

Guiding Principles for Land Use and Physical Planning

- Laws, regulations, plans, and institutional frameworks should form the basis of reconstruction planning. If existing instruments are not realistic, or are contributing to informality, use the reconstruction process as an opportunity to improve them.
- The planning process should incorporate active collaboration among the reconstruction agencies, the affected community, the private sector, and other stakeholders, thereby engendering their ownership of the planning process.
- The planning process should respond to issues of land rights and titling and to discrepancies in the administration of land records, address the needs of informal occupiers of land, and work with them to identify viable alternatives.
- While addressing long-term development and DRR goals, land use and physical plans should still be flexible and offer choices, rather than become static “master plans.”
- Land use and physical plans integrated with strategic planning can address reconstruction, DRR, and long-term development, yet be readily translated into action plans and investment proposals, including those that promote private investment.
- The planning process needs high-level support, active leadership from the government agencies that will actually implement the plans, and involvement from local communities.

This Chapter Is Especially Useful For:

- Lead disaster agency
- Local government officials
- Land use planners
- Agencies involved in reconstruction
- Project managers

Introduction

Land use planning is done to identify alternatives for land use and to select and adopt the best land use options. The main objective of land use planning is to allocate land uses to meet the economic and social needs of people while safeguarding future resources.

Land use and physical planning have an integrative function. Therefore, this chapter needs to be read along with  Chapter 8, Infrastructure and Services Delivery;  Chapter 9, Environmental Planning;  Chapter 10, Housing Design and Construction Technology; and  Chapter 11, Cultural Heritage Conservation. The issues dealt with in these chapters need to be addressed comprehensively during any meaningful planning process.

Land use and physical planning exercises provide a forum in which the interests of multiple stakeholders as well as the physical, social, and economic constraints on land uses can be debated and balanced in the post-disaster context. Specifically, post-disaster planning provides:

- tools and processes for organizing housing and infrastructure reconstruction in space and over time, addressing the impacts of the disaster and disaster risk reduction (DRR);
- a framework for stakeholders and elected representatives to relate reconstruction to longer-term mainstream development priorities; and
- an opportunity to modify policy, legislation, and regulations; strengthen institutions; and improve construction methods.

This chapter shows how land use and physical planning—complex processes with normative, institutional, and technical aspects—can be used to establish a coherent framework within which affected populations can permanently reestablish their housing, settlements, and livelihoods after a disaster.

Key Definitions

Land use planning is a public policy exercise that designates and regulates the use of land in order to improve a community’s physical, economic, and social efficiency and well-being. By considering socioeconomic trends as well as physical and geographical features (such as topography and ecology), planning helps identify the preferred land uses that will support local development goals. The final outcome is allocation and zoning of land for specific uses, regulation

of the intensity of use, and formulation of legal and administrative instruments that support the plan. A land use plan may be prepared for an urban area, a rural area, or a region encompassing both urban and rural areas.

Physical planning is a design exercise that uses the land use plan as a framework to propose the optimal physical infrastructure for a settlement or area, including infrastructure for public services, transport, economic activities, recreation, and environmental protection. A physical plan may be prepared for an urban area or a rural area. A physical plan for an urban region can have both rural and urban components, although the latter usually predominates. A physical plan at a regional scale can also deal with the provision of specific regional infrastructure, such as a regional road or a bulk water supply system.

Land use plans and physical plans are not necessarily mutually exclusive. It is common practice in many countries to prepare comprehensive development plans that address both land use zoning and the provision of physical infrastructure. Such an exercise is more meaningful if carried out in the context of a strategic planning process, whereby the proposals in the land use plan and the physical plan become part of a comprehensive development plan. While land use and physical plans are outcome-oriented, strategic plans are more process-oriented.

Key Decisions

1. The **lead disaster agency** should decide with **local government**, immediately after the disaster, how they will share responsibility and coordinate aspects of reconstruction related to local planning and land use, including decisions on land use changes and relocation. They should also decide whether technical assistance will be needed at the local level.
2. The **lead disaster agency** should determine how geographic, satellite photography, and other data useful for land use planning will be shared with and among all agencies involved in reconstruction, to save costs and improve planning outcomes. See  Chapter 17, Information and Communications Technology in Reconstruction.
3. **Local government** should decide immediately whether its existing land use plans, regulations, and building codes are sufficient to manage the recovery and reconstruction or to what extent they need to be modified. Building code revision, if required, is time-consuming and needs to start immediately.
4. **Agencies involved in reconstruction** should establish a joint timeline for reconstruction early on that allows enough time for planning without impeding the reconstruction process, and should agree on a communications strategy with the public regarding land use issues. See  Chapter 3, Communication in Post-Disaster Reconstruction.
5. **Local government** should participate in assessments or initiate studies to determine how existing land uses and construction technologies contributed to disaster impacts and to determine how regulations should be modified to reduce future disaster risk.
6. **Agencies involved in reconstruction, local government, and land administration agencies** should collectively decide during assessment whether relocation will be part of the reconstruction process, and whether land tenure issues will need to be addressed, so that preparation for these activities can begin immediately, due to their long lead time. See  Chapter 5, To Relocate or Not to Relocate.
7. **Local government** should determine how it will manage (1) plan review and approval, (2) issuance of building permits, (3) contractor training, and (4) construction inspection. **Local government** should also determine whether local capacity and institutions are adequate to ensure safe rebuilding or what, if any, assistance will be needed.

Public Policies Related to Land Use and Physical Planning

Local and National Policies and Regulations

Public agencies at the national, state, and local government levels in disaster-affected countries may already have in place physical and land use policies and regulations, including special provisions to manage post-disaster planning. Implementation of the policy may fall within the jurisdiction of the Ministry of Public Works, the Ministry of Land, and/or the Ministry of Urban Development and Planning, at different levels in different departments. Most disaster-affected urban areas have physical and land use policies and regulations in place, generally under the jurisdiction of the local planning department or planning commission. Rural areas may have no plans or may be governed by regional or rural development plans overseen by a higher level of government, such as the state or province.

International Frameworks

Land use, land ownership, and land rights issues are addressed in a number of framework documents and instruments issued by international agencies. Some key agreements are included in the Resources section below.

Physical planning, because it is context-specific, is addressed less in international frameworks. However, numerous organizations, including the Oregon Natural Hazards Workgroup,¹ the Shelter Centre and the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA),² the United Nations Environment Programme (UNEP),³ and the European Union's Sustainable Urban Development Unit⁴, have prepared useful guides that address physical planning issues.



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Technical Issues

Is There Time for Planning?

Planning as a process is inevitable in a reconstruction scenario, whether the decision is to just rebuild houses or to achieve comprehensive development resilient to future disasters. The key questions are: How detailed will the planning process be? Will the planning process enable reconstruction or become an impediment in itself? These questions are answered by defining the planning process. We may plan for simple housing layouts where land is available or we may take affected communities through a properly structured planning process, which results in communities expressing their needs and aspirations. While the latter takes more time, the time required can be managed by synchronizing outputs with the reconstruction process, as described below.

Is There Information for Planning?

Lack of information is frequently put forward as a reason to forgo planning, and the disaster may have worsened an already inadequate situation by destroying information or making access to it more difficult. But supplementary information can be readily mobilized using various means, including information technologies and participatory data-gathering methods. Lack of information should almost never be a reason not to plan. See 📁 Chapter 17, Information and Communications Technology in Reconstruction.

Is There Capacity for Planning?

Lack of institutional capacity often discourages decision makers from attempting a planning process. While a planning process usually presumes both the existence of a legal and institutional framework to mandate the process and the professional capacity to implement the prepared plans, these are not absolute prerequisites. Various pragmatic approaches have been tried out in post-disaster situations under less than ideal circumstances. 📁 Annex 2, How to Do It: Post-Disaster Planning Where Planning Law and Institutional Capacity Are Weak, summarizes these approaches.

Define a Planning Process to Guide Reconstruction

Need for a planning process. Keeping housing reconstruction in focus, there is a strong case for a planning process if (1) the impact of the disaster is intense and widespread; (2) there is a need to mitigate future risks from the same or other types of disasters; (3) displacement of the affected population is likely due to loss of land, land rights, titling issues, or high vulnerability of pre-disaster housing locations, or (4) the reconstruction tasks are complex. 📁 Annex 1 to this chapter, How to Do It: Undertaking a Comprehensive Planning Process, describes the key steps in carrying out a planning process.

Legal and institutional frameworks for planning. Land use and physical planning are usually governed by law and need to be carried out in conformity with such laws. Ad hoc reconstruction processes tend to result in legal tangles and titling issues later. At the same time, existing laws and

1. Oregon Natural Hazards Workgroup, Partners for Disaster Resistance & Resilience, 2007, "Post-Disaster Recovery Planning Forum: How-To Guide," http://nctr.pmel.noaa.gov/education/science/docs/Reports/OR_Post-Disaster_Guide_20070716_Draft.pdf.
2. United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) and Shelter Centre, 2010, *Shelter After Disaster: Strategies for Transitional Settlement and Reconstruction* (Geneva: UN OCHA), [http://www.sheltercentre.org/library/Shelter+After+Disaster; and T. Corsellis and A. Vitale, 2005, Transitional Settlement: Displaced Populations \(Oxford: Oxfam Publishing\), http://www.sheltercentre.org/node/3128/download/2179](http://www.sheltercentre.org/library/Shelter+After+Disaster; and T. Corsellis and A. Vitale, 2005, Transitional Settlement: Displaced Populations (Oxford: Oxfam Publishing), http://www.sheltercentre.org/node/3128/download/2179).
3. UNEP, 2008, "Environmental Needs Assessment in Post-Disaster Situations: A Practical Guide for Implementation," http://www.humanitarianreform.org/humanitarianreform/Portals/1/cluster%20approach%20page/clusters%20pages/Early%20R/UNEP%20PDNA_pre-field%20test%20draft.pdf.
4. European Commission, 2002, *Consultative Guidelines for Sustainable Urban Development Co-Operation towards Sustainable Urban Development: A Strategic Approach* (Luxembourg: European Commission), http://www.ucl.ac.uk/dpu-projects/drivers_urb_change/official_docs/Tow_Sust.

institutions may be inadequate to respond to post-disaster needs, and therefore the need for updating should be assessed immediately following the disaster. This is especially important if the legal framework and instruments do not reflect the practicalities of how people build, and therefore contribute to the informal construction and land uses that may themselves have contributed to the scope of the disaster.

Functional scope and geographical jurisdiction. While a conventional planning process can address a wide range of concerns, post-disaster reconstruction planning should focus on topics that enable safe and sustainable community rebuilding. The geographical area for planning should also be clearly delineated.

Timeline for planning. The deliverables of the planning process should be in synch with reconstruction priorities. For example, identifying land for relocation and updating building codes are likely to be the most urgent priorities.

Define Principles to Guide Planning

No matter the scale of the planning exercise or whether it is used to update plans or develop new ones, good planning principles should guide the process. The best principles for planning are those that both professional planners and the community agree on and those that embody the larger development vision for the locality. Some principles to be considered are discussed below.⁵

At the town level

- **Plan for growth.** Land use planning may be done to reallocate existing land uses in the short term, but it generally has a longer, more prospective focus, especially in urban areas that are growing or whose growth may be affected by the disaster. Planning for the future relies on assumptions about population change and future demands for land and services. For this reason, developing reliable projections of population and use of services (such as highway traffic) is an essential early step in the land use planning process.
- **Restore connectivity.** Restoration of the social and economic linkages is important for revival of communities. Transportation, communication, and road networks must be priority items in reconstruction so that they can transport labor and material for reconstruction. Connectivity at the local level will make mobility easy for all means of transportation, including walking and bicycles, and will support livelihood activities.
- **Consolidate unused land.** Since reconstruction requires land, plans may be needed to consolidate land so that it can be made available for development. Unused public land and abandoned industrial land are two sources to be considered.
- **Improve energy efficiency and consider environmental impact.** Reconstruction presents excellent opportunities to promote housing designs, development patterns, and neighborhood layouts that lower energy consumption and encourage a lifestyle that has a low impact on the environment. Even landscaping and house orientation contribute to these goals and should be carefully planned.
- **Create development nodes.** Relocated and rehabilitated settlements should be planned so that they are attractive for investment and development. Providing quality public services and sites for services and other land uses desired by residents will help new settlements become vibrant communities.
- **Reconstruct strategic towns.** Economic centers that serve as growth engines should be reconstructed as early as possible. Strategic towns and cities absorb population, generate employment and nonwage economic opportunities, and provide social services to affected people. Even if such cities have the capacity to meet the needs of their own population and support other villages and towns, they may need assistance to plan reconstruction.⁶

At the site level

- **Integrate residential, ecological, and economic land uses.** Home-based businesses are the life blood of low-income communities. Ensure that neighborhood plans and housing designs provide adequate and appropriate space for these activities. A common tool for achieving this is mixed-use zoning that allows residential and certain commercial activities to be carried out from the same plot. The environmental setting and ecological footprint of a neighborhood also affect quality of life and should be priority concerns in site planning.
- **Avoid enclave development.** Relocating communities in enclaves isolates them socially, prevents economic integration, and brings a host of social problems. Therefore, while planning for relocation, careful integration into the fabric of the receiving settlement is essential.

5. World Bank, 2008, "Planning for Urban and Township Settlements After the Earthquake," Good Practice Notes, http://siteresources.worldbank.org/CHINAEXTN/Resources/318949-1217387111415/Urban_planning_en.pdf.

6. World Bank, 2008, "Planning for Urban and Township Settlements After the Earthquake," Good Practice Notes, http://siteresources.worldbank.org/CHINAEXTN/Resources/318949-1217387111415/Urban_planning_en.pdf.

7. Escape routes were found to be a high-priority infrastructure improvement for communities after the 2004 Indian Ocean tsunami. Improving escape routes may require the acquisition of land to expand rights-of-way. This can be accomplished through negotiation or through conventional compulsory land acquisition if a voluntary solution cannot be found.

8. Speech of Chinese Ambassador Zhou Wenzhong, Chinese Embassy in the United States, "Sichuan Earthquake: Relief, Recovery and Reconstruction," July 25, 2008, <http://www.china-embassy.org/eng/sgxx/t478233.htm>.



- **Plan for emergency access.** Any settlement plan must identify escape and evacuation routes and provide access for emergency vehicles and fire service engines. Those affected by the disaster may not return or occupy sites that don't have adequate escape routes.⁷

The Key Actors in a Planning Process and Their Roles

Level of government	Roles
Central or national government	<ul style="list-style-type: none"> ■ Invoke federal/national law, only where the situation warrants. ■ Mobilize the relevant government agencies to undertake, commission, and supervise planning. ■ Provide funding or support for accessing international funding. ■ Provide specialized technical expertise if required. ■ Ensure public investments conform to plans and codes.
State or provincial government	<ul style="list-style-type: none"> ■ Provide legal mandate for the plans. ■ Create the policy environment in which the plans are prepared. ■ Mobilize the relevant government agencies, including regional entities, to guide and support the planning process. ■ Provide technical expertise as required. ■ Provide funding or support for accessing funding. ■ If regional planning is required, carry out the planning process.
Local government	<ul style="list-style-type: none"> ■ Carry out the planning process at the local level. ■ Create structures to enable meaningful community participation. ■ Be committed to implementing plans prepared with community participation. ■ Approve plans and establish the regulatory framework for implementation. ■ Carry out communications campaigns and training programs to ensure compliance with plans and codes. ■ Review and approve building plans, enforce building codes and land use regulations, carry out inspection, and administer sanctions.
Community (affected people as well as larger community)	<ul style="list-style-type: none"> ■ Participate in the land use, physical, and strategic planning processes. ■ Develop a collective vision for the future of the community. ■ Arrive at consensus on policy issues that cut across communities. ■ Where relevant, prepare community-level detailed plans in conformity with larger policies. <p>The 🏠 case study on the 2004 Indian Ocean tsunami in Aceh, Indonesia, below, describes how communities took the lead in remapping land parcels as the first step in a wide-ranging process to formalize land ownership.</p>
Project facilitators (planners, nongovernmental organizations [NGOs], and other intermediaries)	<ul style="list-style-type: none"> ■ Interpret government policies to set out the agenda for planning. ■ Educate the community on planning imperatives and the policy framework. ■ Interpret technical information and offer viable choices to government and communities to enable informed decision making. ■ Develop and carry out projects that comply with plans and codes.
Technical experts	<ul style="list-style-type: none"> ■ Carry out technical investigations, data collection, and analysis to support planning. ■ Develop technical recommendations and options. ■ Assist with implementation of plans and codes.

The actual distribution of roles will depend on the existing legal and institutional frameworks as well as the actual capacity at the local government level. An interesting experiment in progress at the time of this writing is the pairing of cities in China following the 2008 Wenchuan earthquake. The cities and towns affected by the earthquake are being paired with those unaffected by the earthquake for financial, technical, and logistical assistance.⁸

Differentiating the Planning Process for Urban, Rural, and Regional Contexts

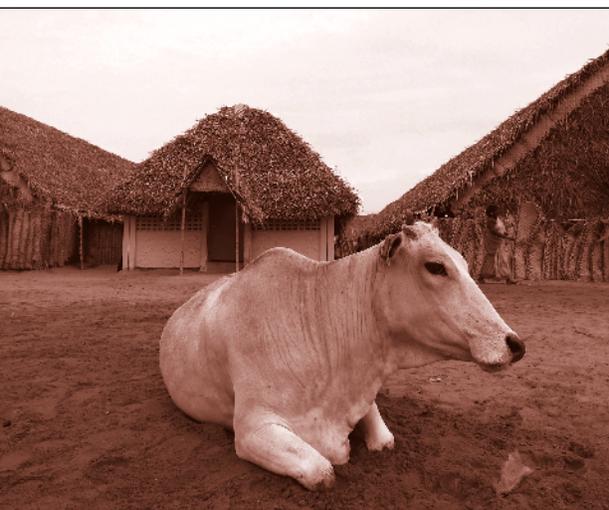
While the generic planning process, as well as the core issues that the process addresses, will remain largely similar in urban, rural, and regional contexts, there are differences that need to be recognized.

Urban areas. The planning process in urban areas tends to be more complex and prone to conflict and contestation. Land values are higher, property ownership is more complex, and flexibility to change land uses is often more limited. It is important to acknowledge that land use planning is going through a paradigm shift across the world. From an earlier, purist approach of exclusive zones for specific uses (e.g., residential, commercial), there is a shift toward appropriate mixes of compatible uses (e.g., residential with small businesses, institutional with offices). From an earlier approach of flat, low-density urban development, there is a shift toward more compact cities with variable density correlated with urban transport systems. Other distinctive characteristics of urban planning include the following.

- Developed or built-up areas predominate. Therefore, the land use plan needs to reflect and plan for diverse land uses.
- The demand for infrastructure will be higher (in both quantitative and qualitative terms) and the provision of infrastructure more complex and costly. Therefore, housing reconstruction must be closely coordinated with the development of infrastructure.
- Urban land use planning has an immediate and highly visible impact on urban land values. Therefore, a transparent approach to planning is essential.
- Urban areas are more likely to have agencies that undertake planning and regulation as well as professionals for design and supervision. Therefore, the approach to DRR is usually based on planning and regulation.
- Investments in urban settlements and infrastructure during reconstruction should contribute to already-established urban development goals.
- Development control and regulation systems are usually present in urban areas but tend to be flawed and complicated, creating high incentives for noncompliance. DRR initiatives therefore need to focus on simple and effective regulatory systems. The 🏠 case study, below, on the 1985 Mexico City earthquake shows how the deterioration of apartment buildings caused by the lack of building code enforcement may have contributed to the disaster impact, and the cost of reconstruction.
- Stakeholder participation in urban areas is relatively difficult due to such factors as: the diversity of interests resulting in more conflict, higher sensitivity of residents to delays, and the volatility of public opinion in post-disaster situations. People are also more mobile and their free time is more limited. Urban residents often care more about their own space than about common space, since geography is only one basis for identity in an urban context.

Rural areas. In rural areas, the settlements and associated built-up areas form a relatively small part of the larger landscape. Land values are lower, and, while ownership and titling issues exist, they can often be resolved relatively easily through participation. The sense of ownership is higher in rural areas, and the social structure plays a major role in the dynamics of reconstruction. However, community participation is fully achievable in a rural context. Other features of rural planning include the following.

- Land use plans need to respond more significantly to natural features, such as geology, topography, hydrology, and ecology. The classification of uses within a settlement will assume less significance while in the larger landscape will reflect the diversity of uses in agriculture, animal husbandry, forestry, and other related activities.
- Institutional arrangements for regulating development are nonexistent in rural areas of most developing nations; there may be no designated planning agency whatsoever. The approach to DRR should be based on building awareness and training construction workers.



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- A land use plan in a rural area may not dramatically change land values, but can still have a significant impact on the sustainability of development.
- Physical planning may be limited to a basic road network and essential services within the settlement. However, there may be planning required to support agriculture and other rural livelihoods.
- Housing is usually designed and built by owners themselves or by local masons. It is important that building regulations are responsive to the local cultural context.

Regions. Regional plans become relevant if there are reconstruction requirements or vulnerability mitigation issues that are spread over large, geographically integrated areas. For example, if the road network in a large area has been damaged or if an entire floodplain has attracted high-risk land uses, a regional plan may be the appropriate vehicle. Coastal zones also may have special planning or regulatory regimes that govern set-backs and land uses across multiple jurisdictions. Other considerations with regional planning include the following.

- A regional land use plan will deal with macro-level issues, like locations of settlements, protection of forests, and management of coastal zones, river basins, and floodplains. However, such plans by themselves will not be enough to guide the post-disaster reconstruction process.
- Physical planning at the regional scale will primarily look at the facilities for regional infrastructure, such as regional roads, structures for watershed management, and bulk water pipelines.
- The institutional arrangements for regional planning can vary from state or provincial governments to special agencies set up to coordinate development in a particular zone. Their planning capability will vary.
- Regional plans are often developed with an economic focus. Their utility in a post-disaster context may be to connect disaster recovery to the economic goals set out in the plan.
- Regional plans have to be complemented by plans for the rural and urban areas within the region.

Note on planning terminology. A wide range of terms are in vogue for various kinds of plans: Vision Plan, Structure Plan, Outline Plan, Development Plan, Concept Plan, Master Plan, Strategic Plan, and so on. There are considerable overlaps and similarities in the contents of these differently named plans. Each country, state, or locality will have terminology that is accepted in that context. The following section describes a fairly generic process that captures most of the contents and formats that are used across the world. It is recommended that the process adopted in each context build on processes that are understood locally, while improving on them, adding whatever is missing in terms of content, format, or processes.

Planning in the Post-Disaster Context

When a planning process is contemplated, the first question asked is “What topics and issues should the plan address?” or “What are the components of a good post-disaster reconstruction plan?” This section describes what needs to be addressed in a comprehensive post-disaster reconstruction plan. The second question is “How do we go about it?” How to do planning is covered in  Annex 1, How to Do It: Undertaking a Comprehensive Planning Process. In situations where the institutional capacity is limited, realistic decisions will be required about how much planning can be achieved, which is dealt with in  Annex 2, How to Do It: Post-Disaster Planning Where Planning Law and Institutional Capacity Are Weak.

Generic Content of a Comprehensive Post-Disaster Reconstruction Plan

Land use	
	In a non-disaster situation, a comprehensive plan would address land uses for all purposes, including transportation, governmental, industrial, commercial, and residential. After a disaster, the planning exercise may focus primarily on land for housing and infrastructure reconstruction, but should not ignore other land use requirements, especially any others that have been affected by the disaster. This component of the plan addresses the issues and questions listed below.
Housing needs assessment	How many houses have been destroyed or damaged? Is it safe to rebuild in the same location? Are there multi-dwelling buildings (apartments)? Are there tenancy, land rights, or titling issues? What is the housing need in different categories?
Assessment of land availability	If <i>in-situ</i> reconstruction is possible, can adequate DRR measures be implemented in available sites? If relocation is required, is there public land available? What are the criteria for choosing relocation sites? What are people’s preferences in relocating? What are the underlying socioeconomic and political dynamics?
Land allocation planning	What is government policy on land for housing reconstruction and other purposes? Will housing reconstruction be plotted (single-family) development or apartment construction? What will be the process for acquiring and allocating land? What will be the policy on land allocation for social and physical infrastructure? Is there any need for land consolidation or land pooling?
Titling	What sort of tenure is to be granted to those who have been allotted land? How will the property rights documents be created and provided? How will the rights of women be protected? The outputs of this component will include (1) maps showing locations for housing reconstruction, (2) tentative or conceptual housing layouts (housing design is a separate activity), (3) housing project briefs with cost estimates, and (4) policy recommendations, if required.
Land use zoning and building codes	
	Land use zoning is a systematic way of managing the nature and intensity of land use in a specific area. The output is a map (with an accompanying table) showing various zones where specific uses or a mix of uses may be permitted. This component should address such questions as: Is there a system for land use zoning? Is it adequate to address DRR requirements? To reduce risk while accommodating future growth, what type of land use zoning is required? What is the institutional mechanism for implementation of the zoning? Is it market friendly? User friendly? How will informal settlements of the urban and rural poor be integrated into the land use zoning? Land use zoning imperatives are different in rural and urban settings, as discussed later in this chapter.

Building codes and development regulations	This component relates to the design, construction, and performance of buildings. The issues that need to be addressed include: Is there a regulatory system in place? How effective is it? Are prevailing codes responsive to prevailing hazard risks? What codes need to be put in place? How would they relate to land use zoning? Do existing procedures for building permission need improvement? What is the architectural heritage of the region? How can building codes accommodate local traditions? Do local building techniques need enhancement for disaster resilience? How will the new building codes affect housing affordability? How will codes apply to informal settlements of the urban and rural poor? The typical output is a set of Building Codes, Building Bylaws, or Development Control Regulations (the rule book for building design and construction).
Guidelines and manuals	If time or institutional constraints make it unrealistic to update building codes and regulations in advance of reconstruction, an alternative is to produce advisory guidelines and manuals that can be used in reconstruction. These guidelines and manuals should be based on standards and codes from an area with similar building technologies and housing designs. There are risks associated with using standards that are inappropriately stringent or from areas with different building technologies. The promulgation of the guidelines should be accompanied by a social communications program, training of builders, and a strategy for overseeing reconstruction. See  Annex 2, How to Do It: Post-Disaster Planning Where Planning Law and Institutional Capacity Are Weak, for more guidance on this situation.
Physical plan	
	Several key elements of physical planning are listed here. Planning may address them collectively, or each may be dealt with separately if the situation demands it.
Road layout	What is the existing road network in the settlement or region? Is it adequate for speedy evacuation and rescue in the event of a disaster? Are new road connections required to reduce risk and enhance preparedness? Are new roads required to provide connectivity to housing reconstruction locations? What is the extent of damage to roads? Are engineering improvements required? The output of this component will include road network maps and project briefs for road construction.
Plot layout	This relates to proposed housing reconstruction. While detailed design of housing layouts is a separate activity, at the planning stage it is important to prepare at least a conceptual layout of the proposed housing to ensure that the land allocation is adequate and that major issues have been addressed. The output is a set of plot layout plans.
Planning for infrastructure and services	This component deals with network alignments and land allocation for infrastructure services. The critical services include water supply, wastewater management, solid waste management, and storm-water management. Power supply and telecommunications networks may also be important. In all these cases, the existing systems need to be documented and proposed improvements need to be conceptually worked out to the extent that is required for assessing land-related issues. The output is a set of maps. Project formulation for infrastructure is a separate activity, but may be carried out concurrently or integrated with the planning process.
Planning for public buildings and social infrastructure	This component deals with allocation of land for facilities related to health, education, government, recreation, community development, and disaster shelters. In the planning process, the questions that need to be addressed are: What facilities existed pre-disaster? Should refuges be built? What is the extent of damage? Do any facilities need relocation? Were pre-disaster facilities adequate? What does the reconstruction policy envisage: restoration of pre-disaster levels or improvement? What is the land requirement? What facilities are required as part of new housing to be created? The output of this component is a set of maps showing locations of proposed facilities and project briefs for creating them. Planning infrastructure projects is covered in  Chapter 8, Infrastructure and Services Delivery.
Local economic development	
	A comprehensive planning process needs to look at the economic base of the settlement/region and the need for interventions in the post-disaster situation. For example, if the disaster has destroyed livelihoods and economic diversification is a dire necessity, then the planning process needs to generate proposals for creating new job opportunities. In most cases, this will have a land allocation or land use zoning dimension. The output will consist of project briefs and, where relevant, maps showing land allocation.
Cultural heritage conservation	
	Issues related to cultural heritage conservation are dealt with in detail in  Chapter 11, Cultural Heritage Conservation. In the planning process, conservation imperatives will find reflection in land use zoning, building regulations, and land allocation for cultural projects where relevant.
Implementation strategy	
	Everything decided or developed in the planning process will remain wishful thinking if inadequate attention is paid to the strategy for implementation. While immediate post-disaster needs (usually “restoration”) will find funding easily, for long-term recovery it may be necessary to develop strategies to generate funding from multiple sources. This section of a plan should bring together the “big picture” of the reconstruction process, define the implementation process, estimate overall funding requirements, and assign roles, responsibilities, and tasks.

Addressing Land and Property Rights and Land Titling Issues

In a post-disaster situation, the following issues related to land and property rights and titling typically emerge:

1. Determining land and property rights that existed before the disaster and the entitlement to land or housing assistance after the disaster
2. Addressing the situation of people with uncertain tenure rights in reconstruction policy making and reconstruction planning
3. Providing certainty of land title or expanded land rights in reconstruction to those affected by the disaster, irrespective of their pre-disaster situation.⁹

Lack of land tenure security is usually compounded by pre-disaster institutional weaknesses related to land and property rights, described below.

Pre-disaster dysfunctionalities. There is an inextricable connection between poorly functioning land systems and disasters.¹⁰ Where tenure security is weak or land markets are not accessible by all groups, vulnerability is higher, disaster impacts are greater, and recovery is slower. Indicators of poorly functioning land systems include:

- a large number of settlements where occupants have extralegal or informal tenure¹¹;
- poor land governance, including outdated, incomplete, or erroneous land records and weak capacity in land administration institutions;
- lack of tenure security with all types of property rights;
- inferior land rights for women because of inheritance, marital law, or administrative practices; and
- highly unequal land distribution, including the inability of large sections of the urban population to afford formal land access in locations that are supportive of livelihood activities.

Before a disaster, weak land systems will cause populations to settle in high-risk areas and will leave these settlements beyond the reach of DRR measures. Occupants with weak tenure rights hesitate to evacuate, despite pre-disaster warnings, for fear of losing their land—and may instead lose their lives. Female-headed households, more apt to evacuate, face disproportionate risks of lost land or property from invaders or theft.

Post-disaster complexities. After a disaster, an influx of the poor and landless from other areas to take advantage of temporary emergency shelters can make closing these shelters difficult when the disaster subsides. Renters, squatters, and landless people who leave the area may have difficulty returning to their disaster-affected land, reestablishing their lease terms, or securing affordable rent. Legal owners may have lost records or have customary rights with no documentation. The number of tenancy categories may far surpass what is anticipated in the law.¹² None of these problems is solved easily or rapidly in most countries, even under the best conditions, and they will inevitably arise in housing reconstruction programs. Some potential solutions are summarized in the following table.

Measures to Consider for Solving Post-Disaster Land Rights Problems

Common land rights problem	Potential solutions
Occupants of informal settlements whose occupancy is of uncertain tenure rights	The resolution of such a problem is inevitably linked to pre-existing government policies on slums and squatter settlements. However, the post-disaster situation usually offers a unique opportunity to provide these households with secure tenure as part of the reconstruction program, particularly if they are affected by the disaster.
Owners with documented land rights who have lost documentation in the disaster	Use community-based mechanisms or traditional authorities to validate claims. Provide new (or interim) documentation to landowners, including in previously undocumented areas.
Owners with rights to land, but no formal title or documentation to prove it or with property title but no land title	Provide technical assistance to the land administration agency to accelerate normal land administration procedures, including replacement of documents, formalization of unrecorded subdivisions, and transfers, especially those from one generation to another. Use duly authorized mobile “land administration teams” to expedite the process of consolidating legitimate claims to property. Provide assistance so that owners can negotiate clear title with the possessor of land. After the 2000–2001 Mozambique floods, the United Nations Human Settlements Programme (UN-HABITAT) helped the government analyze how poor land management had contributed to the disaster and identify projects to remedy weaknesses in the land management system, as discussed in the  case study, below.

9. In Aceh, Indonesia, following the 2004 Indian Ocean tsunami, government announced that residents would have the “right to return,” a policy that was subject to significant debate over its practical meaning for years afterward.

10. United Nations Centre for Human Settlements (UN-HABITAT), 2008, “Scoping Report: Addressing Land Issues after Natural Disasters,” http://www.gltm.net/images/stories/downloads/utf-8nat_disaster_scoping_paper_jan_08.pdf.

11. Customary systems are not necessarily an indicator of poorly functioning land systems. In some locations, such as rural Africa, they may be the most appropriate system.

12. UN-HABITAT identified 31 different tenancy situations in the affected population in Peru following the 2007 Ica/Pisco earthquake. UN-HABITAT, the Department for International Development (DFID), and the Ministry of Housing, Construction and Sanitation, “Final Report, Land Ownership and Housing” (“Informe Final, Tenencia de la Tierra y la Vivienda”), 2008, Centro de Estudios y Promoción del Desarrollo.

Common land rights problem	Potential solutions
Landless who need to be relocated, including disaster refugees	<p>Acquire public land. A common solution is to use public land for relocation. However, availability is not sufficient justification; use should be preceded by a good site evaluation.</p> <p>Acquire private land: Market-based acquisition from landowners willing to sell.</p> <p>Government offers limited fiscal incentives to sellers (property tax rebate).</p> <p>Offer long-term rental assistance rather than land ownership.</p> <p>Use land pooling systems of the sort used in Kobe and Bhuj, India.</p>
International agencies or individuals attempting to acquire legally titled land as part of reconstruction confronted by poor records and inefficient land administration procedures	<p>Provide technical assistance to the land administration agency to accelerate normal land administration procedures.</p> <p>Find owners (public or private) willing to lease land to agencies either as a permanent or interim solution. Agency then follows through to establish freehold ownership of individual parcels, if called for.</p> <p>Provide financial assistance to families to cover legal costs, lower other transaction costs, or subsidize purchase price of land.</p> <p>Focus on procuring land rights and tenancy, rather than on securing formal land title for large numbers of those affected by the disaster.</p>
Large parcel needing to be subdivided to provide individual title to those relocated	<p>Provide technical assistance to the land administration agency to accelerate normal land administration procedures.</p> <p>Agency provides collective land rights to those relocated as a group as a permanent or temporary solution.</p> <p>Agency provides interim documentation until subdivision and titling are formalized.</p> <p>Consider rezoning the parcel(s) to allow subdivision into individual residential, mixed-use, commercial, and institutional (public use) plots. Nonresidential uses may help cover costs of residential land.</p>
Land disputes between households affected by the disaster or with the receiving community, caused by relocation without formal titles or invasion	<p>Avoid relocation programs that create questionable land rights at all costs.</p> <p>Negotiate with claimants to purchase land or land rights and resolve claims before relocation.</p> <p>Establish formal or community-based mediation mechanisms to resolve post-disaster land issues.</p> <p>Consider land consolidation and readjustment of parcels at the community level.</p>
Inflated price of land needed for relocation	<p>Use market valuation methods, validated with data from outside the area.</p> <p>Use competitive bidding process to establish prices.</p> <p>Use negotiated price to avoid eminent domain proceedings.</p> <p>Temporarily impose land price controls by government in the immediate post-disaster period.</p>
Areas from which communities are removed for reasons of risk reduction are rapidly relocated	<p>Zoning or other regulation should be established that forbids relocation in high-risk areas.</p> <p>Provide budgetary support for police or other enforcement body.</p> <p>Create community enforcement mechanisms.</p> <p>Secure abandoned areas or transform into an income-generating use that involves minimal built investment, e.g., urban agriculture and fish cultivation ponds, or into a recreational use, so that either private users or the public at large has an interest in monitoring and reporting relocation.</p>
Governments considering land distribution to those displaced but fearing protests from other landless groups not affected by the disaster, or fearing influx of fraudulent claims	<p>Announce assistance scheme and eligibility criteria after the census of affected population has taken place.</p> <p>Link assistance scheme or land distribution to existing social assistance schemes and policies.</p> <p>Use disaster to establish assistance or land distribution schemes that can be expanded to other groups post-disaster.</p> <p>Employ social communication tools to explain assistance strategy and rules.</p>



Other actions that should be taken during reconstruction include:

- focusing particularly on the housing, land, and property rights of women and children;
- conducting an early land-tenancy assessment and carrying out ongoing monitoring of the impact of measures to address land-rights issues as reconstruction progresses (see Annex 1, How to Do It: Conducting a Post-Disaster Housing Sector Assessment in  Chapter 2, Assessing Damage and Setting Reconstruction Policy, for an example of an assessment methodology that can be used for this purpose); and
- ensuring that agencies or banks transfer land title to new owners once they occupy the house or loans are paid off.

The long-term land rights-related reforms that often are required and that may also be initiated during reconstruction include:

- long-term reforms to improve access to secure tenure and to improve land administration systems;
- the reduction and prevention of informal settlements in DRR strategies (see  Part 4, Technical References, Disaster Risk Management in Reconstruction); and
- establishment of redundant and secure recordkeeping systems, and deployment of information and communications technology (ICT) data warehousing systems to digitize and protect records so that they are available after the next disaster (see  Chapter 17, Information and Communications Technology in Reconstruction).

Promoting Disaster Risk Reduction in Reconstruction Planning

To avoid reproducing the vulnerabilities that contributed to the disaster, multiple actors need to be engaged in implementing and managing DRR.¹³ The following actions should be taken to integrate DRR into the planning process.

- Include DRR as an integral element in every phase of planning for reconstruction.
- Strengthen both institutional and community capacity, and commit resources to ongoing DRR activities and training.
- Implement DRR training and information sharing that reaches all stakeholders.
- Develop model plans that incorporate risk reduction, safe construction techniques, siting, and building maintenance that integrate DRR into housing and settlement designs and maintenance.
- Identify how risks can be transferred through insurance and micro-insurance schemes, and facilitate the implementation of feasible measures.

Structuring Community Participation

Planning for settlements and livelihoods must be coordinated at the local level; therefore, the participation of the community is fundamental to ensure the sustainability of the reconstruction or relocation plan. See  Chapter 12, Community Organizing and Participation, for a discussion of participatory methodologies. Conditions that contribute to the success of this approach include:

- an inclusive decision-making process that incorporates vulnerable populations, including women;
- a high level of interaction, cooperation, and partnerships among different stakeholders, including civil society, national and local governments, the private sector, the media, and national and international support agencies;
- support by local governments to establish a coherent framework, provide effective facilitation mechanisms, and ensure the necessary information is available (participatory data-gathering may be a useful tool); and
- established participatory activities in the community, or a pre-disaster consultative process with communities living in vulnerable locations to agree on preventive measures and mitigation options as groundwork for post-disaster collaboration, especially in communities affected by recurring disasters (a brief description of a community-based hazard mitigation planning process is found in  Part 4, Technical References, Disaster Risk Management in Reconstruction).

The  case study, below, on the reconstruction project undertaken by the South Indian Federation of Fishermen Societies (SIFFS) in Tamil Nadu following the 2004 Indian Ocean tsunami describes how homeowners carried out a geographic and socioeconomic mapping of reconstruction settlements that included a study of the use of outdoor common space.

We may plan for simplified housing layouts where land is available or we may take affected communities through a properly structured planning process, which results in communities expressing their needs and aspirations.

13. International Strategy for Disaster Reduction (ISDR), 2006, "Words Into Action: Implementing the Hyogo Framework for Action Document for Consultation," <http://www.preventionweb.net/english/professional/publications/v.php?id=594>, p. 81; and ProVentium Consortium, 2007, "Construction Design, Building Standards and Site Selection, Guidance," Note 12, http://www.sheltercentre.org/sites/default/files/ProVentium_ToolsForMainstreaming_GN12.pdf.

Risks and Challenges

- Initial damage and loss assessments inadequately incorporate land issues.
- Data needed for planning—for example, land records and GIS data—have been lost or are inadequate.
- The land administration system is weak or flawed and, as a result, the information base related to land is inadequate for proper planning.
- The institutional framework for planning and regulation is weak or flawed, making the planning process difficult and possibly resulting in redundant regulation.
- Ad hoc planning processes create a disconnection between reconstruction and existing land use or physical plans.
- Delays in the planning process and/or institutional and community disagreement over land use and site location delay reconstruction.
- A variety of obstacles prevent acquisition or legalization of land for relocation, reconstruction, and infrastructure rights-of-way.
- A lack of coordination between infrastructure rehabilitation and housing reconstruction.
- Local cultural, social, and economic life is ignored in planning reconstruction.
- The opportunity to improve urban land markets, and to expand land rights and access to land, is missed in post-disaster planning.
- The legality of reconstruction investments is later challenged because of unresolved land ownership claims or violations of land use regulations.

Recommendations

1. Assess the need for a post-disaster planning process as soon as the emergency is over. If the legal and institutional framework is weak, consider using the alternative methods described in  Annex 2 of this chapter.
2. Delineate the geographical area for planning and identify the functional jurisdiction of the plan.
3. Assess the existing legal and institutional framework for planning. Build on existing systems, customizing and improving them for post-disaster reconstruction.
4. Structure the planning process in a comprehensive manner covering land use planning, physical planning, and strategic planning, addressing all the issues relevant to reconstruction, DRR, and, to the extent required, mainstream development objectives.
5. Translate plans into project briefs, including both capital investments for reconstruction and supportive measures, such as awareness building and institutional development.
6. Carry out a stakeholder mapping, and structure systematic and meaningful community participation at all stages of planning—from mapping and data collection to analysis and proposal formulation.
7. Assess the situation with respect to land rights and titling early on. Include in reconstruction planning specific measures to respond to the needs of vulnerable groups, including informal and illegal occupiers of land.
8. Use technologies and tools for planning that are appropriate, considering resource and time constraints.
9. Include DRR as an integral element in every phase of planning for reconstruction.
10. When relocation is unavoidable, integrate relocation areas into the existing fabric of receiving towns and cities.

Case Studies

2004 Indian Ocean Tsunami, Aceh, Indonesia

Consolidating Distressed Communities through Local Services and Community-Driven Land Adjudication

The Indian Ocean tsunami of December 26, 2004, killed more than 150,000 persons in Aceh and left many communities in trauma. The tsunami wiped out not only houses, but also residential property boundaries of villages near the coast and civil records in many local sub-district offices. With support from a nongovernmental organization, through YIPD and Forum Bangun Aceh (FBA), an initiative was launched to involve people in rebuilding their settlements. One activity was the repair and recovery of destroyed local sub-district offices. Sub-district offices were refurbished and reorganized so that they could once again provide citizens with services, such as issuing temporary ID cards (as many were lost) and other identification documents. These offices also provided information on available supplies and recovery programs. As a result of this effort, these locations became regular meeting points for the survivors and helped sub-district staff develop lists of survivor families by sub-village.

Another early initiative was community-driven land adjudication (or community land mapping). The initial activity took place in three sub-districts in the city of Banda Aceh and was funded by the United States Agency for International Development (USAID) through YIPD. This was eventually expanded to more than 400 villages across the Aceh province, supported by the Australian Agency for International Development (AusAID) through Local Governance Infrastructure for Communities in Aceh (LOGICA) and by the Reconstruction of Aceh Land Administration System (RALAS) Project with US\$28.5 million from the Multi-Donor Fund for Aceh and Nias. Community members carried out a land inventory process using guidelines developed by the national Land Administration Agency (LAA). Volunteers were trained to identify landmarks and to produce drawings. The map of parcel boundaries, once completed, was signed by a family member and owners of neighboring parcels (left, right, front, back). The LAA validated the community's findings regarding ownership and boundaries, using land records from before the tsunami and parcel measurements, and then secured community agreement. The ruling on the land parcels was published and registration of titles was offered free of charge. The goal was to formalize 600,000 land titles. By December 2008, 211,839 parcel surveys had been completed, 126,107 land titles were registered, and 112,460 had been distributed. The land management system was computerized, and joint titling for married couples was introduced. This activity set the stage for reconstruction in these disaster-affected regions.

Sources: Azwar Hassan, Forum Bangun Aceh, 2009, personal communication, <http://www.forumbangunaceh.org/> and Multi Donor Fund for Aceh and Nias, 2008, "Investing in Institutions: Sustaining Reconstruction and Economic Recovery. Progress Report of the Multi Donor Fund for Aceh and Nias," http://www.multidonorfund.org/documents/2008-12-18-MDF%20Progress%20Report_V.pdf.

2000–2001 Floods, Mozambique

Development of a Technical and Legal Framework to Address Land Issues

During 2000 and 2001, flooding in Mozambique affected 2.5 million people and left 200,000 people homeless. The floods magnified poor land management practices that had been in place prior to the disaster. While some disaster-affected areas had land use plans, and measures to mitigate erosion and landslides, they often were not followed. Land records and equipment were destroyed by the floods. Insecurity of land and housing tenure meant that some people affected by the flood refused to leave low-lying lands. Other concerns included the property rights of people affected by the flood who did not return to their previous locations and of those settled in new areas, particularly women. (Land rights in Mozambique are acquired through occupation or authorization of statutory use rights. Family law recognizes equal land rights for women; however, in practice, access can be limited.) An assessment by UN-HABITAT noted that the allocation of housing and development of new settlements after the flooding lacked adequate technical and legal backing, presaging the emergence of land disputes between affected households and those already living in relocation areas. The UN recommended that irregular allocations and unlawful occupations of land be remedied as quickly as possible. UN-HABITAT and the government of Mozambique have since implemented a portfolio of projects intended to:

- improve the capabilities of municipalities and the Directorate of Geography and Cadastre;
- rehabilitate the offices of institutions involved in land registration;
- prepare maps of rural and urban settlements affected by the floods;
- delineate and register properties in new settlements; and
- review the legal and institutional framework governing rights to land.

Source: UN-HABITAT, n.d., "Scoping Report: Addressing Land Issues after Natural Disasters," http://www.gln.net/images/stories/downloads/utf-8nat_disaster_scoping_paper_jan_08.pdf.



DANIEL PITTET

2004 Indian Ocean Tsunami, Tamil Nadu, India

SIFFS-Built Houses and Habitat with Owners in Nagapattinam

The South Indian Federation of Fishermen Societies (SIFFS) undertook reconstruction of 1,380 houses in the villages of Chinnangudi, Karantheru, Puduppalayam, and Tarangambadi in the Nagapattinam district of Tamil Nadu, India, after the 2004 Indian Ocean tsunami. For SIFFS, the reconstruction project was about more than the provision of four walls and a roof. Instead, it aimed to create an organic community, taking people's social and cultural needs into account while planning the houses.

SIFFS adopted an ambitious plan to customize every house for its owner, with the motto "1,380 houses in 1,380 designs." With the correct approach to layout, planning, design, and construction, combined with a positive mix of a scientific approach and cultural sensitivity, SIFFS was confident that it could achieve its goals. SIFFS house owners were involved in every step of the process, from design through construction. Some important elements of the project were (1) habitat mapping: a geographic and socioeconomic mapping of the four settlements that included the study of common space as well as space usage within the houses; (2) a mass contact program: to inform

people of mapping results and to seek their opinions on designs; (3) design development: layouts were presented and discussed before settlement plans were finalized; (4) model houses: seven prototype house designs were selected using a participatory process and "real" model houses were constructed to help families make their choice; (5) plot allotment: with the help of local authorities and traditional village panchayats, plots were allocated to each family prior to construction; (6) family design meetings: used to finalize the design before construction; and (7) cluster committees: representatives from each cluster of houses were trained to monitor the construction process. There has been nearly 100 percent occupancy of these houses by their owners since they were completed, and families have already invested their own money to expand or beautify the houses. The goal of building organic habitats—not just houses—was substantially achieved.

Sources: C. V. Sankar, India National Disaster Management Authority, 2009, personal communication; and SIFFS, 2008, "SIFFS Hands Over Houses in Marthandanthurai," <http://www.siffs.org/Index.aspx?Page=NewsContent.aspx&FirstNews=SIFFS&NewsId=54>.

1985 Mexico City Earthquake, Mexico

Improvement of the Tenure Situation of Urban Low-Income Families after Reconstruction

An earthquake with a magnitude of 8.1 on the Richter scale hit Mexico City on the morning of September 19, 1985, killing approximately 10,000 people, leaving 250,000 homeless, and damaging the houses of another 900,000. The disaster impact was magnified by the high concentration of population and economic activity in the affected area and by the deteriorated condition of the buildings, which was attributed to the city's rent-control policies.

Before the earthquake, the Mexican government had made a public commitment to improve low-income housing. Government used the post-earthquake situation as an opportunity to speed up the low-income housing improvement initiative. The Cabinet approved an in-situ reconstruction approach and passed a decree expropriating some 5,500 rental properties that were either damaged or in dangerous condition. Landlords offered little resistance, since most of the properties had ceased to be profitable. This radical measure had positive consequences for the affected families, protecting them from eviction and allowing them later to become homeowners.

The housing reconstruction program cost US\$392 million and was partially financed by a World Bank loan. (The US\$400 million disaster recovery loan for Mexico's earthquake reconstruction is still one of the largest disaster loans ever made by the Bank.) This program required a relatively large subsidy and has been criticized for its somewhat arbitrary targeting, since earthquake-affected families located outside the zone where properties were confiscated were excluded from the reconstruction program. At the same time, the speed with which the reconstruction took place, in an extremely complex environment, sets it apart from many other reconstruction projects of this scale.

Sources: Sosa Rodriguez and Fabiola Sagrario, n.d., "Mexico City Reconstruction after the 1985 Earthquake," Earthquakes and Megacities Initiative, http://emi.pdc.org/soundpractices/Mexico_City/SP2_Mx_1985_Reconstruction_Process.pdf; World Bank, 2001, "Bank Lending for Reconstruction: The Mexico City Earthquake," <http://lnweb90.worldbank.org/oed/oeddoclib.nsf/DocUNIDViewForJavaSearch/9C4EA21BB9273C74852567F5005D8566>; and Aseem Inam, 1999, "Institutions, Routines, and Crisis. Post-Earthquake Housing Recovery in Mexico City and Los Angeles," *Cities* 16(6):391-407.

2001 Gujarat Earthquake, India

Two-Stage Planning Process with Effective Policy for Relocation in Bhuj City

In the aftermath of the 2001 earthquake in Gujarat, India, the state of Gujarat's comprehensive reconstruction program covered urban and rural housing reconstruction and local/regional infrastructure development. Housing reconstruction was principally owner-driven. Government played a facilitating role, providing land and infrastructure. Village councils undertook physical planning for rural housing. For four of the severely affected urban areas, including the city of Bhuj, government commissioned detailed land use planning and physical planning exercises, leading to the preparation of development plans at the city level and town planning schemes at the micro level. New development control regulations were also framed for each city.

In the densely populated, densely built-up "old city" area of Bhuj (and two other towns), land readjustment projects known as Town Planning Schemes were carried out. Neighborhoods were reconfigured where buildings collapsed, creating a vastly safer street network and built form.



This map shows the layout of a neighborhood in the old city of Bhuj before the land readjustment exercise. The streets were narrow, with dead ends and bottlenecks. Few buildings were standing (the plots that are shaded). During the quake, buildings had collapsed on the streets, preventing people from escaping and later hampering rescue.



This map shows the layout of the same neighborhood after the land readjustment exercise. The streets have been made wider, continuous, and much safer. The plots where buildings collapsed have been reorganized. Final plots, somewhat smaller than the original plots, have been allocated in roughly the same location as the original ones, retaining overall community configurations.

While the detailed planning for in-situ reconstruction was in process, government prepared three relocation sites with fully serviced plot layouts for voluntary relocation. This greatly reduced the resistance to improvements in the old city area. About 4,000 households relocated voluntarily to these relocation sites.

Sources: B. R. Balachandran and Purvi Patel, 2006, "Reconstruction of Bhuj: A Case of Post-Disaster Urban Planning," *The ICFAI Journal of Urban Policy*, Vol. 1, No. 1, pp. 24-34, <http://ssrn.com/abstract=1093589>; and B. R. Balachandran, 2006, "The Reconstruction of Bhuj," in *The Role of Local Government in Reducing the Risk of Disasters*, Katalin Demeter, Ekin Erkan, and Ayse Güner, eds. (Washington, DC: World Bank), <http://go.worldbank.org/5K1D5B08V0>.



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How to Do It: Undertaking a Comprehensive Planning Process

In this guide, comprehensive planning is defined as a planning process that incorporates land use, physical planning, and strategic planning. This annex outlines a generic process for developing a comprehensive plan, along with its key activities. The specific planning exercise needs to be adjusted to the requirements of the situation.

Activities, Outputs, and Deliverables

Key activities of a planning process. The planning activities and outputs described in this annex are generic descriptions that may vary by country or locality. The common factor is that

these activities and outputs are the critical inputs to produce the deliverables of the planning process described below. As with the plan's content, the right strategy for the planning process is to build on processes that are already understood in the local context, customizing and improving these processes for the purpose of guiding reconstruction. The outputs that can be expected for each activity are described in the table below. These outputs are the building blocks for the preparation of the plan. By themselves, these outputs don't qualify as deliverables in a planning process.

Activity	Considerations	Output
Delineate geographical and functional jurisdiction of the plan	The first step in the planning process is to delineate the geographical area for which planning is to be done and to determine which components need to be addressed by the plan. This decision should take into consideration the impact of the disaster, issues emerging with respect to future risks, and the existing legal and institutional framework.	Base map showing geographical jurisdiction and report providing the rationale for the geographical area and a preliminary listing of plan components, along with the rationale for those components
Carry out stakeholder mapping	The primary stakeholders for reconstruction planning are those affected by the disaster and the agencies involved in reconstruction, including government and nongovernment agencies. Other stakeholders include the larger community, businesses, line departments not directly involved in reconstruction, and those who can contribute to reconstruction (resource groups, institutions, and individuals). Those affected by the disaster are unlikely to be a homogenous group. The diversity within this group needs to be recognized, particularly with respect to vulnerable groups. The negotiation of interests among stakeholders is a key function of planning. Stakeholders also add value to the planning process through their knowledge of the local context and their skills.	Inventory and brief description of stakeholder groups
Prepare maps and collect data	Prepare a base map of the area to be planned and collect demographic information. Then, for each of the components of the plan, prepare a set of maps showing the pre-disaster and post-disaster situations and collect base data. It is quite common that reliable maps and data are not available. There are various technologies, such as remote sensing, and methodologies, such as participatory mapping and rapid appraisals, that can be used to supplement available information.	Maps capturing the existing situation Reports compiling and presenting data on the existing situation A summary of the maps and data presented in a manner that the stakeholders can understand and use
Undertake participatory strategic planning	The planning process should involve stakeholders in a structured manner. There are two broad stages in this process.	
Analyze existing situation and articulate vision	Using the mapping and data collection that has been carried out, undertake a participatory analysis of the existing situation. Various tools can be used such as a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis. Studies such as land suitability analysis and risk assessment provide the basis for land use planning. From these analyses, generate a collective, overarching vision for the community, settlement, or region that stakeholders agree upon.	SWOT Analysis Report for each component of the plan Vision Statement

Activity	Considerations	Output
Formulate objectives, strategies, and projects	<p>This should be done based on the analysis above and the vision.</p> <ul style="list-style-type: none"> Identify plan components and, for each component, articulate specific objectives. To support these objectives, formulate strategies that build on strengths, overcome weaknesses, take advantage of opportunities, and ward off threats. Translate these strategies into implementable projects. <p>For example, an objective in land use zoning may be to minimize flood impact on housing. The strategy to achieve this may be to make public land in safe locations available for housing. This strategy may be translated into (1) reservations on public land in the land use plan, (2) formulation of a housing project for relocation of households from at-risk locations, and (3) regulations on construction in low-lying areas.</p>	Comprehensive Strategic Plan compiling all components of the plan
Approve, publish, and implement the plan	The success of the plan depends on the measures that are taken to ensure its full implementation.	
Approve the plan	The plan with all its components should be officially sanctioned under the provisions of the relevant planning legislation. Of utmost importance is the publication of revised building codes.	Legal notification issued
Publish the plan	The plan documents, including all relevant maps and reports, should be made publicly available using various media. The entire set of documents should be made available on Web sites. Hard copies of the full set should be available for purchase and hard copies of a short and user-friendly summary may be made available for free.	Plan documents available in various forms
Assign institutional responsibility	Prepare a detailed work plan for the implementation and monitoring of the plan. Identify appropriate institutions for undertaking the various tasks, assess their capacity, officially designate roles, and commission capacity building activities where required. The work plan should include a social communication effort to notify and educate residents about the plan.	Work plan with allocation of roles and responsibilities Monitoring plan
Develop and implement regulations	Development and implementation of regulations and enforcement mechanisms and sanctions will ensure full enforcement.	Regulations

Deliverables of a planning process. All the outputs of the planning process are combined to create four broad categories of deliverables, as shown below.

These deliverables are the documents (including maps) that are used to create the legal and regulatory framework for development. The deliverables listed here are generic. The legal terms for these deliverables will vary by country or locality.

Deliverable	Description
Land use plan and regulations	This is a map or a set of maps with supporting documents that show and describe (1) proposed housing reconstruction locations with basic details, (2) the nature and intensity of land uses permitted in different zones in the planning area, (3) areas reserved for particular uses, (4) areas where development is restricted, and (5) guidelines for the design and construction of buildings. It is common practice to also show any proposed road network and other transportation networks on the same maps. Supporting documents include draft regulations and/or ordinances that must be approved legislatively in order for the plan to be put in force and implemented. The regulations should include sanctions that penalize noncompliance with the plan.
Physical plan	This is a map or set of maps that show the proposed layout of the road network, alignments of various other infrastructure networks, and locations of major facilities.
Compendium of project briefs	This is a list of projects, each one with a brief description, cost estimate, and implementation strategy. Projects may include capital investments as well as other interventions, such as public awareness or capacity building. Reconstruction happens through project formulation and implementation. The planning process is the means of establishing the ground rules for development (or reconstruction) and organizing projects within a systematic framework.
Implementation plan	This a detailed work plan that assigns roles and responsibilities, describes the design of programs for capacity building where required, and a explains the strategy for monitoring plan implementation.

Tools and Methods for Planning

The following are some examples of tools and methods that can be employed in the planning process described above.

Tools for participatory planning. Genuine involvement of stakeholders is critical for preparing plans that capture local knowledge and that address local aspirations and concerns. Examples for such participation are available from experiences in many disasters.

- **Participatory mapping.** In a post-disaster situation, good maps are usually not available. In such situations, it is possible to start with available maps and enhance the information content by involving local people. For example, in Indonesia, post-tsunami planning exercises have used public participation to establish pre-tsunami land holding patterns and also to reorganize those patterns in response to post-tsunami needs.
- **Participatory strategic planning.** SWOT analysis is an effective tool for strategic planning and can be used in a participatory mode as well. In the city planning process in Bhuj, India that was carried out after the Gujarat earthquake citizens conducted a SWOT analysis of their city with respect to various plan components, and came up with strategies for reconstruction and management of the city's growth. See 📖 case study, below, on the Bhuj planning process.

Tools for risk mapping. These tools provide a sound basis for decisions related to relocation and infrastructure development.

- **Risk analysis.** An all-hazards risk assessment (or risk analysis) is a determination of the nature and extent of risk developed by analyzing all potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods, and the environment on which they depend. The risk analysis shows vulnerabilities in a particular location and quantifies the potential impact of a disaster on a community. A detailed methodology for risk analysis is included in 📖 Part 4. Technical References, Disaster Risk Management in Reconstruction.
- **Land suitability assessment.** Land suitability mapping uses multiple parameters, such as topography, ecology, demography, and infrastructure availability, which are assessed and weighted to determine suitability of land for specific purposes.

Technologies for mapping and spatial analysis. The choice of technology depends on the resources available as well as the time frame.

- **Total Station survey.** This is a survey method that uses computerized survey equipment (called Total Stations) and is by far the most accurate method for creating a topographical and cadastral map, but requires considerable time. Where land values are high and variations in topography play an important role in vulnerability (for example, hilly areas), this is an

appropriate method.

- **Remote sensing.** Creating maps from satellite images and aerial photographs falls in the category of remote sensing. There are various kinds of satellite images and they have varying resolution. To illustrate, for planning in rural or regional contexts, False Color Composite images can be used to map land use patterns, while in urban areas, high-resolution monochrome images can be used to identify physical features like buildings and roads. Stereoscopic images can be used to get topographical information and create digital terrain models. Mapping using remote sensing is a relatively fast and less expensive option when high levels of accuracy are not required.
- **GIS data.** GIS is a generic term for software platforms that can combine spatial information (maps) and alphanumeric data in a seamless manner and that use sophisticated algorithms to perform a range of analyses. GIS can be used in post-disaster reconstruction planning for simple functions, e.g., the production of thematic maps depicting impact, to more complex functions, e.g., vulnerability and land suitability analysis, to highly complex functions, e.g., simulation of future disaster scenarios. See 📖 Chapter 17, Information and Communications Technology in Reconstruction.

How to Do It: Post-Disaster Planning Where Planning Law and Institutional Capacity Are Weak

This chapter may give the impression that land use and physical planning processes require powerful laws, institutions, and resources. While that may be the ideal situation, this annex addresses the frequently-encountered situation of a disaster

occurring where the post-disaster institutional capacity for planning is very limited. In such contexts, consideration of planning usually precipitates three primary issues and related concerns. It should be used jointly with Annex 1.

Issue	Related concern
Legality	
What is the validity of a land use/physical plan that has no legal or statutory backing?	Who will approve and regulate the plan? How will compliance be ensured? Where there is reorganization of land involved, how will legal title be assured?
Capacity	
How can the leadership, technical expertise, and financial resources be mobilized in the absence of installed institutional capacity?	Planning a housing site in an ad hoc manner is not a big challenge, but can a whole city or a large portion of one be planned using a “rapid planning exercise”?
Implementation	
How should the activities in the land use and physical planning process be prioritized? How will decisions be implemented?	Are there some activities that are more critical than others? Once the planning exercise is completed, who implements it?

Even though the need for post-disaster planning in these situations is common, there is no standard approach to conducting it. However, there are a number of strategies that have been used around the world.

Create a Mandate for Planning

The strategies that can be deployed to create a mandate for land use and physical planning include amending existing legislation, introducing new legislation (using national or international models), and creating a mandate through ordinances and government orders.

Experience in Japan. Following the 2005 Hanshin earthquake in Japan, the Japanese government enacted a “Special Act for Disaster Afflicted Urban Areas,” with special provisions for urban planning, including the creation of neighborhood committees for land readjustment projects.¹

Experience in China. Following the 2008 earthquake in Wenchuan, China, government’s national implementation guidelines established three categories of land uses for national land available for reconstruction: (1) suitable for reconstruction, (2) appropriate reconstruction, and (3) ecological restoration. The guidelines also defined parameters, such as the priority in which services should be restored and the types of land uses that should be expanded in which areas. Within this framework, specific decisions were delegated to provinces and municipalities.²

Mobilize Institutional Resources

The reconstruction policy should address how the resources for local planning will be made available at the local level, if capacity at this level is at all in doubt. The strategy may need to be quite specific. For instance, if planning capacity is adequate,

but the procedures for eminent domain are weak, national or state government may need to intercede in that specific area. The options for mobilizing institutional resources are numerous. They include:

- accessing planning expertise from another level of government;
- bringing in a planning agency from a comparable location inside the country;
- getting technical support from an international agency and/or comparable location outside country (international exchange programs like the City Links program of the International City/County Management Association [ICMA] or other pairing programs sponsored by international nongovernmental organizations (NGOs) or bilateral agencies;
- creating a platform for collaboration between all the players in the reconstruction process and carrying out a collaborative planning exercise;
- borrowing “planners” from another sector in the same country or the private sector (e.g., economic development, health services, corporate strategy); and
- government officials from one or more jurisdictions acting as planners (mayor’s office, cabinet).

In each of these cases, the technical resources within government can be supplemented by procuring services from the private sector or seeking skilled volunteers.

Experiences in India. To provide assistance to the cities of Cuddalore and Nagapattinam following the 2004 Indian Ocean tsunami, ICMA, with support from the U.S. Agency for International Development (USAID), paired these two Indian cities with three cities in Florida that are at continual risk of hurricanes. Together, they created maps for the Indian cities with detailed data layers of features, such as public



infrastructure systems and facilities, land uses, and relevant building structures. The maps were used to develop evacuation plans and a flood mitigation program, among other purposes.

After the Gujarat earthquake of 2001, the Indian state government of Gujarat created special Area Development Authorities in four affected towns and brought in planners using state resources to manage a process where private sector professionals were hired to provide planning services.

In carrying out rural reconstruction work in Kutch, a collaborative platform was created by Kutch Nav Nirman Abhiyan, a collective of more than 20 NGOs in Kutch. This platform was used to undertake various planning exercises at a regional scale. See the case study on Kutch Nav Nirman Abhiyan in  Chapter 14, International, National, and Local Partnerships in Reconstruction. Under the guidance of planners experienced with the methodology, participatory planning exercises can be organized and carried out in a matter of two to three weeks.

Experience in China. The Chinese experience following the 2008 Wenchuan earthquake (referred to elsewhere in this chapter) entailed pairing more capable cities unaffected by the earthquake with earthquake-affected cities. The assisting cities were asked to make both technical and financial contributions. In this model, a city with better institutional capacity can help to coordinate planning, draft guidelines, and formulate regulations, based on its own planning framework, while also compensating temporarily for any deficiencies in staffing or local capacity caused by the disaster itself.

Prioritize Planning Activities

When there is a scarcity of institutional resources, it becomes important to prioritize the critical elements of the land use planning process. Listed below are the most important land use and physical planning activities, along with suggestions on how they can be handled expeditiously.

Critical planning activities	Suggestions to expedite activity
<p>Identifying land for housing reconstruction</p> <p>The selection and allocation of land based on sound principles and with due consideration of disaster vulnerability issues is a fundamental requirement. It is also important to ensure that clear title be given to the beneficiaries.</p>	<p>Use mostly alternative sources: secondary sources, such as a regional disaster risk reduction agency; satellite or GIS data gathered for the disaster assessment; maps created for other purposes, such as a nearby environmental study; or new local maps developed through a participatory process.</p>
<p>Revising land use zoning</p> <p>While it may not be essential to carry out a comprehensive land use zoning exercise, it is very important to assess disaster risk and vulnerability and to formulate development control regulations that respond to it.</p>	<p>Consider grandfathering existing land uses, altogether or in low-risk zones, to reduce approvals of reconstruction exceptions to existing zoning laws.</p> <p>Seek the leadership of an experienced planner or planners deployed for a short period of time, potentially with support from humanitarian or development agencies, if local expertise is not available.</p>
<p>Physical planning</p> <p>Planning the housing layout in a neighborhood is a priority task that may be able to be done quickly without professional planners.</p> <p>If the disaster impact is widespread, and reconstruction entails extensive infrastructure, public facilities, relocation, and connectivity issues, then physical planning is required and the deployment of a professional planning team by one of the means described above is necessary.</p>	<p>Gather data and maps from government planners preparing for reconstruction of major infrastructure may have GIS data, maps, and/or satellite images that can be extended into local areas or made available directly to local planners.</p> <p>Useful data for planning are increasingly available publicly. For information on this topic, see  Chapter 17, Information and Communications Technology in Reconstruction.</p> <p>Seek the leadership of an experienced planner or planners deployed for a short period of time, potentially with support from humanitarian or development agencies, if local expertise is not available.</p>
<p>Improving construction methods</p> <p>A full revision of building codes, which may be the perfect solution, is rarely feasible in a post-disaster content. Instead, guidelines and manuals for the reconstruction process, tailored to the requirements of the specific post-disaster situation, should be prepared and people should be trained to use them.</p>	<p>Guidelines and manuals are the minimum acceptable activity. See  Chapter 10, Housing Design and Construction Technology, and  Chapter 16, Training Requirements in Reconstruction, for guidance on developing guidelines.</p> <p>Agencies involved in reconstruction may have experience and materials that can be adapted. Ask agencies to develop and propose common reconstruction standards and procedures for adoption by the local jurisdiction.</p>

Annex 2 Endnotes

1. Supporters Network for Community Development, 1999, "Key Terminology in Restoration from Hanshin Earthquake Disaster," http://www.gakugei-pub.jp/kobe/key_e/index.htm#Men1005.
2. National Development and Reform Committee, 2008, "The Overall Planning for Post-Wenchuan Earthquake Restoration and Reconstruction," <http://en.ndrc.gov.cn/policyrelease/P020081010622006749250.pdf>.
3. ICMA, "City Links: Global Problems, Local Solutions, 2003-2008," <http://www.icma.org/citylinks>. Assistance through City Links can be accessed through local USAID offices.
4. Brian Hoyer, 2009, "Lessons from the Sichuan Earthquake," Humanitarian Exchange Magazine, No. 43, <http://www.odihpn.org/report.asp?id=3008>.

