

Earthquake Reconstruction



GFDRR Knowledge Notes

Earthquake Reconstruction

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Tribute to GFDRR

Since its establishment in September 2006, the Global Facility for Disaster Reduction and Recovery (GFDRR) has evolved into a partnership of 37 countries and 6 organizations: ACP Secretariat, Arab Academy, Australia, Bangladesh, Belgium, Brazil, Canada, Colombia, China, Denmark, Egypt, European Union, Finland, France, Germany, Haiti, India, Indonesia, Ireland, Italy, Japan, Luxembourg, Malawi, Mexico, The Netherlands, New Zealand, Norway, Portugal, Saudi Arabia, Senegal, Spain, South Africa, South Korea, Sweden, Switzerland, Turkey, United Kingdom, United States, Vietnam, Yemen, IFRC, UNDP, UN/International Strategy for Disaster Reduction and The World Bank.

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Acronyms

ACP	Africa, Caribbean and Pacific Secretariat
BPN	National Land Agency of the Republic of Indonesia
BRR	Rehabilitation and Reconstruction Agency of the Republic of Indonesia
CDA	Continuous Descent Approach Program
CDD	Community Driven Development
EC	European Commission
EIA	Environmental Impact Assessment
EU	European Union
FEMA	Federal Emergency Management Agency
GDRC	Global Development Research Center
GFDRR	Global Facility for Disaster Reduction and Recovery
IDs	Identification Cards
IFRC	International Federation of Red Cross
KEDV	Turkish Woman Support Organization
KN	Knowledge Note
M&E	Monitoring and Evaluating
MDF	Multi Donor Fund
NGO	Non-governmental Organization
SIFs	Social Investment Funds
SIU	Special Implementation Unit
SRFF	Sustainable Recovery Financing Facility
UN	United Nations
UNDAC	United Nations Disaster Assessment and Coordination
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UN-HABITAT	United Nations Agency for Human Settlements
UNHCR	United Nations High Commissioner for Refugees
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs

USAID	U.S. Agency for International Development
WB	World Bank
WFP	World Food Program
WHO	World Health Organization

Preface

The unprecedented scale of recent earthquakes in Chile, Haiti and Japan underlines the importance of having the body of knowledge and best practices easily available for affected governments in order to assist them in making crucial decisions for post-earthquake recovery and reconstruction.

The World Bank, as one of the biggest financing source of post conflict and post disaster reconstruction, has accumulated vast experience through emergency operations on approaches, policies and strategies followed by national governments in post-disaster situations. These experiences and lessons learned were collected in so called Good Practice and Advisory Notes and offered to governments requesting assistance from the Bank, including the “Short-term Plan of Action” following the Wenchuan Earthquake in May 2008, “Global Good Practice in Cyclone Disaster Recovery and Reconstruction” for Myanmar in May, 2008, “Integrated Flood Risk Management: Key Lessons Learned and Recommendations” for China, August, 2010, and the “Haiti Earthquake Reconstruction and Recovery Knowledge Notes” in January 2010.

The Knowledge Notes prepared for the Government of Haiti covered a number of key areas in earthquake reconstruction, including among others Seismic Safety Assessment of Buildings; Debris Management; Environmental and Social Assessment; Experience with Post Disaster Income Support Programs; Land Tenure; Managing Post-Disaster Aid; Rebuild or Relocate; Transitional Shelter. The notes provided just-in-time advice by introducing options for disaster recovery.

Based on the proven usefulness of Good Practice Notes in formulating recovery framework, GFDRR has decided to develop Knowledge Notes for different disasters and make them available to policy makers and practitioners potentially facing post-disaster situations. The “Earthquake Reconstruction” is the first piece of the series.

Acknowledgement

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I. Overview: Recovery Framework

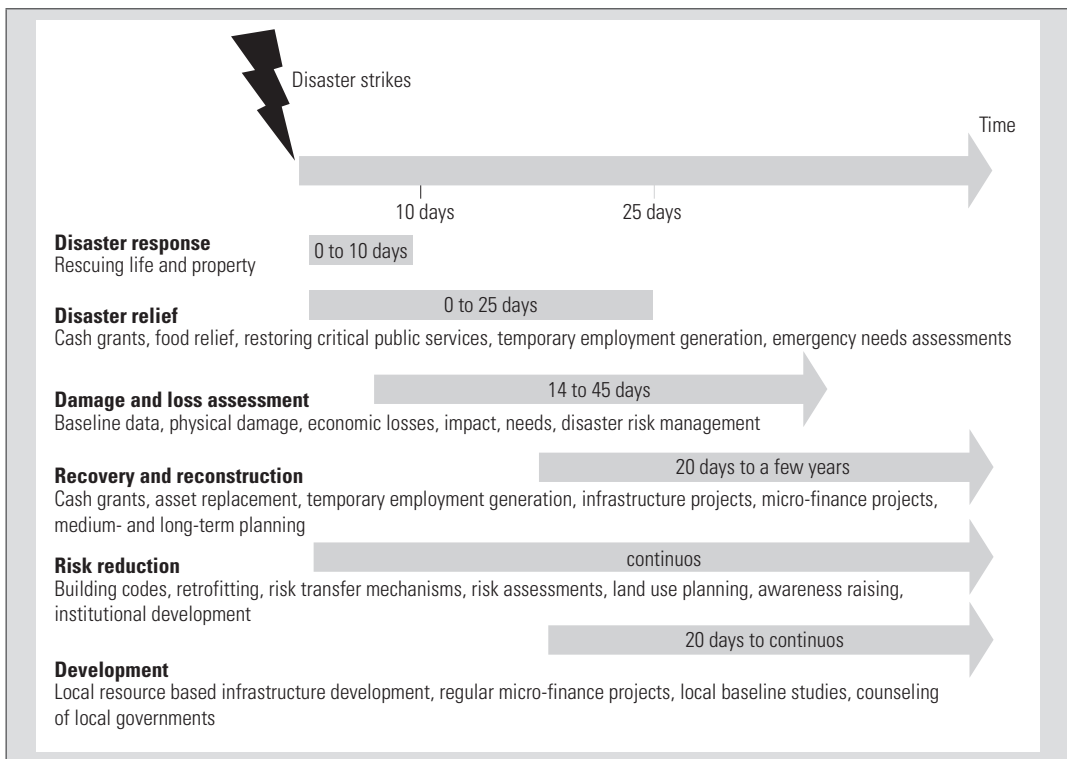


Planning for long-term reconstruction has to begin early in the recovery phase and involve decisions regarding institutional mechanism for managing reconstruction, availability of financial resources, prioritization of reconstruction activities, monitoring and evaluation system, and public information and communication program just to mention a few. The development of Reconstruction Framework should be based on a thorough and reliable analysis of disaster impacts and recovery needs. Experience shows, that having the recovery framework aligned with national development programs and objectives ensures sustainability and efficient use of resources.

1. Timing of Post-disaster Activities

Looking at the time component, all post-earthquake activities occur in three major phases—during response, recovery and reconstruction—as shown in Figure 1.1.

Figure 1.1 Post-Earthquake Activities



Phase 1 includes the time for response (0–10 days) and relief (0–25 days). During this time the goal is to stabilize the situation—through rescue, immediate medical aid, provision of food and emergency shelters, care for the dead, identification of dangerous structures and control of situations. In these early days it is critical to ensure that the affected population has access to food and basic health services. In parallel of stabilizing the situation the planning for recovery starts. A crucial decision that must be made during these very first few days regards housing. If damage has displaced a large number of people, the decision must be made as to where the people will be sheltered during the recovery and reconstruction phases—on-site or off-site? Can resources be mobilized to provide temporary (not emergency) shelters on the site or should be large ‘refugee camps’ built at some distance from the original location? This decision will affect almost all aspects of the following phases.

During the transition from response to recovery the assessment of disaster damages and losses is undertaken. The assessment—a complete tabulation of direct and indirect socio-economic effects of the event—is required to estimate the needs—financial, social and psychological—for recovery and reconstruction and to develop the Recovery Framework.

Phase 2 is the recovery (days to months) period. During this time the situation returns to relatively normal conditions (but not normality) and the main activities include moving the population from emergency shelters (tents, shanties) to tolerable housing where they remain for months to years, until the permanent housing conditions are re-established. In the temporary housing the basic services as water, sanitation, nutrition and public health (including psychological) are provided as soon as possible. Schools should also restart. Depending on the scope of the disaster, the above tasks are often accomplished within weeks.

Similarly high in priorities is the restoration of the basic economic activities and services such as transportation, utilities, basic production. Main roads need to be repaired on an emergency basis, as well as power, some of the commercial activities (if needed, even in tents), and factories need to be brought back to production. These activities are partial in the first days to weeks, but within weeks to months together with social functions (families, work, school, commerce) they should be back, albeit sometimes in temporary facilities. Also during this phase, the planning for the reconstruction phase is initiated.

Phase 3 is the reconstruction (months to years), in which the affected region fully returns to normality. The guiding principle for reconstruction is, to “build back better” and make the community more resilient to disasters. This phase has two main dimensions:

- **Rebuilding Functions.** This means building new structures or making permanent repairs with the same functions as they were prior to disaster. For example, rebuilding or repairing a damaged bridge at the same location falls under this category. The rationale can be that the road can't be moved and the location is the best for a bridge. What has to be ensured in rebuilding functions is that the reconstructed bridge withstands the next disaster. The standards for the repair or replacement must be higher than pre-disaster.
- **Rebuilding Differently.** The reconstruction phase offers a unique one-time opportunity to rebuild differently. Master plans can be developed and implemented for the affected locations (construction and building regulations can be introduced including prohibition of development on a fault line, or on highly liquefiable soft ground, or close to landslide hazards).

2. Setting Goals

The second aspect of the post-earthquake period is determining the “goals”, meaning “what do we want to achieve by the time the reconstruction process is completed?” It involves fundamental policy decisions as to (a) are we going to basically rebuild in the same location, and in the same patterns? If not, then the policy decisions are (b) in what way, and how, can the community/region be reconfigured? On the other hand, if rebuilding is done in the same location and in similar patterns, then the policy decisions are more limited to (c) microzoning, and building standards.

In most of the cases, the situation requires a combination of different types of policy decisions. For example, major cities are usually not going to be relocated—so the remaining option during reconstruction is to apply microzoning (relatively small-scale changes in land use—prohibiting re-building on liquefiable ground), and to implement and enforce building standards (repairs and rebuilding would require to meet higher standards than before). However, it is possible that smaller heavily damaged communities in the mountainous areas are relocated away from excessively high geologic hazards (e.g., landslide). These types of decisions should be made during the earlier phases of the post-earthquake situation, clearly articulated and communicated to the affected population as soon as possible. The earthquake offers a brief window of opportunity to effect change, and the longer decisions are delayed, the harder it is to facilitate change. It is also important to remember that all these seemingly technical and economic considerations have social and human implications and the involvement of affected individuals and communities into the decision making processes is essential.

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II. Managing Post-Disaster Aid



Following major disasters, the solidarity of the international community—bilateral and multilateral donors, foundations and individuals—is reflected in the flow of financial support and assistance for recovery and reconstruction of the affected areas. While these financial resources provide the opportunity to ease the short term needs of the population and develop and implement a reconstruction framework that improves the resilience of communities through risk reduction measures, it is also important to note that the management and efficient use of these resources add an additional layer of challenge for governments.

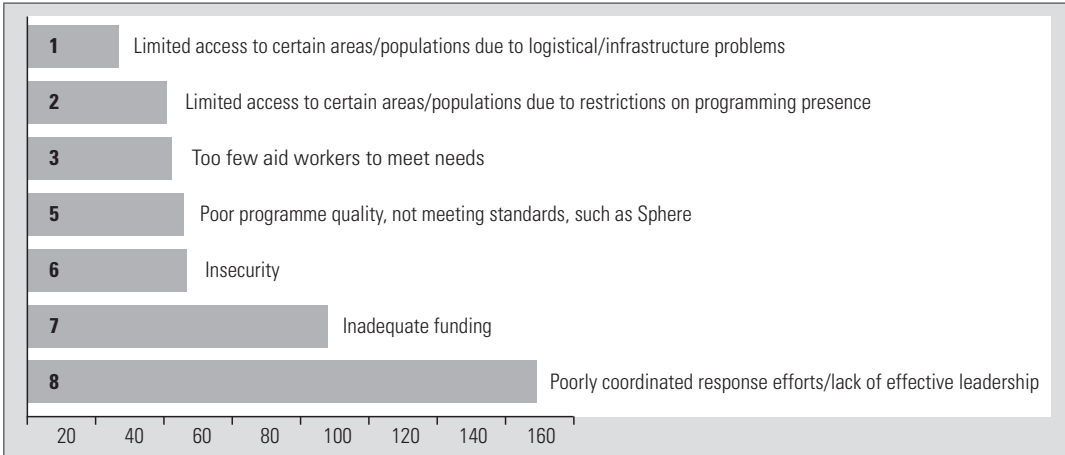
The disaster affected countries often face a tremendous inflow of resources from different sources and this increasing volume of aid would come with fragmentation. The international community's ability to coordinate aid effectively will thus be one of the most important challenges, both in the short term for the relief effort as well as in the medium-term when the reconstruction activities begin.

Box 2.1 Key Decisions Points

- Establish early the best mechanism to manage recovery. Clear modalities of operation will be critical.
- Speed should override detailed planning in the early phase. A "cluster approach" can help establish clarity on leadership.
- Hold (monthly) decision meetings with international partners and conserve the time of senior government officials.
- Tracking the money and results needs to be started early. A strong and detailed Damage and Loss Assessment is critical to effectively allocate resources later.
- Establishment of a Multi Donor Trust Fund can help reduce the fragmentation of aid.

The strength of an affected country's international management system will determine the success of the recovery effort. Senior government officials will most likely be overwhelmed by requests from well-intentioned donor partners. It is important that development partners and NGOs do not overestimate their individual role. Too frequent individual interaction with senior government officials creates a high risk of draining unnecessarily the scarce human resources of the government. A recent survey of humanitarian assistance considered the lack of effective and efficient coordination as the biggest constraint to a successful response to humanitarian operations (see figure 2.1).

Figure 2.1 Challenge of Effective Coordination



Source: ALNAP, 2010

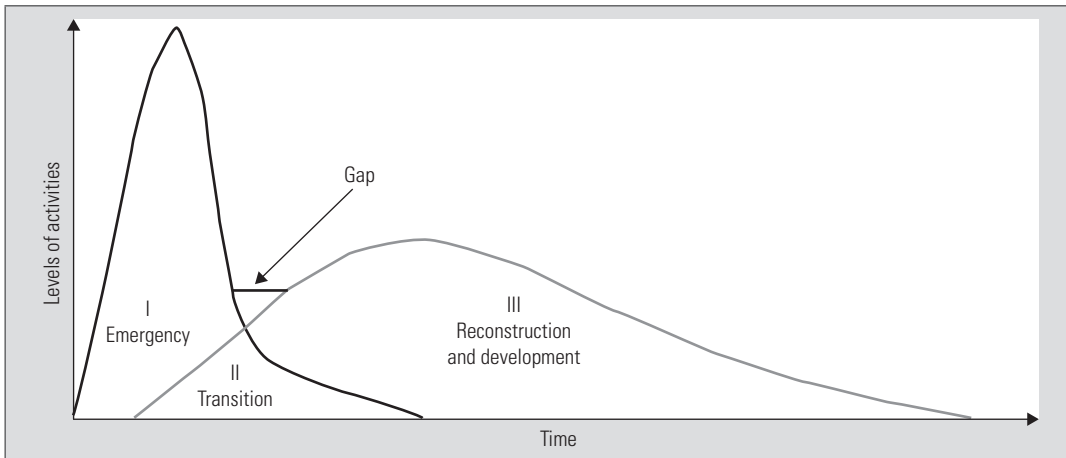
In the initial phase—the first six to nine months—there is a high premium on speedy implementation of relief and recovery programs. Speedy delivery should override detailed planning. In this early phase, the affected region and its major partners should develop a rough reconstruction plan that is simple and provides guidelines for sequencing programs. For large-scale infrastructure projects it takes several months to complete procurement and to mobilize teams to support works, while more decentralized, smaller programs such as household repair or community-based recovery projects can begin earlier. It is important to start preparing these smaller programs early so that they can be implemented once the emergency effort reduces its intensity. Otherwise, there is a high risk of a gap, which has slowed down the recovery effort in many previous natural disasters, including Aceh’s post Tsunami reconstruction (see Figure 2.2).

1. Six Lessons from Past Experiences

- Define early on the best institutional approach to lead the recovery effort.** There are several options to determine the best institutional setup for managing the recovery and reconstruction process (see *Managing the Recovery*). The scale of a large earthquake argues for a lead agency (or agencies) to be fully focused on the task. This agency will most likely need to establish special mechanisms for resource allocation, procurement, and staffing. In

case the staff or the unit are contracted, it will be critical to establish a sunset clause to avoid that the entity is taking a life of its own or surviving beyond its mission.

Figure 2.2 Gap Between Relief and Recovery



Source: ALNAP, 2010

- **During the relief effort, establish clarity on leadership and division of labor through the cluster approach.** In this approach, which has been successfully practiced in humanitarian relief in recent years, a lead agency, which can also be an NGO, is responsible for the emergency response in the whole sector, not just for its own actions. If a gap emerges, the lead agency is expected to have the capabilities to fill that gap itself as a provider-of-last-resort. The gap between humanitarian relief and the recovery effort, therefore, is effectively addressed. The cluster approach can also help to minimize the gap between humanitarian relief and the recovery effort.
- **Establish (monthly) decision meetings with international partners.** One of the best early investments is the establishment of a joint decision making body, which meets predictably and follows up on all the decisions continuously. This policy forum could also include representatives of non-traditional donors. In the case of Aceh's post tsunami reconstruction, the Multi Donor Trust Fund provided the venue for policy discussions and overall stocktaking of the reconstruction program between government and development partners, including key NGOs.

- **Encourage development partners to establish and contribute to a Multi Donor Trust Fund.** The pooling of funds can substantially reduce fragmentation of aid and transaction costs for an affected area's government. The Aceh Multi Donor Fund established a high level policy forum and also helped provide much needed "fungible funds." These funds helped close several of the sectoral and spatial gaps in the second phase of the recovery (see box 2.2).
- **The government should setup a monitoring system that tracks money and outputs.** Given the likelihood of high fragmentation of aid, it is very important to establish an information system that provides overall trends and gaps in real time. However, many mistakes have been made in establishing oversized monitoring systems that focus too heavily on sophisticated information technology and too little on the quality of the data. While information technology can help, ultimately people need to track the money and the outputs. The secret of a successful monitoring system is a dedicated team of analysts who are responsible for collecting, updating, analyzing, aggregating, correcting, and communicating the data. If the reconstruction agency decides to approve every recovery project—as it did in Aceh—it could establish a comprehensive project database, which would then become the baseline for the monitoring system. At a later stage, authorities could apply the 20/80 rule and focus on the big players when updating the database. Typically, the top 20 players manage 80 percent of the reconstruction portfolio. Building on this project database and the Damage and Loss Assessment, the reconstruction agency could estimate sectoral and geographic gaps (see box 2.2).
- **Post disaster financing is fundamentally different from the implementation of regular development projects.** In post disaster situations, while core fiduciary principles apply, the management, planning, budgeting, and project implementation need to be much more rapid and flexible. Funding does not necessarily need to be channeled through country systems if the regular budget cycle does not allow for a speedy and flexible implementation of recovery projects. However, to the extent possible, all reconstruction funds should be recorded in the regular budget even if they are not channeled through it. Proper fiduciary oversight and speedy implementation can go together. The government should consider establishing an Independent Service Authority that is chaired by the government but which includes civil society and international members to oversee procurement and financial probity.

2. Conclusion

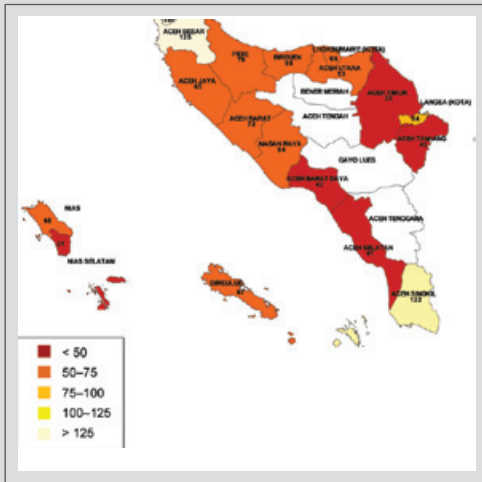
Government leadership is the key factor in determining a successful recovery of any affected area. International partners should make every effort to strengthen the government's role to lead

recovery—no matter how fragile the government’s capacity is. In previous successful recovery efforts, international partners came together to align behind government and “lower their flags” instead of increasing the fragmentation of aid. The experiences in Indonesia and other parts of the world have demonstrated that the coordinated partnership of development partners under government leadership could lead to a better post disaster future even in areas that were the poorest and most oppressed prior to the disaster.

Box 2.2 Aceh: Tracking Aid to Identify Geographic and Sectoral Gaps

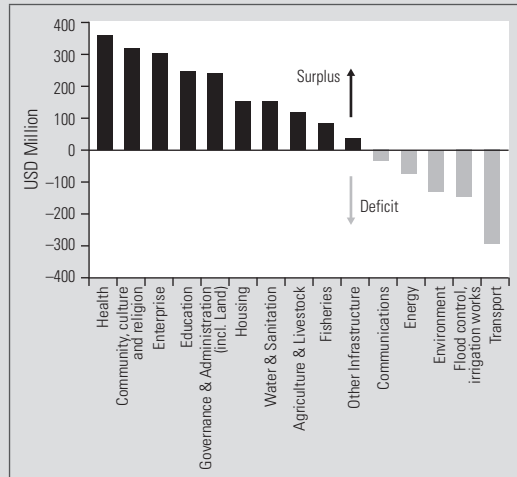
Aceh, after the 2004 Tsunami, as many other affected communities following a major disaster, experienced generous inflows of aid from all over the world. The financial assistance to Aceh was sufficient not only to rebuild what had been lost in the tsunami but also to “build back better.” How was this information generated? Which sectors were receiving the most, which the least? Which regions needed additional funding? A joint team of the Reconstruction Agency and the World Bank were tracking the money since the beginning of the recovery effort to identify geographical and sectoral gaps (see below charts). The regions close to the provincial capital Banda Aceh received sufficient funding while the badly affected areas on the West Coast and the Island of Nias remained severely underfunded (dark red regions in the map below). Similar disparities were seen in sectoral reconstruction, with some sectors being overfunded (including health and education), while the funds flowing to others (transport, housing, flood control, environment, and energy) failed to even to return the sectors to pre-tsunami levels. Based on these “gap assessments,” the Government of Indonesia and the Multi Donor Fund (MDF) allocated additional funds to close the gaps.

Figure 2.3 Financing Gap by Regions



Source: Fengler, Wolfgang, Ahya Ihsan, and Kai Kaiser. 2008

Figure 2.4 Financing Gap by Sectors



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III. Managing the Recovery



The Government of an affected country has several available options to manage the recovery process in an effective and coordinated manner. The two most common approaches are: (i) create a new institution for recovery management, and (ii) strengthen and coordinate existing line ministries to be the reconstruction leaders in their respective sectors. A third hybrid option is also presented that combines features of both approaches.

1. Create New Institutions to Manage Reconstruction

The creation of a new institution to manage re-construction is desirable in a situation where it is unlikely that the existing government agencies will be able to coordinate and implement a high number of additional projects at increased speed, while sustaining routine public services. This option consolidates reconstruction in one agency that provides oversight, a single point of coordination for international stakeholders, and additional capacity to implement and expedite reconstruction projects. This model was used in Sri Lanka and Indonesia after the 2004 Indian Ocean Tsunami and in Pakistan, following the 2005 Earthquake.

The new coordinating agency should be:

- Headed by a respected senior government official with a clear mandate.
- Rapidly staffed by seconded civil servants and staff from development partners, consultants, private sector experts, and pro bono experts.
- Performing one or more of the following roles:
 - Coordination between government, donors, and non-governmental institutions.
 - Monitoring and benchmarking the recovery.
 - Setting and enforcing quality control standards, public information, and community relations.
 - Managing key reconstruction activities such as land acquisition and/or project implementation.
- Setting up systems for ensuring a “clean” recovery through transparency, accountability, integrity, independent oversight, and anti-corruption measures. This is a key function in ensuring that international pledges become firm commitments.
- Established for a finite lifetime and to support capacity building to facilitate a seamless transition to the normal functioning of government agencies.

Box 3.1 Principles for Rebuilding National Capacity

- **Good Governance.** Place emphasis on transparency, accountability, stakeholder participation, and controlling corruption.
- **Capacity Strengthening.** Start by building on existing capacity and social capital.
- **Invest in a Modernized State.** Ensure that the recovery process contributes to rebuilding a government capable of providing services and enforcing the rule of law.
- **Decentralization.** Use the recovery to increasingly decentralize economic and political activity where it promotes prosperity and good governance.
- **Quality Standards.** Apply, monitor, and enforce quality standards, such as integrating disaster preparedness, managing the environment, protecting vulnerable groups, enhancing gender equality, and enabling the private sector

A best practice for developing a new recovery agency is the Executing Agency for Rehabilitation and Reconstruction of Aceh Nias (BRR), which operated from 2005–2009 in Indonesia. Some of the relevant lessons from the BRR experience are:

- **Incremental Responsibilities.** Move from coordination and information sharing to a more complex role in project implementation as the capacity increases over time.
- **Financial Management.** Adhere to the principles of speed by accelerating on-budget financing and using off-budget mechanisms;¹ of efficiency by ensuring off-budget funds are properly coordinated; of flexibility by using uncommitted resources such as the Multi Donor Trust Fund to fill sectoral and geographical gaps in reconstruction; and accountability by having systems for integrity and anti-corruption.
- **Facilitation and Information.** Facilitate the recovery through development of a geospatial information system; a one-stop shop for donors to process tax exemptions, visas, and import licenses; quality standards for housing; and standard operating procedures for approving and monitoring projects.

¹ Part of the international financial assistance is not pooled into the national budget but finance separately recovery projects with add-on resources outside of the national budget (“off budget”), for example. UN agencies and international and national NGOs finance and implement their projects that are supposedly aligned with the recovery framework of the given country.

- **Leadership.** Select a nationally and internationally respected leader who has cabinet-level status as well as access to and political support at the highest level.
- **Communications.** Develop different instruments to communicate early and often with beneficiaries and donors about the pace and direction of the recovery. This is key in ensuring expectations are set realistically throughout the program.
- **Learn from Mistakes.** Conduct an early beneficiary census to meet needs and avoid fraud; consider community-driven housing reconstruction and/or the top-down contractor model or the combination of two depending on the specific circumstances and traditions; and integrate Disaster Risk Reduction from the outset.

2. Use Strengthened Line Ministries

The alternative approach for management of the recovery is to rely on strengthened line ministries to supervise and implement projects. This usually begins with joint preparation of a master plan, blueprint, or action plan for the recovery where the respective roles and activities of the line ministries are identified in support of the reconstruction. The government budget is the main medium for channeling recovery financing to line ministries, though parallel off-budget activities, such as through United Nations (UN) agencies and non-governmental institutions (NGO), are usually critical. The line ministries then implement projects and programs while supervising related off-budget efforts.

Lessons learned from strengthening line ministries following disasters in developing countries revolve around the establishment of project management/implementation units. These units can:

- Help line ministries make emergency decisions that are supportive of both relief and a longer-term recovery framework.
- Provide a mechanism for day to day management of recovery activities within a given ministry.
- Monitor reconstruction finance.
- Ensure that mitigation measures are adopted to avoid negative impacts.
- Adjust implementation based on lessons learned from early results.

Box 3.2 The Federal Emergency Management Agency (FEMA) in the U.S.

Key features of FEMA include:

- Federal-level support for public and individual assistance provided by a national agency.
- Additional reconstruction activities implemented through the existing government departments corresponding to the sectors and services where damage has been sustained. For example, funds are channeled through the Department of Health to reestablish public health services.
- Existing government agencies at different level, that is, national and sub-national, work together to deliver the reconstruction program

3. Hybrid Model

A third, hybrid path involves existing government structures that are strengthened by a temporary agency that is tasked with providing support to increase the speed of reconstruction. This model combines the approach of the first two options.

Box 3.3 Hybrid Model in Liberia

The post-conflict reconstruction effort in Liberia is an example of how a temporary agency can support the reconstruction efforts of the existing government structure. In the case of Liberia's reconstruction, a special Implementation Unit (SIU) was established in the Ministry of Public Works to assist with procurement and provide technical support to other line ministries involved in infrastructure activities (e.g., roads, ports, airports, water, agriculture, and energy). As capacity is rebuilt, the functions are transferred back to the line ministries.

A Public Finance Management Unit was also created within the Ministry of Finance to provide financial checks and balances throughout the reconstruction program. Both agencies relied on contractual staff. As the reconstruction program developed, it became clear that an expansion of support from the SIU was necessary and the agency moved from providing only minimal capacity support to providing more strategic anchoring for the reconstruction program.

The key characteristics of the hybrid model if used post-earthquake in a country with weak institutional capacity would be:

- A small recovery agency or committee with a very focused mandate would undertake a limited number of critical reconstruction functions, such as:
 - Expediting reconstruction processes, including procurement.

- ❑ Managing a land acquisition program.
 - ❑ Providing technical assistance to the implementing agencies to address bottlenecks and speed up delivery.
 - ❑ Monitoring and benchmarking the recovery.
 - ❑ Developing and enforcing quality standards.
 - ❑ Overseeing public information and relations
 - ❑ Housing of a one-stop office to facilitate recovery procedures.
- Ensuring the transparency and accountability of the reconstruction process in order to maintain credibility among beneficiaries and donors alike.
 - Implementation of key projects and programs through line ministries where capacity exists.
 - Where capacity does not exist or where delivery is delayed, implementation through parallel structures such as NGOs and UN agencies.
 - Gradual strengthening of line ministry capacity to implement critical projects and programs as well as to supervise and facilitate off-budget activities.

The advantages (+) and disadvantages (–) of each option are summarized in the Table 3.1.

Table 3.1 Reconstruction Management Options

Recovery Agency	Line Ministries	Hybrid Approach
<ul style="list-style-type: none"> + Can accelerate coordination and implementation of recovery; + Models of good practice exists with features that can be replicated; + Can draw on resources beyond the civil services resource pool; + Focuses on tasks which are specific to reconstruction, e.g. land acquisition, development of reconstruction policy. 	<ul style="list-style-type: none"> + Respect and strengthens existing government structure and capacities; + Does not create additional competition for resources and power; + Facilitates transition from reconstruction to longer-term development. 	<ul style="list-style-type: none"> + Respects and strengthens existing government structure and capacities; + Has a light structure therefore can be easily dissolved after the reconstruction is over; + Provides additional capacity to line ministries whose capacities and resources will be under immense pressure; + Provides a single point of responsibility for managing reconstruction; + Focuses on tasks that are specific to reconstruction, e.g. land acquisition, development of reconstruction policy, aid tracking.
<ul style="list-style-type: none"> – Potential for rivalry with existing agencies; – Takes more time and resources to establish than expected; – Requires existence of strong central government for support and authority; – Can create issues of sustainability of reconstruction ‘investment’; – Does not strengthen existing government bodies. 	<ul style="list-style-type: none"> – If the capacity was low before earthquake, it might further decline post-disaster; – Line ministries will be drawn away from their routine work; – Will still require third party implementation; – Will not address specific reconstruction activities, such as coordination of off-budget funds and continuous communication with stakeholders on reconstruction progress & upholding transparency and accountability. 	<ul style="list-style-type: none"> – Light structure may not sufficient to deal with the enormity of the task; – May lack the political weight necessary to coordinate other line ministries or other reconstruction actors.

IV. Transitional Shelter



Large scale earthquakes can destroy enormous number of housing units and make thousands, sometimes even millions homeless and displaced. From the early stages of post-disaster, important decisions and activities are related to emergency, transitional, temporary and permanent shelters for affected population. This note captures the experiences of several countries, including Haiti and relies on the work and guidelines of the Shelter Center.

Governments of affected regions must face urgent decisions about how to develop transitional shelter options that are responsive to both the immediate risks and to the longer-term reconstruction and recovery needs. Decisions made about the type and location of transitional settlements made in this early phase will have a spillover effect on policy decisions months and even years later. Finding a durable solution for those displaced by disasters can take years due to such varying constraints as land acquisition, development of infrastructure, ownership issues related to construction of new housing, and delays or changes in the design and location of the new houses.

1. What Is Transitional Shelter?

“A transitional shelter provides a habitable covered living space and a secure, healthy living environment, with privacy and dignity to occupants during the period between a natural disaster and the achievement of a durable shelter solution”.² Transitional shelter is part of a process covering the spectrum from immediate temporary/emergency shelter following displacement through the time an individual’s house is reconstructed or a durable solution is found.

Figure 4.1 is the illustration of various shelter interventions and assistance programs to different population groups which can be part of a shelter strategy post-disaster. The figure was included into the recommendation of the Shelter Center technical guidance prepared for Haiti. The document covered topics as shelter distribution, transitional shelter construction and material checklist.

2. Preferred Options for a Transitional Shelter Program







- Tailored to community/individual needs and circumstances. There is no easy, one size-fits all transitional shelter needs. Policy decisions about shelter type and location should be made in

² Corsellis and Vitale (2005).

consultation with the affected population, keeping in mind that the preference for transitional shelter may be community-specific and needs might change as time passes.

- Done by, rather than for, the affected population. In some cases provision of building materials to affected families to construct their own shelter might be the most preferred solution. It depends on the country specific circumstances and traditions. It might be difficult to follow this option in urban environment.

Figure 4.1 Post-Earthquake Shelter Interventions and Assistance

Summary of the response for displaced populations				Summary of the response for non-displaced populations	
Rural self-settlement	Urban self-settlement	Host families	Planned and self-settled sites	Owners	Tenants
					
Phase 1 Shelter within 3 months, before the hurricane season					
Tarpaulins with rope	Phase 1 transitional shelter – tarpaulins, rope when available			Priority given to displaced	
Tents	Household items			Unsafe structures demolished	
Household items	Tents for prioritised groups			Public information	
	Public information				
Phase 2 Full transitional shelter within 12 months					
	Phase 2 transitional shelter – roof of corrugated metal sheeting, frame of timber, bamboo or steel			Self-help	Relocation assistance
	Support provided through public information campaigns and technical advice over seismic and hurricane resistance			Phased materials distribution	Rent assistance
	Cash, vouchers and materials distribution also considered			Technical advice	Extending credit
	Coordinated rubble clearance				
Durable housing in less vulnerable locations, built back safer					

Source: Shelter Cluster Haiti: Transitional Shelter Technical Guidance, IASC, Haiti Shelter Cluster

- Near to or on the site of the damaged/destroyed homes. Allow internally displaced persons to participate in reconstruction, re-establish community ties, secure land tenure, and regain proximity to their former employment or source of livelihood. If it is not possible, relocate displaced families near their homes or work, and provide free or at minimal-cost transportation to get to former or future home sites as well as to their means of livelihood.
- Designed in a way that allows a seamless transition from transitional settlements to the permanent solutions. Transitional shelter itself does not constitute a permanent solution for the affected population

3. Advantages and Disadvantages of a Transitional Shelter Program

Some of the advantages of a well-devised transitional shelter program are: it spans the entire transitional period from disaster to durable solution, involves locals in the decision making process regarding the type and design of the shelters, supports local procurement construction materials. It contributes to revival of the economy, and relies on local skills and materials acceptable for communities in question. The best designs allow families to upgrade, move, or incorporate shelter materials into their permanent dwelling.

Some of the disadvantages of a transitional shelter program are: it may take more time than acquiring tents, contradicts to the international perceptions that earthquake victims “need” tents, require more human resources to determine the appropriate materials for the transitional shelter construction, depend on the global supply of these materials, and initially be more expensive than procuring tents. Transitional shelter, particularly far from the city, can render the displaced population “invisible” and take some of the pressure off the housing reconstruction effort.

4. Transitional Settlement Options for the Displaced and Non-Displaced

A transitional shelter program can be used for both the displaced and non-displaced population. The affected region’s displaced population might find themselves in one of many situations: staying in planned camps (e.g., new sites selected by the government), in collective centers (e.g., buildings like schools and community centers temporarily inhabited for shelter), in self-settled camps (i.e., spontaneous camps formed after the earthquake), rural and urban self-settlements, or with host families.

In urban areas, the proportion of tenants to owners/occupiers often exceeds 50 percent. Whether owner, tenant, or informal settler, households that were not displaced may also find themselves in need of—and should be eligible for—support for transitional shelter.

Box 4.1 Post Disaster Transitional Shelter in History

1963 – Skopje Earthquake (Macedonia) 20,000 temporary housing units on sites about 10 km from the city center.

1972 – Managua Earthquake (Nicaragua) 5,000 housing units in secondary cities.

1976 – Guatemala City Earthquake (Guatemala) 10,000 serviced lots in Guatemala City.

2001 – Gujarat Earthquake (India) Materials for bamboo-framed, thatch-roofed units.

2003 – Bam Earthquake (Iran) Camps established outside the city and 18 m² of prefabricated houses provided in urban areas.

2005 – North Pakistan Earthquake (Pakistan) Reusable dome-shaped transitional shelters and recycled material salvaged from debris.

2008 – Jogjakarta Earthquake (Indonesia) 25 million sticks of bamboo provided for transitional settlements.

2009 – Abruzzo Earthquake (Italy) 4,500 temporary apartments provided within new apartment blocks

5. Types of Transitional Shelter

Ideally, transitional shelter materials used in affected areas should be sturdy enough to last through the whole transition period. When possible, they should be:

- **Upgradeable.** While being inhabited, transitional shelter can be improved over time and become permanent housing. This is achieved through maintenance, extension, or replacement of the original materials for more durable alternatives.
- **Reusable.** The transitional shelter is inhabited while parallel reconstruction activities take place. Once reconstruction is complete, the transitional shelter can be used for an alternative function, for example, a shop or storage.

³ Adapted from Transitional Shelter Guidelines.

- **Re-sellable.** Once reconstruction is complete, the transitional shelter is dismantled and its materials are used as a resource to sell. Therefore, during the transitional shelter design process, materials need to be selected to be suitable for resale.
- **Recyclable.** The transitional shelter is gradually dismantled during the reconstruction process, and the material from the transitional shelter is used in the construction of a permanent shelter solution for the family.³

6. Issues of Immediate Concern

If a transitional shelter strategy is not yet in place, steps need to be taken immediately to develop one, in consultation with the affected population. This plan lays out a policy framework on the number and types of proposed shelters, a timeframe for their development, provision of related facilities and services, and a plan for communicating with the public.

The affected population should be consulted on shelter options. The preferences may be community-specific, and the choices of the communities should be respected. Women, in general, spend more time in the shelter, so their input into the design of the transitional shelter is essential for a successful program.

Allow the renewal of livelihoods as soon as possible. The likelihood of a successful program increases with the rapid return to livelihoods. Transportation should be provided to new and former sources of livelihoods.

Develop a plan for basic services. This includes the provision of potable water, proper sanitation and health facilities, and education for children in tandem with the transitional shelter plan.

Ensure that transitional shelter is resistant to future disasters. For example, in the summer, families slashed windows in tents provided after the Pakistan earthquake, rendering them useless the following winter.

7. Medium Term Concerns in Transitional Shelter Programs

People displaced by the same disaster often have been affected to different degrees, and thus responded accordingly. Some were able to begin reconstruction of their partially damaged

housing only days after the disaster. Others continued to be displaced for a prolonged period, and perhaps founded themselves in a situation that changed from week to week for many months or years.

If displaced families or individuals elect to stay with a family, host families should receive support to reduce any additional burden of caring for the hosted families.

Determine whether the use of materials salvaged during debris removal can be used for building or augmenting transitional shelters. (See Debris Management)

Prepare a plan to mobilize the displaced families. Whether self-sheltering in neighborhoods or in collective settlements, this is meant to address sanitation, schooling, recreation for children, protection of vulnerable persons, conflicts, and disaster preparedness.

Ensure continuous two-way communication in order to keep communities informed of developments and also to allow communities to give feedback and input.

Box 4.2 Key Points Related to Transitional Shelter after Disasters

- Reconstruction can take years, or decades, and transitional shelter needs to be designed to potentially last as long as the permanent solution is achieved.
- Durable solutions must be kept in mind. Research from the 2005 transitional shelter program in Indonesia showed that the positive economic impact of transitional shelter declined when it was occupied for too long.
- Degree of acceptability and ownership by displaced communities determines a successful outcome of a transitional shelter program.
- Acceptability and ownership often depends on the extent to which settlements have been designed with the affected population's participation and with local needs and customs taken into consideration.
- Best designs allow the household to upgrade or incorporate the shelter materials into the permanent reconstruction. Allow the family to return to their home because they are mobile and flexible, or both.
- Minimize the distance from former and future homes and minimize the duration of displacement, allowing people to better maintain their livelihoods and protect their land, property, and possessions.
- Creating a sense of community among displaced families at the temporary settlement(s) helps to avoid conflicts and discontent.

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V. Environmental and Social Assessment



It is often said that a major disaster condenses 20 years of construction into a few years of reconstruction, with inherent environmental and social impacts, risks. Lessons from past disasters show that it is critical for the government to clarify from the outset the environmental and social procedures to be followed by all development partners, and for institutional capacity to be strengthened for effective follow-up, particularly at the community level. Not doing so, may result in major delays (especially with regard to land tenure issues), further environmental degradation, and rebuilding structures that may fail to resist future disasters due to poor site selection or construction standards.

Earthquakes—and the planned reconstruction—usually add to the environmental pressures that the countries already face. Following the initial impact of disasters and environmental impacts of the massive debris management and disposal, the main pressures are likely to come from solid waste, water consumption and pollution, energy and food needs, and demands on local materials for reconstruction. As it is common in post disaster contexts, affected areas often focus their immediate assistance on humanitarian needs, while recognizing that environmental issues will become increasingly important during the recovery phase over the medium to longer term.

As affected areas move into recovery and reconstruction, there is an urgent need to harmonize donor responses. Experience from previous major disasters shows that, without solid coordination and oversight, aid agencies and line ministries face pressure to meet physical targets and deadlines for reconstruction. Construction codes, environmental and social standards, and other key quality aspects becoming sacrificed in the process. For example, in the case of Haiti, more than 10,000 non-governmental organizations operated prior to the earthquake. Following the disaster, about 385 additional, mostly relief organizations had registered with the Office for the Coordination of Humanitarian Affairs. Coordination and harmonization among NGOs and relief agencies is a critical challenge.

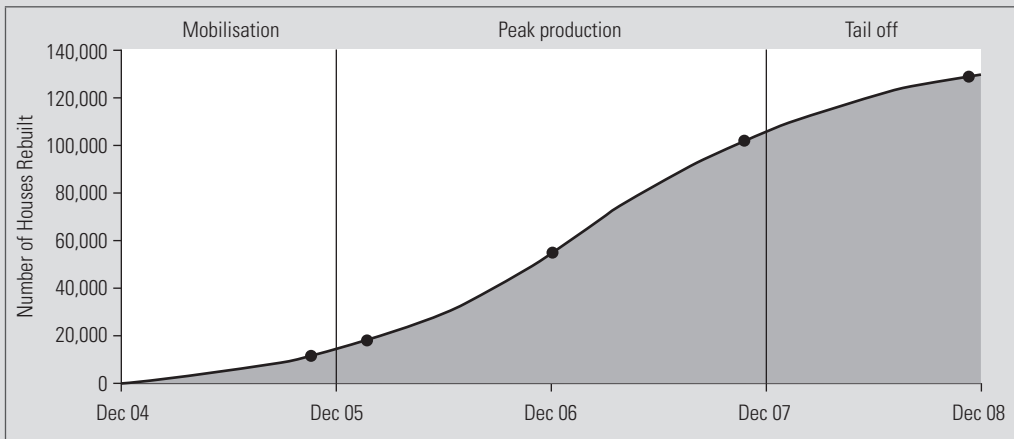
The main environmental challenges the governments of affected countries might face can be summarized as follows:

- Assessing the Environmental and Social Impacts of the Disaster. In most countries many rapid assessments have been already carried out and they need to be compiled and made accessible to decision makers in their own language.
- Harmonizing Environmental and Social Guidelines. How best to develop a harmonized environmental and social framework for the various operations and agencies involved in the recovery and reconstruction, so as to facilitate cooperation and avoid unnecessary complications and transaction costs.
- Reinforcing Institutional Capacity for effective environmental and social monitoring.

Box 5.1 Lessons Learned from Aceh—the Need for Effective Application of Guidelines for Reconstruction

During the early reconstruction period in Aceh, there was a weak understanding of a standard quality of reconstruction—particularly for housing. Consequently, many aid agencies proceeded to develop their own standards. This led to social tensions about inequity of assistance, a high demand for fuel wood for brick production, the need for retrofitting sub-standard structures, and a proliferation of unqualified contractors. Many households also proceeded to build additions which ignored the building codes. The coordinating agency (BRR) progressively contained these issues with harmonized guidelines—including the “Strategic Framework for a More Environmentally Sound Reconstruction of Aceh”—community participation, “green procurement”, and blacklisting unqualified contractors. In total, reconstruction took four years—two years longer than originally planned.

Figure 5.1 Housing Reconstruction, Aceh



Source: da Silva (2010) Lessons Learned from Aceh

1. Assessing the Environmental and Social Impacts of the Disaster

The first challenge is to rapidly assess the potential environmental and social impacts of the disaster. This initial stage typically uses rapid assessment tools aimed at filling information gaps until a more comprehensive Environmental and Social Impact Assessments can be undertaken. The table 5.1 below lists some of the early standard Environmental and Social Assessments carried out in Haiti following the 2010 Earthquake.

Table 5.1 Environmental and Social Impact Assessments, Haiti

Assessment	Agency	Timing
Hazard Identification Tool	UNEP/OCHA	Day of disaster
Rapid Environmental Impact Assessment	UNEP	5 days after disaster; updated every 2 days
Initial Social/Needs Assessment (incorporated in UNDAC)	UN/EU/WFP	3–8 days after disaster
Public Health Risk Assessment	WHO	9 days after disaster
Post Disaster Needs Assessment	Multi Agency	1.5 months after disaster (planned)

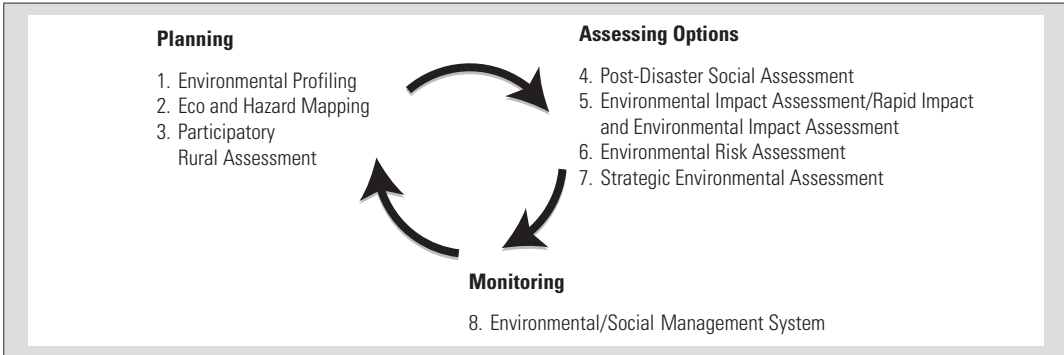
Specific environmental and social disaster impacts may require specialized assessments. These may include, for example, assessments of asbestos waste management or groundwater contamination. It is critical for development partners to closely coordinate these initial impact assessments via a central focal point. Such centralized coordination is critical not only for future records of a disaster, but also to avoid duplication of efforts and to assist a harmonized Post Disaster Needs Assessment. Coordination efforts can be supported by uploading the assessments to an open access, centralized web-site.

2. Harmonizing Environmental and Social Guidelines for the Recovery and Reconstruction

The second challenge is how to use Environmental and Social Assessments specifically for recovery and reconstruction. This is a distinct challenge from assessing the disaster's impacts. In essence, it involves the: (i) planning; (ii) assessment; and (iii) monitoring of recovery and reconstruction activities. For each of these steps, a range of specialized tools can be used (see figure 5.2).

An important consideration for the governments is how to anticipate and apply the Environmental Impact Assessment (EIA) and Social Safeguard procedures during the recovery and reconstruction period. Most recovery efforts have focused on cash-for-work schemes, primarily centered on debris clearance and recycling, drain clearance, and installation of logistical facilities for temporary resettlement camps. As efforts progressively shift toward the actual rehabilitation and reconstruction of public works and housing, environmental and social issues are likely to intensify.

Figure 5.2 Management Systems



Source: Adapted from Common Tools for Environmental and Social Assessment in Disaster Recovery and Reconstruction (GDRD undated).

To facilitate recovery and reconstruction, governments may want to consider adopting a harmonized Environmental and Social Framework. Experience from other disasters suggests that, in the absence of such a framework, development partners tend to follow their own safeguard standards, creating a fragmented and confusing reconstruction process. In some cases, no guidelines may be followed at all. The simultaneous use of different procedures in the same geographical area can lead to social tensions and perceptions of unequal benefits and entitlements. The below examples from internationally assisted emergency programs provide illustrations of how such frameworks have been used and illustrates options for their development.

- In China, the US\$710 million Wenchuan Earthquake Recovery Project followed an Environmental and Social Safeguard Screening and Assessment Framework. This facilitated the screening of small projects under a simple checklist that scrutinized the projects' complexity and determined whether they needed an Environmental Impact Assessment (EIA) or a more simplified procedure. It also screened projects to determine whether more complex social issues, such as resettlement, were involved. The Framework remained, however, project, not program specific.
- In Aceh, UNEP assisted the government in adopting a Strategic Environmental Framework for a more environmentally sound reconstruction. However, this was only adopted more than two years after the disaster, following earlier pilots developed by other development partners.
- In Timor-Leste, each sectoral program adopted a specific safeguard framework; tailor-made to that sector's needs and designed to evolve as the country was rebuilt. The extent of donor harmonization varied considerably by sector.

- In Madagascar, the government was faced with a system of protected areas that tripled in size (to 6 million hectares) in only seven years, implemented by over 16 partners. It harmonized environmental and social safeguard requirements into a new Code for Protected Areas, which became legally mandatory for all its partners.

Box 5.2 Environmental Challenges Post-Tsunami, Aceh

- Problems of water quantity and quality. In Aceh, many households drilled deep wells to extract uncontaminated water, thereby affecting groundwater aquifers. Many households also built their own sanitation systems, rather than plan communally for the disposal of waste.
- Excessive removal of raw materials for construction, especially sand, gravel, and fuel wood for brick-making and housing construction. In Aceh, the rebuilding of 120,000 houses was estimated to affect 10,000 hectares of forest.
- Land tenure claims. These may arise between individuals as well as vis-à-vis public works. Potential resettlement issues should also be anticipated (see Land Tenure note).
- Poor location or design of housing. After the tsunami, many households in Aceh built additions or rebuilt in locations that were unsafe. There was also a proliferation of poorly qualified contractors. To manage this, authorities gradually adopted a system to retain qualified contractors who would work with and on the behalf of communities to manage the reconstruction of 20–50 (and later, 100–150) houses. Unqualified contractors were not allowed to undertake construction projects.
- Overexploitation of natural resources—with population displacement, increased pressures are expected on already fragile and overexploited fisheries and forestry resources.

National Frameworks can be used to encourage sound environmental and social practices during reconstruction. By adopting simple screening and monitoring procedures, the government could promote “green” procurement and sound socio-cultural policies during reconstruction. Key questions include:

- Does the project promote recycled/re-used materials?
- Can temporary shelters be re-used or incorporated into permanent housing?
- What materials are available locally? Are they sustainably sourced?
- What is the potential for introducing new materials at comparative cost that has less environmental impact?

- Is the project likely to affect an area larger than the site directly concerned?
- Does the project involve demolition of existing structures? To whom do they belong? Is the land privately or publicly owned?
- Does the project involve involuntary land acquisition or prior acquisition of land?

Box 5.3 UNEP Guidelines

The environmental and social issues of reconstruction should be anticipated early to avoid potentially irreversible impacts or costly retrofitting. The supply of and demand for potential key resources like water, sand/gravel, and fuel wood should be assessed in order to encourage environmentally and socially sound policies.

Source: UNEP (2007)

Governments of disaster hit countries often require a standard Environmental Assessment for major construction, rehabilitation, and road projects. In follow-up to an earthquake, the government may want to consider the following options:

- Clarify the cutoff (project size) for which national guidelines apply.
- Make the directives publicly available on the internet, in national, English and other languages.
- Review and update any relevant clauses to address the special needs of post earthquake reconstruction.
- Refer to these guidelines, as well as to any other relevant national legislation, in any Environmental and Social Management Framework prepared to support reconstruction.

3. Reinforcing Institutional Capacity for Effective Environmental and Social Monitoring

The third—and perhaps most difficult—challenge is to reinforce institutional capacity for effective environmental and social monitoring. The capacity of a Ministry of Environment may weaken due to a large scale disaster. Several options could be considered to reinforce it:

- Contract qualified partners, such as, nongovernmental organizations, trained individuals, and qualified native expatriates, to monitor standard environmental or social safeguard issues on behalf of the government. The latter retains final clearance oversight. In Madagascar, the Office National de l'Environnement (until recently, a contractual parastatal) oversees environmental assessments while the government issues the final permits. Projects are charged 3–5 percent to support assessment costs.
- As an interim measure, rely on the capacity of major existing projects funded by development partners with strong track records. These projects tend to already follow the standard safeguard procedures of international agencies, such as, the Regional Development Banks, U.S. Agency for International Development (USAID), or the World Bank; furthermore, they would be required to ensure that sufficient capacity is in place for effective monitoring. The major disadvantage—as stated above—is that safeguard monitoring would remain project, or program specific, causing long-term sustainability to become less predictable.
- As part of the process of reaching a harmonized environmental and social framework, a capacity building program could be promoted in safeguard related skills—preferably as a joint effort by key donors. Such a program would target the phased transfer of responsibility for safeguard oversight to local agencies during the period of project implementation. It would also assist in compilation of a roster of skilled and trained in-country environmental and social consultants helping the government teams in future safeguard work. Existing efforts in this direction (e.g., under multi donor sectoral programs) should be examined and, if necessary, strengthened. Under specific circumstances of an urban-rural population shift and weakened overall capacity following the earthquake, capacity building should cover the regional and local, as well as the national levels.

In sum, as the relief phase progresses to recovery, potential social and environmental issues linked to rehabilitation and reconstruction will need to be anticipated and managed. Harmonized procedures and strong early investment in national capacity are a best practice.

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VI. Rebuild or Relocate



While economic activities, livelihoods, land tenure, and existing transportation systems are powerful constraints to relocation, in a highly earthquake prone country or capital city, limited relocation, e.g. of only some functions such as government, might be considered. Quantitative data should be assembled and quickly analyzed in order to decide what and where to relocate. The decision of whether and what to relocate should be made fast, before ad hoc reconstruction overtakes the situation. Continuing uncertainty is destructive of morale and recovery.

Following a devastating earthquake, one of the most difficult questions is whether to rebuild and invest at the existing location, or whether the majority of governmental and economic functions, as well as the population, should be permanently relocated. Several countries faced this question throughout the human history.

Box 6.1 Rebuild or Relocate in History

1755 – Lisbon (Portugal) destroyed, rebuilt in same location with special seismic design.

1773 – Antigua (Guatemala) destroyed for second time, moved to Guatemala City (heavily damaged in 1976 with 23,000 killed).

1841 – Cartago (Costa Rica) destroyed by earthquake, moved to San Jose.

1854 – San Salvador (El Salvador) heavily damaged, also in 1917, 1986, and 2001 but remains the capital in same location.

1906 – San Francisco (U.S.) totally destroyed by earthquake and fire. Despite pre-earthquake new City Beautiful urban plan by Daniel Burnham, city rebuilt exactly the same, due to difficulties in changing existing property rights.

1907 – Kingston (Jamaica) heavily damaged, rebuilt in same location with height limits imposed on buildings.

1923 – Tokyo (Japan) largely destroyed by earthquake and fire, rebuilt as before.

1967 – Caracas (Venezuela) heavily damaged and rebuilt in the same location.

1972 – Managua (Nicaragua) largely destroyed by earthquake, city center remains largely abandoned today.

2004– Aceh (Indonesia) 60 percent destroyed by tsunami, largely rebuilt in same place.

2005 – Hurricane Katrina devastated New Orleans (U.S.) and as of 2009, the population is only 60 percent of pre-Katrina

Some cities started over at a new location (Guatemala), some were rebuilt as before (San Francisco, Tokyo), some were not doing enough (New Orleans, Caracas), and some literally did nothing (Managua). While there are many intermediary options, the choices confronting the governments range between the following two extremes:

- **Rebuild.** In this approach, the basic economy of an affected area would remain the same, and the existing infrastructure (port, energy, roads, and water and wastewater systems) investment would not be lost.
- **Relocate.** This approach would create new urban regions. For example Haiti was considering to relocate urban settlements with hundreds of candidate locations including Croix-des-Bouquets (13 km to the east of Port-au-Prince) and Hinche, a seismically stable city of 50,000, located 128 km to the north of Port-au-Prince.

The fundamental factors to be considered in deciding whether to rebuild or relocate a city are:

- **Economic activity drives the recovery.** Basically, the question is whether the economy of an affected city was thriving and robust before the disaster? By creating a new “growth pole” as a capital city, would it be affordable and worth the risks? The political economy of the costs, always underestimated, front-loaded while benefits begin trickling in much later. It should be noted that in cases where capitals have been moved, it has taken the better part of a decade. San Francisco in 1906 was the “Queen of the West” with good reason, and had plenty of financial vigor to quickly rebuild. New Orleans was a declining city before Hurricane Katrina and has rebounded very slowly.
- **Livelihoods.** If a major urban region is created elsewhere, where will the jobs come from? What economic drivers exist or can be created to sustain the population in a new location?
- **Hazards.** The primary reason to consider moving a major city is its location in a very hazardous area. The new area could contain many attractions as a site for a new city—significantly lower hazards, sufficient buildable area, and good water resources and climate but the transportation might be costly. Higher hazard sites such as Port-au-Prince, in Haiti, can still be made adequately safe with good seismic design and construction (i.e., greater capital investment), as compared with sites having lower hazard but higher transport costs.
- **Transport.** Using the example of Haiti, the country’s lack of transport system is an obstacle to its development as it no longer has a rail-road and has only 4,000 km of road (and of this, only 1,000 km of paved road). However, Hinche—a potential site for relocation, has recently had major road improvements and is now only about two hours from Port-au-Prince over a good road. Relocating the capital following the 2010 earthquake may be significantly more feasible than previously, although Haiti cannot afford to build new transportation

infrastructure and, on the other hand relocate Port-au-Prince, so the existing transportation infrastructure may be the chief constraint to any decision to relocate.

- **Land Tenure.** This is a key issue in developing countries following a major disaster, particularly when relocation is considered. Will current land owners of affected areas be compensated with new land plots if they were moved to a new location?
- **Political and Social.** Relocation may create new political divisions and stresses in an affected country's society. Inevitably, change is disruptive. Social and cultural problems in voluntary relocations are always underestimated and/or unforeseen. Relocation may also generate political tensions and pose significant governance challenges. Finally, relocation is nearly always accompanied by a new way of organizing the urban society and economy. This presents opportunities but also challenges: Who will plan and execute the reform and how?
- **Heritage.** Major cities are usually repositories of cultural and historic heritage. How would an affected country's heritage be endangered and what mitigating actions might be taken if a city of cultural value needs to be relocated?

Rebuilding in-situ and fully relocating a city are two extremes between which there are other options, sharing the characteristics of both approaches to varying degrees. As an affected population tries to rebuild their life and livelihoods following the emergency phase, decisions on massive relocations need to be made as quickly as possible. Such decisions should be based on the above factors as well as many other preferences of the population, including distrust in repaired buildings and fear of multistorey buildings. Another factor for planned rebuilding or relocation is the time typically required for development and implementation of a proper new urban plan. Following the 2001 Gujarat (India) earthquake, the successful urban re-planning of Bhuj, a city of 140,000 inhabitants, required two years.

If relocation is seen as the way to go, economic, political and social conditions must be created so as to attract the population to the new sites. Rather than moving the population, seen as involuntary evacuation, governments may want to consider incentives so some of the economic activities move to secondary cities, to encourage the private sector to invest in the new areas, and to support rural economy through targeted policy and infrastructure development. Lastly, achieving less but sooner may be the optimal choice. If a clear choice is not initiated fast, economic, political and other factors would lead to a de facto decision, and the opportunity to rebuild better would be lost. Regardless of the ultimate choice, feasibility studies should be carried out to orient the Government in their final plan.

VII. Debris Management



The 2004 tsunami in Aceh and Nias resulted in 5.8 million m³ of tsunami waste, and two years later, despite dedicated efforts, only about 1 million m³ had been cleared. After Katrina, the U.S. spent over US\$3.7 billion clearing 76 million m³ of debris during the course of a year. The Haiti earthquake produced an estimated 40 million m³ of debris. These examples illustrate the challenges of large scale, affected areas as they seek to balance the damage of an earthquake with the urgency of recovery.

Debris cleanup requires prudent management. Debris can contain human remains, which need to be retrieved with dignity, and personal property, often the only assets survivors have left. Debris can provide raw materials for reconstruction—wood, metal, bricks, and concrete can be used to build future structures and fill roads. Debris left by an earthquake may also be dangerous to the population and the environment because among recyclable materials, there could be pollutants and hazardous materials as well, such as fuel, ammonia, pesticides, lead, heavy metals, medical waste, and asbestos.

Post-Earthquake countries usually face two major challenges in debris management:

- How to best coordinate removal of debris during the recovery phase?
- How to manage such large quantities of debris given the urgency of reconstruction and livelihood needs?

To save costs and coordinate efforts, a Post Disaster Debris Management Plan is generally recommended. Such a plan clarifies responsibilities, procedures, location of storage, and disposal sites as well as staff and equipment needs.⁴ By contrast; weak initial planning can result in significant additional costs.

The most urgent tasks should be agreed early on. Agreement on a complete Debris Management Plan can take time, ranging from 1 to 1.5 months in the U.S. after Hurricane Katrina, to close to 2 years in Aceh after the tsunami. The Government of an affected country may want to consider developing the plan in stages, with the most urgent procedures agreed first. These include:

- Procedures for disposal of medical waste.
- Procedures for disposal of hazardous waste.

⁴ For a Debris Management Plan, see Jha, Abhas. 2010. Safer Homes, Stronger Communities – A Handbook for Reconstruction after Natural Disasters – Chapter 9. www.housingreconstruction.org/housing/

- Designation of debris collection sites and subsequent wide dissemination of site information to the public (by radio or other rapid means).
- Follow up agreements between the government, communities, and development partners, could then be implemented progressively. However, as illustrated above, any delay in planning could have major cost implications.

Another major challenge facing the government is how to manage such large quantities of debris given the need to balance the urgency of reconstruction with employment opportunities.

Box 7.1 Example from the Marmara Earthquake (Turkey) and Aceh Tsunami (Indonesia)

- The Marmara earthquake (1999) generated 35 million m³ of rubble. More than 90 percent of the original debris was potentially recyclable, but weak initial coordination and planning led to extensive dumping. As a result, the debris became commingled with soil, clothes, wood, and in some cases hazardous materials, requiring expensive secondary sorting to produce recyclable materials.
- In Aceh, about 400,000 m³ of tsunami waste was initially dumped into rice fields, fish ponds, and other sites in order to clear residential areas. The Tsunami Waste Recovery Program had to spend about US\$9 million, rent 60 trucks, and employ 1,500–2,000 workers to recover this waste.

1. How to Use Debris

Debris Management can be used to promote the overall reconstruction plan. In this context, the government may want to use Debris Management as an opportunity to implement its reconstruction strategy:

- In areas where reconstruction is planned, encourage the local population to re-use and recycle the debris.
- In new development sites, use debris for structural fill however, this must only be done after removal of organic materials like wood. Organic material will decompose, creating voids that may collapse in the future. People have died as a result of such collapses.
- In other areas, consider strategies, such as re-forestation (through mulching) or potentially leaving the debris on-site (after removal of hazardous materials).

2. On-site Separation or Transport to Intermediate Sites

A major choice in the overall Debris Management Strategy is whether debris should be separated at the place of origin or transported to intermediate holding areas prior to separation.

- The first option (on-site separation) has generally been preferred for disasters in developing countries (e.g., countries affected by the Indian Ocean Tsunami) due to lower costs and the potential of maximizing livelihood opportunities. This option also facilitates separation of hazardous materials if users can provide information on their location prior to the earthquake. It also avoids collecting waste from various sites—thus the potential for recycling is higher. However, the sites occupy valuable space that may be needed for reconstruction and if coupled with manual separation, can be time-consuming.
- The second option (transportation of debris to intermediate holding areas) has been used for earthquakes in California (U.S.), Kobe (Japan), and Wenchuan (China), together with mechanical sorting. While it has the advantage of clearing space rapidly for reconstruction and is subject to more stringent controls, it is costly and requires large areas. As the debris is processed and moved off-site for re-use or disposal, additional volumes could be managed at a site. Several intermediate holding and processing sites could be located in a major city. The precise number of sites and their sizes will depend on the processing speed and volume of debris handled. The assessment should also include the costs of fuel and the number of drivers and trucks to transport the debris, which would vary according to truck capacity and distance to the sites.
- Temporary storage and/or stockpiling may lead to contamination of water and food supplies; therefore, any stocked material should be placed, if available, on a lined pad (e.g., concrete, asphalt paving or natural material made of low porosity clay). The ground should be sloped to allow runoff to flow to a low point, and runoff basins be sized to contain potential rainfall flow. Any exposed (dumped) debris should be considered as a potential public health and environmental hazard.

3. Labor or Capital-Intensive Technology

Debris Management can provide solid livelihood opportunities, but choices may need to be made with respect to the schedule of reconstruction. Opportunities to maximize employment are found primarily through choices of sorting and handling technologies (see figure 7.1 below).

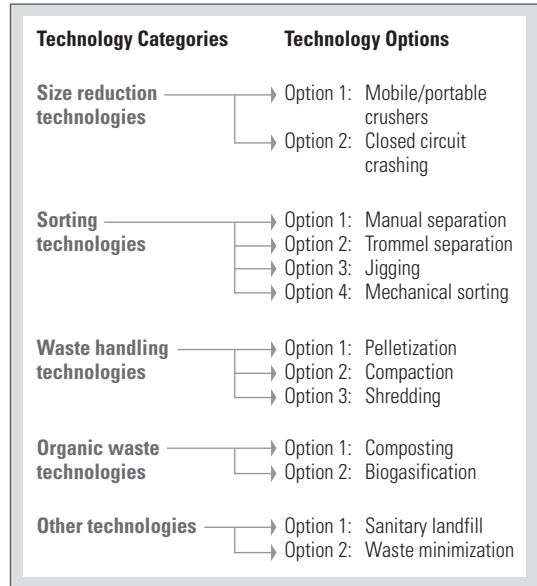
Technologies for crushing construction and removing building debris remain largely mechanical.

- If the objective is to promote livelihoods (cash-for-work), then manual separation and salvaging, followed by recycling, should be promoted. In Aceh, removal of 1 million m³ of tsunami waste used approximately 795,000 person-days of labor (1,450 temporary workers/day for 1.5 years). An option to speed up debris removal might be to install short tracks of rails to facilitate the pushing of wheelbarrows. These could be removed after the recovery period.
- Mechanical sorting (most commonly through vibration screening) can be used as an alternative or complementary technology for heavier or more toxic debris. The capacity is about 2–3.5 m³ per hour.
- When an earthquake results in a large amount of debris, there should be numerous opportunities to combine manual sorting with mechanical processing. In the short term, manual sorting is most suitable. As more mechanized and contractual arrangements become available, they could be progressively integrated.

Debris management is an opportunity to promote cash-for-work recycling programs. Prior to the disaster, recycling activities might be already supported by different initiatives and programs and some private waste collectors already might be operating in the affected area. It is important to rely on these initiatives and to use experienced “waste pickers” as supervisors to increase the number of people benefitting from cash-for-work programs.

Special care is needed to protect workers from unsafe buildings as well as hazardous and medical waste. Close supervision and training also needed to ensure the safety of workers, particularly around sites known to contain hazardous substances or asbestos.

Figure 7.1 Debris Removal Technologies



Source: SWA, LW, UNEP

Table 7.1 Possible Use of Debris

Type of Debris	Main Use	Disposal
Construction and Demolition: <ul style="list-style-type: none"> • Wood • Metals • Bricks • Concrete 	<ul style="list-style-type: none"> • Re-use if lead-free • Re-use clean reinforcement bars (re-bar) • Re-use clean bricks; crush broken bricks • Crush for aggregates and use in road construction and structural fills or stockpile 	Landfill (if contaminated) Landfill (if excessive volume or contaminated after crushing)
Municipal Waste		Landfill
Rotten/Spoiled Food/Meats/Animals		Landfill
Vegetative Waste (trees, brush)	Compost or mulch (for agriculture/parks)	Incineration (to reduce volume) Landfill
Bulky Waste: <ul style="list-style-type: none"> • Appliances • Electronics • Other materials (carpets) 	Recycle (after removal of refrigerant) Recover components	Landfill
Hazardous/Toxic Wastes: <ul style="list-style-type: none"> • Paints • Solvents, Pesticides • Asbestos 	Separate from other debris: <ul style="list-style-type: none"> • Paints can be reused if mixed with similar paints such as latex 	Sector for Special Treatment Landfill (wetted and placed in double bags)
Medical waste	Separate from other debris. Landfill or treatment (incineration, autoclave)	Landfill or treatment (autoclave, incineration): <ul style="list-style-type: none"> • Landfill needs special handling/disposal (e.g. puncture proof containers and special purpose pits) • Incineration should only be used with care as can produce toxic smoke

Given the quantity of debris generated by an earthquake, governments may want to identify the buildings most likely to contain hazardous materials for carefully supervised manual sorting. Surrounding households identified as less hazardous, could be selected for more rapid debris removal, thus organizing the cleanup of neighborhoods on a rolling basis using a combination

of manual sorting and mobile debris-processing equipment. As an area is cleaned up, reconstruction should begin consistent with approved plans. Processed construction and demolition debris could be hauled to temporary storage areas and used later in reconstruction under supervised quality control.

In sum, the options ultimately selected for Debris Management should seek to optimize livelihoods, save costs, ensure public safety, promote environmental sustainability, and accelerate recovery.

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VIII. Helping Women and Children to Recover – Building Resilient Communities



Disasters are not neutral. They compound social exclusion and existing vulnerabilities, disproportionately taxing the poor, women, children and the elderly. Relief and recovery interventions are also not neutral. They can increase, reinforce, or reduce existing inequalities. In the immediate term, this means taking measures to protect the safety and human rights of women, children and other vulnerable groups, collecting data by sex and age to understand different needs, and involving women and children in the design, implementation, and monitoring of interventions. For longer term recovery, support can be designed to upgrade living standards of the poor, to enable the most marginalized to participate, and to establish mechanisms between affected citizens and government to foster accountability.

1. Immediate Concern: Security and Human Rights

Guaranteeing the physical security of women and children is critical in post disaster settings. International experience shows that the violence against and sexual harassment of women and children typically increase after a crisis, when civil and administrative structures have been weakened. In temporary shelter settlements, security provisions should include appropriate lighting in areas frequently used by women and girls, safe and confidential reporting mechanisms, and additional policing.

Adequate privacy should be offered to all. Women and girls should be consulted on the setup and location of sanitation to ensure that the route is safe and latrines are well lit, locked from the inside, and offer privacy. Separate facilities, not directly next to each other, should be put in place for males and females. Pregnant women in temporary settlements are at high risk due to the psychological and physical strains. Medical facilities should be established specifically for pregnant women, lactating mothers, and infants.

Orphans and children separated from their families are at high risk of abuse, abduction, and kidnapping. The physical security and legal protection for this highly vulnerable populace is a priority, as is family reunification. In some cases, as in Pakistan, the government banned the adoption of children from earthquake-affected areas. For orphans, interim and alternative care options that are culturally sensitive should be provided, and unnecessary institutionalization should be avoided. Awareness raising and training on child rights and child protection should be carried out targeting all concerned actors.

In some poor countries children are sent⁵ by their parents to live in the home of a distant relative or stranger, with the hope that they will have better access to food and education. Many of these children are girls, many are forced to work as domestic servants and are prone to abuse.

⁵ Pan American Development Foundation (PADF) for USAID. 2009. Lost Childhoods

While some run away, others are evicted by their host families. NGOs might set up centers to work with street children. But when the centers are destroyed by disasters the children are likely to return to the streets. These children will need special support, and can be even mobilized to participate in recovery and reconstruction activities.

2. Medium Term: Understanding Different Vulnerabilities and Capacities

After a disaster and during recovery, lack of data can impede equitable distribution of assistance. A number of factors contribute to the particular vulnerability of women before, during, and after a disaster: lack of information about shelter options, limited literacy, culturally restricted mobility, and responsibilities to care for the young and the elderly. Entitlement programs have traditionally favored men over women as tenants, bank account holders, and perceived heads of households. The Damage, Loss and Needs Assessment could help ensure equity by disaggregating mortality and morbidity by gender and age, and taking into account losses suffered in the informal sector. Past experience stresses the importance of assessing women's vulnerabilities separately due to the potential differences and the relationship between these differences and a number of cultural and social factors. It is helpful to set up special desks at aid distribution centers for women, girls, and other vulnerable groups. Special attention should be paid to children's inheritance rights to land and property as well as to the administration of these rights by legal guardians.

Reconstruction programs need to try to preserve social networks and find ways to lower the workload of women. Women generally provide the care for children, the elderly, and the disabled and carry out demanding household tasks like the provision of water and wood for fuel. Not only do disasters increase the intensity of this work, they also disband informal networks among extended family and neighbors. In times of crisis, these very networks have proven to be important coping mechanisms for women. Thus, the 2003 reconstruction project in Zambia allocated budget to gainfully employ older women vis-à-vis childcare and, significantly, to re-establish support networks.

For women in the informal sector, the loss of housing often means the loss of workplace, tools, supplies, and markets. For example, in Haiti, agricultural production is often produced in the garden by women and traded in the marketplace for other essentials not produced or manufactured by the household. This provides the income with which women feed and care for their children. It is important to formally recognize women's agricultural activities and provide compensation for their loss of tools and agricultural inputs.

Restoring records of property rights to housing, commercial property, and land should be launched as soon as possible, with special assistance to the poor, squatters, widows, and orphans. Establishing a multi disciplinary Land Task Force has worked in other cases to protect land and inheritance rights, as well as to resolve land dispute.

3. Establishing Long Term Opportunities for Women and Communities

The promotion of gender equity can often be addressed easily and speedily in the recovery process. For example, including women in the design and construction of housing, promoting land rights for women, building non-traditional skills through income-generation projects, distributing relief through women, and funding women's groups to monitor disaster recovery projects are practical steps that can be taken to empower women. At the very least, they supersede the reinforcement of existing gender inequities. Indeed, it has become standard practice to issue housing grants as well as housing and land titles in the names of both the wife and the husband, and to stipulate that widows inherit houses in their own names. Cases include post tsunami reconstruction in Sri Lanka; post earthquake recovery in Maharashtra, India; and post flooding reconstruction in Argentina, El Salvador, and Mozambique.

Post disaster situations can be opportunities to empower women at the grassroots level, build more resilient communities, and initiate long-term social change and development. Women have often been active leaders in rebuilding their communities after disasters. They take the initiative in calling grassroots community meetings and organizing disaster response and recovery coalitions. After the earthquake in Maharashtra, India, a local non-governmental organization negotiated with the government to secure the appointment of women as communication intermediaries, placing them at the center of the reconstruction process. The women's groups underwent training to build technical capacity and monitor re-construction. Over time, they became community development intermediaries. In Turkey after the 1999 earthquake, a local non-governmental organization (KEDV) began to rebuild disrupted community networks and to promote women's participation in the public sphere by creating public spaces for women and children. These centers started out in tents and then moved to temporary housing settlements. They provided women's groups with a place to meet, learn new skills, gather and share information on the reconstruction process, and start individual and collective businesses. They provided children with a harbor of safety.

Box 8.1 Key Points Related to Supporting the Recovery of Women and Children After Disasters

- Ensure that relief and recovery interventions protect the safety and human rights of all.
- Assess and understand the different needs of women, girls, boys, and men for recovery, including the indirect economic impacts women typically suffer from being in the informal economy.
- Establish specific monitoring mechanisms (e.g., Continuous Social Impact Assessments) to ensure that women and children can access recovery resources, participate publicly in planning and decision making, and organize to sustain their involvement throughout the recovery process.
- Foster women leaders among the grassroots to facilitate recovery in the community; create formal spaces where women's groups can organize to participate in recovery efforts and formally allocate resources and roles to groups of affected women. This will not only contribute to more effective and efficient recovery, it will establish opportunities for women and communities to shape a more sustainable development.

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IX. Seismic Safety Assessment of Buildings



An immediate post-earthquake task is to decide which buildings are seismically safe or can be made safe and which affected buildings must be demolished. This task is normally done in two steps. The first step is to rapidly inspect buildings and tag building safety. A second, more detailed assessment is then needed for buildings marked for reconstruction or structural repairs. The use of the standard methodologies ATC-20 and FEMA 306 are recommended.

Reconstruction cannot begin until building safety has been assessed. Rapidly assessing safety, meaning identifying buildings that need to be demolished, repaired, or can be used as, is among the first tasks on the critical path to reconstruction. Until this task is completed, very little can be done. Compounding the problem are aftershocks, some of which may cause further collapses of buildings, and that the assessment or inspection process is a labor-intensive task requiring many experienced engineers. However, this problem is not new, and standard methods developed and applied in a number of earthquakes over the last two decades.⁶

1. The Two-Step Process of Seismic Safety Assessment

The Seismic Safety Assessment of Buildings is a two-step process. The first step consists of deciding which buildings can be occupied, which are likely need repairs and should not be occupied, and which are heavily damaged and likely to be demolished. These decisions are made using a standard methodology⁷ of visual inspection and evaluation of building components (see figure 9.1 top). When inspected, buildings are tagged as follows:

Green – Safe to occupy

Yellow – Do not occupy

Red – Do not enter

The ATC-20 methodology is the international standard for this purpose. It has been adapted and employed in numerous earthquakes in Indonesia, Japan, Turkey, the U.S., and other countries.

⁶ Lately, the government of Haiti employed the building safety assessments presented in these notes.

⁷ ATC-20 (2005). Procedures for Post Earthquake Safety Evaluation of Buildings, Second Edition, p. 152. Applied Technology Council, Redwood City. www.oes.ca.gov/WebPage/oeswebsite.nsf/ClientOESFileLibrary/Recovery%20-%20TAP%20-%20Safety%20Assessment%20Program

Hundreds of engineers have received training in ATC-20, which only takes a day or two. Extensive training materials are also available for this purpose. Lastly, a “smart phone” application of the ATC-20 methodology termed ROVER (Rapid Observation and Visual Estimation of Risk) has recently been implemented which significantly speeds up inspection time and productivity. The application can be installed on any mobile telephone and eliminates paper forms. All data is geo-referenced and one-time entered, including building photographs (see bottom figure, next page), and then uploaded to a central server database. Uploading can be via a telephone network or at the end of the day via a computer link.⁸

During the second step, an assessment is made of the structural repairs needed. Once buildings have been rapidly or initially assessed, a significant fraction (all Yellow and many Red tagged) will then need a more detailed assessment for designing structural repairs. Such assessment and design of repairs is a difficult task for which many engineers lack experience. However, a standard methodology for detailed assessment of concrete and masonry buildings has been developed, termed FEMA 306 (see middle right of figure 9.1, showing the methodology’s Process Flowchart) which could readily be adapted to any country’s conditions. Training requires several days.

2. Conclusion

Thousands of damaged buildings in any affected area can be rapidly and efficiently assessed in a two step process using two standardized and widely accepted methodologies. The techniques can be easily adapted for buildings in different countries and employed by local engineers and technicians to the extent these professionals are available. It is important to keep in mind that the safety assessment may also serve the beneficiary assistance, which requires transparency and credibility (both fulfilled by the above methods if properly implemented) as well as an appeal mechanism for owners objecting to the findings.

Implementation of a Building Seismic Safety Assessment program requires in any country the following steps:

- Agreement of the authorities on employing these methods.

⁸ The ROVER software/hardware package uses a mobile phone, not as a telephone but as a handheld PC, and actually does not rely on having a functioning telephone network in order to be employed for Building Safety Assessments. For more information see: www.sparisk.com/pubs/ATC_67-2008-ROVER-flyer

Figure 9.1 FEMA Manuals*

ATC-20 Detailed Evaluation Safety Assessment Form

ATC-20 Damage Assessment Form

ATC-20 Damage Assessment Form
Evaluation of Earthquake-Damaged Concrete and Masonry Wall Buildings, Basic Procedures Manuals (FEMA 306)

Investigation

Assemble Information (0.1)
Identify Components (0.4, 0.4, 0.4)
Document Damage (0.3, 0.3)
Classify Component Damage (0.3)

Verification (0.6)
Component Damage Records (0.3)

Evaluation

Subject Performance Objectives (0.6)
Analyze Subject Performance (0.4)
Alternative Design Method (0.4)
Performance Restoration Measures (0.3)

ROVER SmartPhone Implementation of Post-Earthquake Survey Methodology (FEMA)
(left-right): Windows Mobil SmartPhone with Initial Screen, Building Location Screen, Type of Construction Screen, Photos Screen, Server Upload screen (only selected screen shown)

Based on forms and figures from FEMA Manuals and training materials on post-earthquake rapid assessment.

- Initiating a technical support center for ATC-20 training and inspections.
- Following up the initial training with FEMA 306 training and detailed assessments.

Initial ATC-20 assessments can begin within several days following a decision to proceed and all affected buildings can be tagged within several days to weeks, depending on staffing and the extent of damage. Detailed assessments usually completed within months to a year or even more, depending again on staffing and the extent of damages.

X. Land Tenure



Lack of clarity in land title systems can significantly delay the reconstruction of housing and infrastructure, and lead to conflict. If the land tenure system already faced challenges prior to the disaster, it might pose serious risks for reconstruction in the post earthquake context. It is important that land title, access, use, and pricing issues are addressed up-front, as it was the case in Aceh. The development of short-term solutions to initiate the process may be considered, followed by a broader, longer-term review and if necessary, reform and upgrading of existing systems.

For immediate reconstruction needs a legal framework to address land acquisition and occupation should be developed. Land may be in short supply in the reconstruction process. In fact, the Aceh experience shows, post disaster conditions are usually cramped. Land tenure issues are likely to arise and as people tired of waiting for shelters begin to return to the sites of the former homes to rebuild. An immediate priority of existing property owners will be to re-establish their land ownership. Specific mechanisms to fast track the allocation of public land for recovery and reconstruction activities might be considered.⁹

A diverse category of affected people need to be addressed. Pre-earthquake informal settlers as well as post-earthquake squatters should be provided with viable alternatives. Squatters' claims to public land should be assessed as part of the process. As tent cities and new rural residences consolidate over time, the gray area between “temporary” and “permanent” shelter, and its land tenure implications, should be considered.

Gender considerations should be included. The international best practice of issuing a joint title for husbands and wives needs to be respected. When particular attention is paid to ensuring women's land rights, households are better able to cope with disaster. Women's land rights whether they have joint, independent, or shared claims to common land and/or resources should be ensured.

Box 10.1 Key Decision Points

- A legal framework to address land acquisition and occupation should be developed for immediate reconstruction needs.
- The needs of diverse categories of affected people have to be addressed.
- Gender considerations should be included.
- Forms of proof of ownership other than existing formal land title might be considered.
- A second phase might consider a broader systemic strengthening and reform.
- Involving communities strengthens buy-in and promotes success.

⁹ See, How to Rebuild: Environmental and Social Safeguards Note (pp.66–68).

Box 10.2 Lessons Learned From Past Experiences

India

The 2001 earthquake in Gujarat, India left an estimated 200,000 dead, more than 300,000 injured, and 1,000,000 homeless. Survivors faced disability, trauma, homelessness, and loss of productivity and earnings.

- Providing short-term shelter during the rebuilding was an immediate, top-level priority.
- Apart from shelter, the most urgent need was to reestablish livelihoods for the poor, particularly, small vendors, informal service providers, and farmers.
- The poor and vulnerable had fewer resources to rebuild. The long-term consequences of death and disability disproportionately impacted widows, orphans, and the elderly.

Madagascar and Peru

Experience shows that lack of clarity in land title systems can significantly hamper development (Madagascar), delay the reconstruction of housing and infrastructure, and lead to conflict (Peru). Effectively addressing these issues up-front facilitates reconstruction.

- In Peru, ambiguities and gaps in the titling system (e.g., the failure of homeowners to seek separate titles for their buildings) resulted in frequent legal disputes.
- Following the Ica Earthquake, a system of government vouchers for housing reconstruction was developed, but it soon became mired in dispute due to widespread lack of formal titles.
- Policies intended to provide communities with tenure security were poorly disseminated and overly bureaucratic, therefore underutilized by poor communities.
- The World Bank-supported National Land Rights Project was launched, and is now in its second phase.
- In Madagascar, the recent program National Foncier was faced with an outdated and largely untitled land system. Communal land tenure offices were created (many were mobile and under government contracts) to verify and validate simple tenure certificates. This system allowed land certificates to be issued after only 200 days and at US\$24 per unit*

* Ranaivoarisoa, Rija, Andre Teyssier, and Zo Ravelomanantsoa. 2008. La gestion foncière communale à Madagascar: objectives, processus, et lignes directives de la reforme foncière. www.foncier-developpement.org/

Forms of proof of ownership other than existing formal land title might be considered. An equitable process for (re)establishing land title could consider all types of land certificates and other forms of proof of ownership. The government could work together with communities to document and verify claims (e.g., through on-site GPS coordinates, informal mapping, photograph of destroyed property, and documenting oral testimonies). Such informal evidence could be made legally valid as a basis for claims. The titling process might also be linked to registration

with public utilities (e.g., water, electricity, and sanitation services), as another form of proof of residence and as a way of restoring/enhancing access to basic utilities.

Box 10.3 Indonesia, Lessons from Aceh

- Land tenure system in post tsunami Indonesia was underdeveloped. Only few parcels were titled and most records were destroyed in the disaster itself.
- The government agreed to restore land tenure through a multi tiered community-led process. The first project financed under reconstruction focused on land administration. Local communities, with support from NGOs and the National Land Administration Agency (BPN), conducted land inventories in accordance with BPN guidelines. BPN verified the results by measuring the parcels and validating community agreements on ownership and boundary demarcation. The results of this adjudication were publicized for four weeks, afterwards the properties were registered and titles issued. These services were provided free of charge. This process facilitated the reconstruction of housing and infrastructure, with community mapping of over 200,000 parcels of land and formal titling of over 100,000. The project also established a state-of-the-art land administration database to prevent future loss of documentation.
- Progress with titling and housing reconstruction could not be achieved simultaneously. Rather, the issuance of a title generally followed construction. The CDA approach allowed construction to proceed with a high degree of confidence that houses were indeed on the correct plots and in accordance with land rights.
- Many families chose to informally subdivide their plots to enable the building of new houses for family members on the resulting “sub-parcels.” Many of these were subsequently titled under RALAS or another government program.
- The tsunami exacerbated impediments to women’s access to land. A system was created to address women’s limited ownership rights to land registered under the names of their husbands or fathers. Mobile teams from Shari’a courts accompanied the BPN land adjudication teams to tsunami-affected communities to reinforce religious principles of guardianship and inheritance and to encourage women’s land ownership and rights under Shari’a.
- Vulnerable groups need special support. Less effectively addressed issues included resettlement assistance for those rendered landless by the tsunami and in particular, vulnerable groups. It was later recognized that these groups should have been a key focus early on.
- Existing capacity is relevant. For example, Aceh was able to count on support from a strong central land administration apparatus (albeit with some prodding).
- People generally do not want to relocate, and relocating towns and communities is rarely successful. Providing assistance to communities in rebuilding their homes, businesses, and farms on the original sites is an approach that tends to lead to more sustainable results.

A second phase could consider broader systemic strengthening and reform. Most developing countries and emerging economies have unresolved issues related to land tenure. Following a major earthquake it is possible to address these through a systemic reform process as in Peru in

the context of recovery and reconstruction. It could involve both legal reform and the creation of a robust national database for documenting land ownership (see Experience with Post Disaster Income Support Programs). Existing building codes, their practical enforcement, and any possible role of corruption in construction should be analyzed. A long-term solution could also guarantee all citizens equal access to affordable, timely, and independent appeals mechanisms when their claims are contested. In a post disaster context, the poor and vulnerable are less able to defend themselves in land disputes, specific efforts to provide them with effective legal support should be taken to facilitate equal access to legal appeals.

Involving communities strengthens buy-in and promotes success. It is essential to consult and involve the displaced population at all phases to ensure general buy-in and ownership of the process. Assisting communities in rebuilding their own homes, businesses, and farms at the original sites, rather than imposing top-down solutions, tends to lead to greater consensus and more sustainable results.

Governments facing reconstruction challenges because of lack of cadastre system and/or missing records due to earthquake might wish to review the lessons from Indonesia following the 2004 Tsunami.

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XI. Experience with Post Disaster Income Support Programs



Following any large scale disaster, livelihood support is a critical part of recovery and reconstruction efforts. Direct cash grants and public works programs are common interventions to provide assistance to vulnerable households. Program goals include protecting the most vulnerable in the short term while reviving economic activity for the longer term. Lessons learned from international experience inform important design and implementation considerations for any disaster affected governments.

Restoring livelihoods in earthquake affected areas is a critical component of relief and reconstruction efforts. The strategy that enables resumption of normalcy in the affected areas must involve rebuilding assets to generate income and employment as well as protecting the most vulnerable members of the community. This strategy poses a significant challenge where the extent of earthquake damage is exceptional.

This note focuses on two broad types of income support programs implemented in countries that faced large scale disasters: (i) direct cash transfers to eligible beneficiaries, and (ii) public works programs (cash-for-work). It is important to state at the outset that the direct cash transfer and public works programs used in most post disaster situations were devised within the scheme of a larger social protection agenda.

1. Direct Cash Grants

Cash grants to affected households provide crucial short-term assistance. They help protect the vulnerable and boost local economies by creating purchasing power in affected areas. The success of a direct grant program, however, is predicated on the capacity of the government to effectively design and implement it. Adequate supplies also must be available for purchase and, of course, the markets themselves must be functioning. Cash grant programs in Pakistan (post earthquake) and Sri Lanka (post tsunami) provide valuable lessons. The key elements of a cash grant program are highlighted below.

Targeting Issues: Who Should Receive Cash Grants? Geographic targeting may be appropriate and easy to implement rapidly when damage is extensive and the majority of affected households are confined to a given area. However, previous experience indicates geographic dispersion of the most affected and vulnerable populations. Areas deemed “less affected” often include households who have experienced extensive damage. If targeting occurs at the household (not geographic) level, then clear, simple, and verifiable criteria should guide the eligibility process. Typically this includes those who have been displaced and are living in

temporary shelters or relief camps, as well as those headed by an elderly person or having experienced the death of the main income earner. Additional criteria for identifying the most vulnerable should be developed in close collaboration with the authorities and informed by a careful Damage and Needs Assessment. The assessments may be necessary prior to implementation of the program and initially a combination of geographic, demographic, and self-targeting methods may be preferable until a good household targeting system can be built that effectively reaches vulnerable populations over the longer term. Household-level targeting systems have been successful in both Pakistan and Sri Lanka, yet it is important to recognize the challenges of implementing such a targeting system in emergency situations.

Targeting Issues: Efficient Implementation. Eligibility criteria should not be administratively burdensome to implement. A quick and careful review of the existence or lack of cash grant programs in affected regions could help reveal whether communities or local authorities are well placed to identify beneficiary households for efficient grant implementation. However, since communities may have been fractured and scattered in the aftermath of an earthquake, efficient targeting could be challenging. In the case of Pakistan, authorities selected beneficiaries in affected areas through a simple targeting form. As information was collected, it was reviewed against eligibility conditions, and households were selected for the program. A grievance process was implemented to ensure that anyone who felt wrongly excluded could appeal and have the case investigated by local government officials. This process did take time, so implementation was phased in gradually. In contrast, in Sri Lanka, where a well-established national safety net program existed prior to the tsunami, community officers who facilitated the national program were entrusted to identify eligible households in affected areas. To ensure minimal exclusion of affected areas and households, a monitoring survey was conducted at the outset to re-assess the program and make midcourse corrections to improve targeting. Ultimately, the success of a cash transfer program depends on clear implementation arrangement. In Pakistan, the first step was developing a comprehensive manual to specify eligibility criteria, rules for validation and appeals, as well as the accountabilities of different tiers of government.

Determine the Amount and Duration of Payments. The amount of cash assistance provided to each household is always a difficult parameter to set and requires balancing between needs, resource availability, and labor disincentives. In Pakistan, US\$50 cash per month per household was granted to eligible households. The amount was established by calculating the needs of an average household of seven. The government decided that the payment would be uniform for all beneficiary households and would continue for six months. In Sri Lanka, US\$50 per month per household was granted for four months. In post disaster settings, at least initially, needs could be quite high due to significant asset losses and disrupted or halted income flows. The cost of

the food basket has been used as reference points. Paying the whole cost of living for all affected families, undoubtedly, is very costly with large-scale disasters. Moreover, such high payments assume that families are unable to earn any income, an extreme situation which was true for some initially but which would be less the case as families reestablish income streams, even if not as high as prior to the earthquake. Thus, payments may be reduced over time as the recovery proceeds.

Delivery of Payments. The delivery of payments should alleviate the cash constraints of the needy, be affordable, safe, reliable, and accessible to all. High transaction costs due to intermediaries and/or travel should not be prohibitive. If identification cards (IDs) are required, arrangements should be made to provide IDs to those who have lost or never had them. Banks, post offices, and other institutions that are readily available may be used for distribution—especially if they were earlier serving similar programs. For example in Turkey, following the Marmara earthquake of 1999, the social security system was administering and delivering the cash payments. The flow of funds should be transparent and auditable. An evaluation of the program in Pakistan, which opted to make benefit payments through banks and made arrangements for beneficiaries to open free accounts, points to the importance of accessibility and the need for timely and robust audit processes to ensure good governance and prompt payments. In some countries where remittances are a common source of income for much of the population, a better payment delivery option could be through fund transfer agencies. Prior to the earthquake, a large number of households depended on remittances through fund transfer agencies, which are seen as honest and efficient with affordable fees, and reached most parts of the country. Additional options that have been used to complement delivery mechanisms in certain settings and contexts include credit unions and microcredit agencies.

Calculate Program Costs. Program costs are determined by the final cost of a grant program, which is calculated by adding up the total benefits (i.e., the amount of the cash payment multiplied by the estimated number of payments) to the total implementation costs (i.e., the cost of data collection, monitoring, and administration). Although the rule of thumb to calculate implementation costs for a scaled and established program is 10 percent of total costs, it should be noted that in emergency programs, which tend to be smaller and have less systems in place, this cost may differ drastically. In Pakistan, a damage assessment of lost livelihoods combined with data from household surveys estimated that about 250,000 households would receive US\$50 cash grants for six months with a possible extension for an additional three months to the most vulnerable households. The total cost of the program was US\$85 million.

Ensure a Clear Exit Strategy. A clear and transparent exit strategy, defined prior to any payments, helps avoid dependency on subsidies. Beneficiaries should not be deterred from looking

for regular employment. A prudent approach toward different population groups is variety, based on longer-term vulnerability. For able-bodied workers, a program could move from unconditional to conditional cash transfers. Conditions could include participation in a public works program or other preparations for employment. For the most vulnerable households headed by those unable to work or orphans, cash transfers could be delivered through regular social welfare programs, and for an extended period of time if necessary.

Monitoring and evaluation (M&E): Monitoring and evaluating a social support program is facilitated by a sound database, and a lack of data should not discourage its implementation. In fact, any new assistance program is an opportunity to create a database that can be augmented and maintained beyond the recovery phase. It also can help mitigate disaster risk over the long term. In Pakistan, a database of applicants to its cash grant program was created to be cross-checked with its national ID system. With this database, it was easier to propose extending Pakistan's program for the most vulnerable households and to transfer them to ongoing safety net programs.

2. Public Works Programs (Cash-for-Work)

Public works programs have helped counter the impact of disasters in developed and developing countries alike. A public works program provides cash or payment in kind to individuals who are able and willing to work to help their households meet their immediate needs. At the same time, such programs can restore (or create) much-needed infrastructure. Examples of projects include debris removal, repair of community water supply and sanitation schemes, repair or new construction of public buildings such as community centers, and road repairs. The programs can be easily targeted to specific geographic areas. Overall, public works programs are flexible, easily scaled up, and quickly mobilize resources.

Public works programs have been widely used in the aftermath of natural disasters and major conflicts. Countries such as Indonesia, India, Madagascar, Kenya, and Honduras all implemented similar programs to compensate the impact of various shocks. In Indonesia, around 18,000 participants in 60 villages were involved in public works programs after the tsunami. It made quick and safe disbursement of assistance possible. The programs are often funded with budgetary resources but can also be implemented by non-governmental organizations (NGOs), Social Investment Funds (SIFs), or Community Driven Development (CDD) funds.

A public works program is essentially a form of cash transfer program conditional on working. Key design elements are highlighted below.

Setting the Most Effective Wage Rate. The wage rate is a key element determining the distributional outcomes of the program. In an effort to build a targeting system that is effective in the immediate term as well as the longer term, while reaching the most vulnerable and affected households and economically disadvantaged, the wage should be set just below the prevailing market rate for unskilled manual labor. Only those who have no other means of income will accept the lower wages of cash-for-work. Setting low wages can also help prevent temporary work programs from crowding out more permanent job creation. In some cases, the prevailing market wages are lower than the unenforced yet legal minimum wage. Setting the program wage as such would however weaken self-selection of the poorest into the program. In such cases, it is important to explore options to have the payments classified in a way that the minimum wage law does not apply (e.g., Trabajar in Argentina). It is also important to determine the appropriateness and feasibility of public works in specific country contexts. For example, in Pakistan, prior to the earthquake, there was a high rate of migration of adult men from the affected areas. This made it difficult to ascertain a priori whether people (in particular, women) would be willing to engage in manual labor. For this reason, a direct cash transfer program was deemed more appropriate for implementation.

Determining the Work Content. Public works should target disaster-affected regions and address the needs of specific communities. Projects should not only produce infrastructure that is owned and managed by communities or governments to ensure that the assets created are shared and sustainable, they should also produce public assets that are “built back better” to survive earthquakes and adhere to disaster risk management practices. Furthermore, a careful determination of the maximum number of person-days of employment is essential. This is mostly dictated by budget availability but also depends on the estimated population of households affected or vulnerable as a result of the disaster. Finally, projects should adhere to the respective environment and social safeguard procedures (see chapter on Environmental and Social Assessment).

Making the Program Cost-Effective and Labor-Intensive. A cost-effective program should pay out a high percentage of its total outlays in wages. In other words, labor-intensive projects should be selected. International examples suggest that the cost of labor for road construction projects ranges from 40 to 50 percent of the total costs. In road or drainage maintenance projects, the rate ranges from 70 to 80 percent. In Argentina, for example, the proportion of labor costs in program budgets ranged from 30 to 70 percent, depending on the type of project. In South Korea, the share of labor costs was close to 70 percent. The goal is to ensure that the selection of projects is guided by community needs combined with cost-effectiveness in order to maximize a primary objective of the program: creating employment.

Dealing with Implementation Issues. One should bear in mind implementation issues in a specific country context to determine the best way for funds to flow to local authorities and communities. As discussed above, the flow of funds is critical for a project to move credibly from design to implementation.

Monitoring and Evaluation. Program monitoring helps ensure that public works are demand driven and adhere to their guidelines. Monitoring and evaluation also prevents corruption or leakage. Finally, it should ensure wages are paid to the workers on a timely basis.

