A recent statement prepared by WorldFish points out that coastal fisheries in Asia were severely depleted and over-fished before the tsunami. Too many boats taking too many fish had in some areas reduced fish stocks to less than 10% of their original levels and destroyed or degraded the

habitats upon which these potentially renewable resources depend. A trend toward the use of damaging gear and the use of increasingly destructive fishing methods—such as small mesh nets that take juveniles—has made the situation progressively worse. The tsunami has only added to the problem.

- While assisting fishers by replacing equipment and rebuilding boats, ensure that less destructive and more sustainable fishing practices are adopted.
- Assist fishers who do not wish to return to fishing by developing alternative livelihoods. This will contribute to reducing fishing effort and restoring natural resources.
- Promote employment-intensive fisheries operations that contribute directly to poverty alleviation and food security.
- Implement integrated coastal fisheries management (ICFM). This approach is centered on the development of management plans that incorporate social, economic and biological objectives. Such initiatives should be developed within a co-management framework with strong involvement from the affected communities. ICFM encourages communities and governments to look explicitly at the distribution of benefits from coastal resources and to maximize the contribution of fisheries to poverty reduction.
- Develop investments, training and infrastructure that reduce post-harvest losses. In rebuilding destroyed infrastructure and processing facilities and creating new ones, make investments to minimize post-harvest losses and add value to catches. This will also provide additional livelihoods, particularly for women, when it emphasizes the use of employment-intensive, low-cost, hygienic technologies.
- Encourage investment in community-based aquaculture and other livelihoods that bring benefits to local populations and do not degrade coastal ecosystems. Rehabilitated aquaculture must adopt environmentally sound management practices that do not pollute, damage habitats or cause long-term harm, including use of feed that is taken from sustainable sources and seeds that are raised in environmentally sound hatcheries or taken from sustainable fisheries.
- Modify the placement and density of shrimp aquaculture operations to reduce environmental degradation and adverse impacts on other coastal activities. In particular, subject shrimp ponds to siting criteria that protect natural systems and coastal water quality, and limit the intensity and extent of operations in each coastal reach.
- Avoid the ‘privatization’ of inshore waters and the consequent disruption of fishing operations and livelihoods.

Principle 7

Promote sustainable tourism that respects setback lines and carrying capacity, benefits local communities and applies adequate management practices.

- Identify vulnerable sectors of the population and develop strategies (e.g. training, micro-enterprise development) to redirect these to such income generating activities as value-added processing, ecotourism and cottage industries that reduce pressure on ecosystem services.
- Ensure that tourism planning is responsive to the needs of the local community and seeks to ensure community benefits. Local communities should be involved in the tourism planning process and development of associated recreational activities. This will help ensure that economic benefits are adequately distributed.
- In coastal tourism development, use appropriate siting, improved engineering designs and appropriate construction management practices that respect the dynamic nature of the coastal areas and ecosystem function. Such measures help control the negative impacts that can come with coastal tourism, including the loss of habitat and landscape, degradation of water quality, erosion of beaches and loss of beach access and income by traditional resource users. Such siting and design also helps minimize risks from storms, hurricanes, tsunamis and erosion and will reduce the need for prohibitively costly restoration and rehabilitation measures. Construction setbacks are one of the most appropriate proactive means of reducing risk of natural hazards. National and local authorities must support the industry through public sector planning, development control and provision of construction standards.

II. PROCESS MEASURES

Principle 8

Secure commitments from governments and international organizations to abide by these Principles and build on and strengthen existing institutional arrangements where possible.

- Mobilize rapid or immediate endorsement of these principles and enunciate their implications for all reconstruction activities. The adoption of the principles need not add time to the reconstruction process and, if unequivocally endorsed by the highest levels, will reduce uncertainty.
- Set specific measurable goals (e.g. to double the number of people with potable water over pre-tsunami levels) for the reconstruction by each participating nation and its partner organizations. This will help focus the effort and provide a basis for measuring successful implementation of the principles.
- Use the opportunities created by the intense activity brought by the reconstruction process to strengthen the relationships among these institutions and to address weaknesses in the current coastal management system. Responsibility for coastal planning and decision-making—including the necessary enforcement powers—are invariably distributed among a number of governmental agencies at the national and sub-national levels. In some nations non-governmental organizations also play major roles in coastal management.

- Embrace opportunities to strengthen each nation's coastal management system and encourage investments in associated training and institution building.

Principle 9

Ensure public participation through capacity building and the effective utilization of all means of communication to achieve outcomes that meet the needs and realities of each situation.

- First, consult with local people to review conditions as they existed before the tsunami to identify potentially significant habitats, rights of way to the shore and significant cultural or religious sites. The provision of detailed before and after aerial photographs and maps showing the reference line will assist in this process. It is essential that representatives of the poorer segments of the community are present and participate actively and that traditional leadership such as village leaders and religious leaders provide guidance and assist in the mediation of disputes.
- Second, envision the conditions and specific features of the coastal reach in question that would be seen as meeting local needs and local goals. This will address the specifics of marking the setback line and engaging in a rapid planning and zoning process. These discussions are likely to reveal competing views and conflicts. Therefore, it is important that decisions be guided by the precise demarcation of the setback line and that the boundaries of bioshields be based on pre-defined and unambiguous criteria and that these be applied in a transparent manner.
- Adapt strategies for applying these principles as appropriate. It will be important to learn and adjust as the reconstruction and rehabilitation efforts unfold. Local knowledge combined with technical expertise and guided by national goals is the recipe for success.

Principle 10

Make full use of tools such as strategic environmental assessment, spatial planning and environmental impact assessment, to identify trade-offs and options for a sustainable future.

- Tailor coastal management principles to the unique conditions present in every coastal reach. This favors a decentralized approach and a co-management structure in which local institutions assume significant roles in planning and decision making.
- Assist the governmental and non-governmental institutions with coastal management responsibilities to refine their abilities to identify threats and their root causes, to negotiate goals and strategies with a diversity of stakeholders, to practice conflict resolution and to prioritize their actions.
- Promote the use of economic assessment tools that help set priorities for investments, define and meet financing needs and sequence investments so as to maximize inter-sectoral collaboration and the advance towards sustainable development.

- Encourage the application of the Precautionary Principle and to its use in impact assessments that should be used to evaluate proposals for major construction projects.

Principle 11

Develop mechanisms and tools to monitor and periodically communicate the outcomes of the reconstruction through indicators that reflect socio-economic change and ecosystem health.

- Set clear goals for the desired outcomes of the reconstruction and rehabilitation process reach by reach and subsequently use these as a reference point for assessing progress and the practice of adaptive management.
- Define and monitor simple, practical indicators for assessing progress towards goals and monitoring the coastal reconstruction and rehabilitation process.
- Report periodically on the results of the reconstruction processes and the lessons that emerge from the application of the principles; document failures as well as successes.
- Make it easy for the print, radio and television media to stay involved in the reporting process by establishing and updating a website and registering it with the main search engines.

Principle 12

Widely disseminate good practices and lessons learned as they emerge.

- Annually invite experts and leaders from the region and elsewhere to review progress and widely disseminate throughout the region the emerging good practices.
- Celebrate success. Create incentives to, and publicly recognize successes—particularly when they result from local initiatives and local creativity in problem solving.

Conclusion

Formulating principles to guide the rehabilitation and reconstruction is but one first step in the arduous reconstruction process. Those engaged in the process will need to work hard to create conditions that are better than those that existed before the tsunami and make coastal communities - particularly the poor - less vulnerable than they were before. There will be major pressures to simply put things back as they were before and to take advantage of the emergency to further individual interests rather than the common good. These pressures must be resisted. The implementation of these twelve Cairo Principles will help grasp the opportunities generated by such a calamity and thereby create conditions that are more sustainable and more equitable than those that were present before.

Appendix

Selected literature and references are provided below. Documents accessible through websites have been emphasized due to their easy access worldwide.

General guidance

- Additional guidance on post-tsunami reconstruction is provided in an IUCN information paper, dated February 2005, entitled “Guidance for Ecosystem Rehabilitation incorporating Livelihood concerns.” It is available on the web at:
<http://www.iucn.org/tsunami/docs/tsunami-guidance-info.pdf#search='%EF%82%B7%20IUCN%20information%20paper%20%28February%20005%29%20Guidance%20for%20Ecosystem%20Rehabilitation%20incorporating%20Livelihood%20concerns.'>
and: <http://www.iucn.org/tsunami/docs/tsunami-guidance-info.pdf>
- Asian Wetland Symposium of 9 Feb 2005 on tsunami and coastal wetlands had recommendations for action: http://www.wetlands.org/news&/docs/AWS_Tsunami.pdf

Reducing vulnerability

- UNESCO has produced a document entitled “A proposal for building capacity to generate coastal bathymetry: a critical element in protecting lives, livelihoods and sustainable development in areas prone to ocean-based extreme events. The IOC/UNESCO website is at: <http://ioc.unesco.org/iocweb/index.php>
- Information on the Indian Ocean Tsunami Warning System is gathered at: <http://ioc.unesco.org/indotsunami>

Debris clearance

- Guidelines on debris disposal are available at several sites including <http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21chapter21.htm>

Promoting access to sustainable livelihoods

- The International Tropical Timbers Organization’s 1996 paper by C. Field, entitled “Restoration of mangrove ecosystems” contains ideas about reforestation to assist sustainable livelihoods.
- The UN department of economic and social affairs has publications relating to sustainable development at: <http://www.un.org/esa/sustdev/mgroups/success/SARD-6.htm>

Conserving, managing and restoring natural systems

- Links to useful literature on the restoration of near-shore marine ecosystems are provided by http://restoration.nos.noaa.gov/htmls/resources/habitat_pubs.html
- The Florida seagrass restoration project has information that could be adapted to other areas: <http://www.fws.gov/CEP/FLGulf.fs.rev.pdf#search='sea%20grass%20restoration'>
- The site <http://w1.mangrove.org:880/video/rem.html> has links to methodology on mangrove restoration. Methodology on mangrove restoration is described in an article at: <http://www.tautai.com/Pubs/Mangrove%20Restoration%20Ambio.pdf#search='mangrove%20Restoration'>
- Links to other information on mangroves can also be obtained at: <http://www.ncl.ac.uk/tcmweb/tcm/mglinks.htm>
- Dr. Jurgen Primavera and Dr. Anitra Thorhaug have published several peer-reviewed journal articles on restoration of mangroves and seagrasses, respectively
- The National Oceanic and Atmospheric Administration (NOAA) has two websites with useful links to information on coral reefs, their restoration and remediation:

http://www.coris.noaa.gov/library/other_sites.html and
http://www.nodc.noaa.gov/col/projects/coral/corallinks/Coral_linkmain.html

- The Intergovernmental Oceanic Commission/United National Educational, Scientific and Cultural Organization (IOC/UNESCO) has also advised about coral reef restoration and remediation at: <http://ioc.unesco.org/coralbleaching/gef.htm>

Sources of building materials

- Some ideas on the sourcing of certified timber and other raw materials and strategies on the sound use of wood are presented by the World Wildlife Fund (WWF) at:
<http://www.unece.org/trade/timber/docs/sem-1/papers/r36Raineypdf#search='sourcing%20of%20certified%20timber'>

Soft engineering solutions

- An electronic bibliography on the use of constructed wetlands to improve water is available at <http://www.nal.usda.gov/wqic/Bibliographies/eb9701.html>
- General links to information on constructed wetlands (including for wastewater treatment) are at <http://www.epa.gov/owow/wetlands/watersheds/cwetlands.html>

Setting up protected areas

- Lessons learned from setting up marine protected area designations in the United States that may be adapted and applied to other nations are provided at http://mpa.gov/information_tools/lessons_learned_table.html

Sustainable Fisheries and Low-impact Aquaculture

- WorldFish center has produced a briefing paper entitled “Building a better future for coastal communities affected by the tsunamis.” This contains key recommendations from the project on “Sustainable management of coastal fish stocks in Asia” documented in Silvestre et al., 2003; In Silvestre et al., (eds): Assessment, management and future directions for coastal fisheries in Asian countries. South and SouthEast Asian Coastal Fisheries: Their status and directions for improved management. WorldFish Center Conference Proceedings 67, 1120 pp. This publication is available at:
<http://www.worldfishcenter.org/rawl/publications/publications.asp>
- Guidance on the restoration of small scale fisheries is available at: http://www.idrc.ca/es/ev-28137-201-1-DO_TOPIC.html
- Codes of conduct for sustainable aquaculture are discussed in the following FAO document: http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/003/AB412E/ab412e34.htm
- The marine finfish aquaculture network refers to cooperation in sustainable finfish aquaculture: <http://www.enaca.org/modules/news/index.php?storytopic=10&storynum=10>
- Information on Fisheries assessments may be downloaded at:
<http://earthwatch.unep.net/oceans/oceanfisheries.php> and
<http://www.nefsc.noaa.gov/nefsc/publications/tm/tm184/>

Land management/infrastructure issues

- Ideas that could be adapted to the current situation can be found within the 2003 Final Report on the Water Quality Coalition for Reef Protection Project by the Rainforest Alliance/National Fish and Wildlife Foundation: http://www.eco-index.org/search/pdfs/707report_1.pdf

Tools for rapid social and environmental assessment

- The World Bank’s community-driven development is described at:
<http://lnweb18.worldbank.org/ESSD/sdvext.nsf/09ByDocName/CommunityDrivenDevelopment>

- Tools and methods of social assessment are evaluated at: <http://www.worldbank.org/socialanalysisresourcebook/socialassess5.htm>
- More information on using social assessment and rapid participatory rural appraisal may be found at: <http://www.fao.org/docrep/W5830E/w5830e08.htm> and <http://www.unu.edu/unupress/food2/UIN08E/uin08e0u.htm>
- OECS 2003. Technical Manual for Post-Disaster Rapid Environmental Assessment. Volume 1 and 2. Organization of Eastern Caribbean Countries, Environment and Sustainable Development Unit. <http://www.oecs.org/esdu/>
- UN-ECLAC 2003. Handbook for estimating the socio-economic and environmental effects of disasters. United Nations Economic Commission for Latin America and the Caribbean. <http://www.proventionconsortium.org/toolkit.htm>
- Wetlands International 2005. Assessment of field protocol for rapid wetland and coastal assessment – a guide for staff: <http://www.wetlands.org/Tsunami/Tsunamidata.htm>

Methods for broader environmental impact assessments

- Biswas AK and SBC Agarwal (eds.). 1992. Environmental impact assessment for developing countries. Oxford; Butterworth Heinman.
- Lohani BN. 1997. Environmental impact assessment for developing countries in Asia. Asian development bank. Manila.
- Barrow CJ. 2000. Social impact assessment: An introduction. London: Arnold.
- International association for impact analysis provides information at: http://www.iaia.org/Non_Members/Pubs_Ref_Material/pubs_ref_material_index.htm
- DigitalGlobe, a commercial satellite operation has made a donation for post-tsunami reconstruction. Imagery donated and downloadable free of charge at www.landcover.org may aid environmental impact assessments.

Ensuring public participation

- Guidance on ensuring stakeholder participation, especially the participation of women, is given in the document “Biodiversity in development”: <http://www.wcmc.org.uk/biodev/index2.html>
- Additional guidance on stakeholder participation is presented in “Diversity makes the difference”: http://www.generoyambiente.org/ES/publicaciones_uicn/biodiversity/modulebiodiversity.htm
- FAO has a website dealing with the issue of gender equity in public participation: <http://www.fao.org/worldfoodsummit/english/fsheets/women.pdf>

Strengthen institutional arrangements

- UNEP’s “10 keys for local and national action on municipal wastewater” discusses the interactions of the different players in a locality – ranging from the communities themselves to NGOs, local governments and the tourist industry, for example. Ideas in this list could be adapted to fit the current context. <http://www.gdrc.org/uem/water/10-keys.html>
- More ideas that could be adapted to coastal areas are presented by the Bonn Keys at: <http://www.gdrc.org/uem/water/bonn-keys.html>

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