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Land Use Planning after a Natural Disaster

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Thesis

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by

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Abstract

Recovery from a natural disaster is difficult, expensive, and can take ten years or more. Many contend that recovery planning can be ordered, knowable, and predictable and that the destruction of buildings and displacement of the population provide an opportunity to build back better. This thesis examines the complexity of recovery through the lens of land use planning. Land use planning serves as the central focus because land provides an individual or family their livelihood and its use underlies the economy. The thesis considers two planning models -- rational comprehensive and incremental. The thesis concludes that incremental planning is more appropriate for recovery planning, but that even during recovery the community needs post recovery goals and objectives to provide context to their day-to-day decisions. A more comprehensive planning process is better suited for developing and articulating post recovery goals and objectives.

Land Use Planning, Natural Disaster, Rational Comprehensive Planning, Incremental Planning, Recovery and Reconstruction, Planning

Introduction

A natural disaster can strike with little or no warning and can cause extensive destruction to a community's housing, infrastructure, and economy in addition to killing and injuring its population. Those not killed can find themselves homeless, living in austere conditions, and susceptible to exposure, disease, hunger, and abuse. The impact of the disaster often exceeds the community's ability to immediately clean up and recover, and the return to pre-disaster conditions can take up to ten years or more (Action Plan for National Recovery of Haiti, 2010). The cost of recovery and reconstruction can often exceed the community's resources forcing the community to seek assistance from higher levels of government, other donor countries, or international organizations; borrow money, often at rates or with conditions that can impair the community's economy for years to come; or only partially rebuild, leaving the community and its population worse off and more vulnerable to future crises. The burden often falls heaviest on the poor, minorities and other disadvantaged groups because they lack resources to support recovery, often live on land more susceptible to natural disasters, and lack representation in the halls of government (The World Bank, 2010; Inter Agency Standing Committee, 2002; Brookings Institute, 2005; The Sphere Project, 2011). The basic decisions a community must make when choosing how they want to build back after a natural disaster involve the land -- how to use it and who owns it and whether to build back the same or to make use of the opportunity to build back differently (Kennedy et al., 2008; Monday, 2002; Christoplos, 2010).

The purpose of this thesis is to identify how land use planning can aid in recovery and reconstruction planning after a natural disaster. The central focus is on how land use planning is integral to recovery and reconstruction and provides the foundation upon which the community is rebuilt. Studying various efforts at recovery and reconstruction reinforces two planning

models -- incremental and rational comprehensive (Ross and Leigh, 2000). The conditions encountered during recovery favor an incremental approach to planning. Incremental planning can focus on changes that improve safety and quality of life and provide a foundation for greater change in the future (Kates et al., 2006; Lindblom, 2009). However, recovery planning that lacks grounding in a long term vision of a better community impede the community's long-term development (Monday, 2002). Integrating long term goals into recovery planning without creating additional hardship for the community necessitates a deliberate and reasoned planning approach. Therefore, post disaster planning should include aspects of both incremental and rational planning. The leadership's challenge is to strike a balance between the speed of incremental planning and the deliberation of rational comprehensive planning (Campbell and Fainstein, 2009; Lindblom, 2009)

The capability to conduct, resource, and implement recovery planning varies from country to country and even between communities within the same country. This variance makes any thesis that looks across countries and regions more abstract than focusing on one country, region, or crisis. Identifying common solutions is also difficult due to differences in laws and traditions, resources allocated to conduct planning and implementation, and authorities and capabilities vested in government leaders. In acknowledgement of these challenges, this thesis focuses on the theoretical basis of land use recovery planning and the conflict between the rational comprehensive and incremental planning models, because these issues are common challenges planners must confront and overcome.

In this thesis I review the literature to identify land use considerations for recovery and reconstruction planning and implementation. I reviewed reports and manuals from government organizations and international aid organizations, peer-reviewed articles, and books on post-

disaster recovery and reconstruction. I also reviewed journal articles, news articles, and books on a number of different natural disasters across the world. I analyzed the material in order to develop an understanding of how land use supports recovery and reconstruction planning and implementation.

The thesis identifies the land use considerations for recovery and reconstruction by examining how land use is part of recovery and reconstruction planning, the land use tools used to support the planning process, and the issues that make land use planning during recovery and reconstruction so challenging. The first section of the thesis lays out a framework for post disaster planning by identifying four phases -- emergency, restoration, recovery and reconstruction, and commemorative -- and identifies recovery and reconstruction as the longest and most important phase. The second section reviews the planning process and the supporting tools that are used by government officials, international aid organizations, and community planners to conduct recovery and reconstruction planning. The third section examines the main issues that make recovery and reconstruction planning so challenging. The final section provides conclusions on how land use supports recovery and reconstruction planning and implementation.

What Happens after a Natural Disaster: The Four Phases of Recovery and Reconstruction

After a natural disaster strikes the government must lead the effort to rebuild the community. The process of rebuilding can take up to ten years and requires a significant commitment of resources -- time, money, people, and will of the leadership (Action Plan for the Recovery of Haiti, 2010). As pointed out by Schwab and his fellow authors (1998), there is no clear demarcation between emergency response, recovery, and reconstruction. The literature generally breaks down disaster and post-disaster into four overlapping periods or phases -- emergency, restoration, recovery and reconstruction, and commemorative and betterment (Schwab et al., 1998; Kates et al., 2006). The emergency phase, which can last from minutes to days, encompasses the disaster itself and the immediate aid and assistance rendered. An earthquake, such as the one that struck the east coast of the United States on 23 August 2011, can last only a few minutes (USA Today, 23 August 2011) while the removal of flood waters from New Orleans post Hurricane Katrina extended the emergency period to six weeks (Nelson et al., 2007). The restoration phase commences at the conclusion of the emergency period and continues for days and even months. The focus of this phase is on the restoration of major services (electricity, lights, water, and sewer), transportation networks, and the removal of debris, which is essential to beginning the next phase (Schwab et al., 1998). The next phase is recovery and reconstruction, which is focused on repairing and rebuilding the community's capital stock and the renewal of social and economic activities to their pre-disaster levels; return of the pre-disaster population, or at least a stabilization of the population; and the repair or replacement of homes, jobs, and community activities. The final phase is the commemorative. This phase normally takes place several years after the disaster when sufficient time has passed

to allow the community to reflect on the disaster and how well the community built back (Schwab et al., 1998). The focus of this thesis will be the recovery and reconstruction phase, because it is during this phase the key decisions on land use are made and when the main land use actions are undertaken.

Land Use Planning: During Recovery and Reconstruction

Land use planning influences the entire recovery and reconstruction process and therefore must commence early and be integrated into all aspects of planning and implementation (UN Settlement Program, 2010). The purpose of post-disaster land use planning is to identify policies, strategies, and roles and responsibilities to mitigate the risk of future natural disasters, ensure compatible land use, protect the land tenure of displaced land owners and secondary rights holders, and protect and restore the ecosystem.

Schwab points out that many experts and politicians adopt a philosophy that recovery and reconstruction can be an "...ordered, knowable, and predictable" process (Schwab et al., 1998, p. 7). Following a prescribed processes and applying land use tools can allow government to make sense of a confused and complex situation and develop a plan to rebuild. This philosophy however is often challenged by reality. A democratic government adhering to its laws is never in absolute control, will never be afforded unlimited time or resources, nor will it be provided a blank slate upon which to develop grand schemes for the wholesale redesign of a city or region. Even authoritarian governments will have limited resources and may even have its authority constrained if it seeks international or bi-national assistance. The result is a complex process characterized by a succession of quick decisions based on incomplete information and limited opportunity to gain input from the population (Lindblom, 2006).

Complexity, incomplete information, lack of resources, and difficulty communicating with the community do not negate the need for planning but in fact reinforce the need for efficient and effective planning (Lindblom, 2006; Klosterman, 2006). First, there will never be sufficient resources to meet everyone's needs, especially in the compressed time frame that characterizes recovery and reconstruction (UNHSP, 2010; Olshansky, 2006). The planning

process is necessary to prioritize available resources to meet the most critical needs and to lay a foundation for further recovery. Second, a natural disaster can change the community's demographics and can even modify the land itself (UNHSP, 2010). A plan is needed to address these changes, especially the need to re-examine land use and to settle ownership and equity issues. After a natural disaster strikes it is not uncommon for a number of actors (government agencies, international organizations, nongovernmental organizations, business owners, and individuals and their families), each with their own goals and objectives and with varying resources, to be actively engaged in recovery and reconstruction. A plan is necessary to unify their efforts, minimize conflict, and eliminate gaps in assistance that could leave groups without assistance, and reduce the chance scarce resources are squandered on redundant efforts (Schwab et al., 1998; UNOP, 2006; UNHSP, 2010).

Land Use and Recovery and Reconstruction Planning

The steps for recovery and reconstruction planning are the same as in any other type of planning (Sendich, 2006). However, the main references for post disaster recovery and planning, the United Nations Settlement Programs *Land and Natural Disaster: Guide for Practitioners* (2010), the World Bank's *Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural Disasters* (2010), and Jim Schwab and his fellow authors' *Planning for Post-Disaster Recovery and Reconstruction* (1998) recommend a planning process of six or fewer steps. A common theme that emerges is the importance of first conducting an assessment in order to gain an understanding of the situation before any serious recovery and reconstruction planning can commence (UN Settlement Program, 2010; World Bank 2010). The results of the assessment are intended to guide recovery and reconstruction planning, and the assessment process should be iterative to ensure planners are working with up-to-date information (UNEP,

2008). The UN Settlement Program recommends four separate assessments. A rapid assessment, to be completed within five days of the disaster, to support emergency requests for aid and funding. The rapid assessment should identify the land affected; any urgent humanitarian land requirements, such as locations for temporary camps and food storage sites; and any time critical risks to early recovery (UN Settlement Program, 2010). Within six months, the government must complete a Post Disaster Needs Assessment (PDNA). The PDNA normally uses an established international format and is used to request and justify funding for the early stages of recovery and reconstruction. The PDNA should identify risks from natural hazards, land conflict issues resulting from private and public land being used to support recovery and reconstruction, land use barriers to recovery and reconstruction, and challenges to the land administration that will impede recovery. Concurrent with the PDNA and completed within six weeks of the disaster, the government should conduct a loss and damage assessment. A loss and damage assessment calculates the amount of land damaged and lost as a result of the natural disaster and any damage or loss to the land administration system. The assessment should also identify how any loss and damage would affect recovery and reconstruction. The final assessment is land availability and risk mapping. This is a more deliberate assessment intended to identify what land is available and what land is now excluded, for reasons of health, safety, and welfare, to support rebuilding. Until assessments are conducted there can be no significant planning because pre-disaster information will often be lacking, outdated, or incomplete. Even when the data were collected, analyzed, and archived prior to the natural disaster there is a need to revalidate that this information is accurate and is accessible in the post-disaster environment (UN Settlement Program, 2010; The World Bank, 2010).

The World Bank (2010) provides a good guide for planners to use when conducting land use planning in support of recovery and reconstruction. At the town level it recommends planners anticipate eventual growth as well as rebuilding what existed before. Planners should consider ways to restore connectivity between neighborhoods and towns and how to consolidate unused land to make it more useful. Planners should consider changes in land use and design that can mitigate the risk from future natural disasters, encourage more energy efficient use of the land, and stimulate development in areas that are key to economic revitalization. At the site level the World Bank (2010) recommends planners look for opportunities to integrate and harmonize residential, ecological, and environmental uses; avoid creating enclaves that isolate groups, especially minorities; and create paths that allow easy access for emergency vehicles and equipment (The World Bank, 2010).

The World Bank (2010) and the UN Human Settlement Program (2010) also identify key decisions that must be made as early as possible to support effective planning. First and foremost the government must decide who and how it will conduct land use planning, since in many communities responsibility for land planning is fragmented. Failure to clarify who has authority and responsibility can lead to multiple disconnected land use plans that create confusion, delay recovery, and waste valuable resources (The World Bank, 2010; Nelson et al., 2007). As early as possible the lead planning agency must decide and communicate whether existing land use plans, regulations and building codes are sufficient or whether they need to be modified before recovery and reconstruction can begin. If there is not a land planning capability then the government must provide the capability either by tasking a higher echelon of government or an adjacent jurisdiction or by temporarily providing resources to the affected government to reconstitute their missing capability. A common/joint timeline and

communications strategy must be published to enable concurrent integrated planning and to ensure individual entities do not needlessly expend valuable resources. The government should conduct a study to determine if pre-disaster land uses and construction techniques contributed to the impacts of the disaster and to identify modifications that if implemented could mitigate future risk. A decision by the government on whether all or parts of the community will need to be relocated is necessary so that decisions on where to relocate and what to do with abandoned land can be made. This decision will invariably involve land taking, compensation, and new land use incompatibility issues that will need to be resolved by the government's leadership and will undoubtedly cause conflict with elements within the community.

The government leadership will also need to decide how it will manage its land administration system -- the experienced personnel, records, procedures, and information systems needed to manage the land. An early decision on whether the pre-disaster land administration system is still functional and whether it is capable of meeting the needs of recovery and reconstruction is critical. Changing the system or any of its sub processes could improve the system's accuracy and usefulness both during recovery and in the future. However, caution must be used when deciding on whether to change the system during a crisis, since change could unnecessarily slow the recovery process by diverting resources and creating parallel systems neither of which are wholly accurate (The World Bank, 2010). Haiti's lack of progress in land use planning and resettlement highlights this problem. The lack of an accurate and functioning pre-disaster land registry has delayed recovery because land ownership and authorized land uses cannot be determined. Unfortunately, even after a year and a half no significant effort has been made to correct this problem (Government of Haiti, 2011; The Economist, 15 October 2011).

Tools that Support Land Use Planning

Tools that support land use planning vary between countries based on their traditions, laws, and capability to govern. Most countries have, at least nominally, laws and regulations that deal with the universal issues of ownership and use (Bernstein, 1992). In his book on post disaster recovery and reconstruction planning for the American Planning Association, Schwab et al. (1998) identify a number of land use tools planners can use to aid recovery and reconstruction planning and implementation. While the tools addressed in Schwab's book are not found or applied the same in every country they do provide a list planners should consider using during recovery and reconstruction.

The implementation of any of the below tools can create unforeseen problems. During recovery, changes to provide stability that modify existing land use and ownership should be incremental so that the results can be reversed when no longer needed and the impacts can be monitored to watch for unintended consequences. If the leaders intend to make permanent changes to land use and ownership then a more comprehensive and reasoned approach is appropriate. The reality is that community leaders and planners are likely to apply both methods during recovery. The default however, given incomplete information and a fluid situation, should be alleviating hardship and limiting harm.

One of the most important, though controversial, post disaster land use tools is a moratoria. The impetus for families and businesses to immediately return to their home or business and begin rebuilding is strong (Kates et al., 2006). However, commencing rebuilding before a plan is complete can undermine efforts to reshape the environment to make the community safer, more prosperous, and more livable. A building moratoria can buy time for the authorities to complete damage assessments, establish priorities, acquire additional resources,

and publish guidance and directives that will better protect the environment as well as better provide for the health, safety, and welfare of the community (The World Bank, 2010).

Moratoria however can create hardship and have unintended consequences. After the earthquake struck Christchurch, New Zealand in 2011 a moratoria was established while a rebuilding plan was developed. The moratoria precluded business owners from inspecting their property and completing required insurance forms. As a result, business owners lacked the funds needed to pay employees, meet loan obligations, or operate their business temporarily from another location. The disruption to the local economy caused the government to have to provide funds to pay salaries and to aid business owners to pay their loans. Fortunately, the New Zealand government had the resources to meet these needs (The Economist,15 June 2011). New Zealand's solution is impractical to many developing countries because they lack the resources to provide the same level of support making a moratoria harder to endure.

Another potent tool is zoning. Zoning is the division of the land by government in order to regulate the types of land use allowed, density of development, height, bulk and placement of structures, amount and design of parking, and other aspects of land use and development activity in order to provide for the health, safety, and welfare of the community (Sendich, 2006; Villavaso, 2010). Most developed and many developing countries have in place some form of zoning in order to regulate land use. In these cases zoning can be used to aid recovery and reconstruction. However, in many countries there is either no zoning or zoning is ineffectual. In these cases the use of zoning or any other land use regulation to aid in recovery and reconstruction is difficult to use because there is no legal foundation for the separation of uses for the health, safety, and welfare of the community. The lack of zoning/land use regulation also

make it difficult to institute measures to mitigate against future disasters as there is no basis for excluding uses that degrade protective measures (UNHSP, 2010).

The displacement of people and businesses and their temporary relocation can cause use conflicts that existing zoning and land use regulations are not designed to resolve. In these cases temporary zoning can be used to provide suitable locations for transitional camps and for temporary businesses while recovery and reconstruction are ongoing. Permanent modifications to pre-disaster zoning should also be considered. Recovery and reconstruction can provide an opportunity to redraw the land use map and to modify the zoning laws and regulations to separate incompatible land uses, stimulate economic activity, and reduce the risk from future disasters Sendich, 2000; Schwab et al., 1998).

One useful tool that is absent from the literature reviewed is performance standards. Performance standards are used to control the external effects of a property's use through standards directly related to its operational capabilities. The standards are intended to reduce the threat to the community's health, safety, and welfare by setting limits on externalities such as noise, odor, smoke, dust, noxious gases, vibration, heat, and glare (Sendich, 2006). Performance standards could be of particular use during recovery because the buffers that are normally placed between incompatible land uses are not practical due to the limited space available to accommodate temporary housing and factories. Performance standards should also be considered as part of the reconstruction plan. Institution of new or modification of pre-existing performance standards can be useful in correcting pre-existing land use conflicts that cannot be corrected by changing zoning regulations and can be useful in forestalling conflicts as the area recovers.

There are disadvantages to performance standards. To be effective, the performance standards must be promulgated, monitored, and enforced. All three tasks must be executed by trained personnel. Unless trained personnel were available pre-disaster, hiring and training personnel could divert scarce resources from other needs. Even if there are trained personnel on staff the resources are likely to be insufficient to handle new performance standards as well as all the other extra work brought about by a disaster. The local government will likely need to hire and train additional personnel to meet these demands. Businesses must also be provided education and training on the performance standards if they are to comply with these new regulations. Providing this education and training during recovery requires dedicated resources if it is to be effective (Nolon and Salkin, 2006; Villavaso, 2010).

Developing or modifying land use regulations will not eliminate all incompatible land uses as some nonconforming uses will remain. Where these nonconforming uses create a threat to health, safety, and welfare the tool of expropriation may be needed. This controversial tool can be used either to take the property in total or to merely restrict the property owner's use in some manner or to such extent that a taking in fact occurs (Sendich, 2006). Use of this tool in a post disaster environment has often been associated with a privileged class taking the property of a minority group and therefore can raise equity issues. Therefore, care must be taken to use this tool in a transparent and consistent manner and to limit property taken to what is actually needed to support recovery and reconstruction (United Nations Settlement Program, 2010).

Planners have a number of other tools they can use to aid them in recovery and reconstruction planning -- subdivision regulations, site planning, demolition regulations, and construction regulations. Subdivision regulations control the division or combining of land for building and development purposes and provides standards for the design and layout of parcels,

roads, utilities, and other public improvements as well as procedures and requirements to ensure that infrastructure is in place to support development (Sendich, 2006). Other countries have similar regulations, though sometimes not as detailed as can be found in the United States. In a post disaster environment, subdivision regulations can be used to create sites that are supported by public infrastructure; ensure sites are constructed in a manner that promotes the health, safety, and welfare of the community; make it easier to divide or combine land for development; and provide streets that are larger and easier to navigate.

The city of Bhuj, India after the 2001 Gujurat Earthquake provides a good example of how subdivision planning can improve a community's health, safety, and welfare. Prior the earthquake historic development had created an impenetrable maze of narrow dead end streets and alleyways that impeded traffic flow, increased air pollution, and blocked access for commercial and emergency vehicles. During rebuilding, the city redesigned lot layouts to provide for wider streets that passed through the area and connected with the larger arterials. The improved access sped up traffic, improved air quality, and improved access to residents and business for commercial and emergency purposes (The World Bank, 2010)

There is a need in the aftermath of a natural disaster to demolish damaged buildings in order to protect the community from falling debris and collapsing structures and to clear land for rebuilding. Delayed demolition of a site can impede reuse of that parcel as well as become a barrier to repairing or rebuilding on adjacent and nearby lots. Rapid demolition can also be problematic. Hasty decisions can lead to the premature destruction of historic or culturally significant buildings that could be repaired and refurbished if provided resources. Retention of damaged historical and cultural buildings can restore pride in the community's heritage and serve as a rallying point for the community's recovery. Hasty demolition can also preclude an

opportunity to reuse or recycle building materials. Use of reused and recycled material can cut down the amount of storm debris that must be disposed of, reduce the cost of rebuilding, and indirectly preserve natural resources (Mainka and McNeely, 2011). A plan to segregate and properly dispose of hazardous waste must also be developed. The main challenge is to develop and promulgate demolition regulations in time to support demolitions and to put in place the support structure needed to sort the demolition debris for reuse and recycling and proper disposal (St. Tammany Parish Waste Management Plan, 2008).

Building codes and a building permit process are critical tools for an effective and efficient recovery. The World Bank (2010) emphasizes that the government must determine if existing building codes are adequate or whether they must be updated and expanded to incorporate the latest technologies, material, and design ideas to ensure buildings are safe and habitable. Building codes situations will differ based on climate, available materials, and the need to incorporate an area's customary or traditional design. However, there are a number of national and international building codes that can be used as a starting point. In conjunction with providing a building code there is a need to have a process in place to review plans, issue building permits, and inspect results. The building permit process may need to be broken into two distinct parts. The first part is a process designed to review and approve emergency building permits to repair or demolish buildings that present a risk to health and safety. The emergency process may waive some existing requirements in order to remove a threat. The second process is an expedited version of the standard process. The same procedures are used but the emphasis is on prompt review and the allocation of additional resources to speed the process along (The World Bank, 2010; Schwab et al., 1998).

Rational Comprehensive Versus Incremental Planning

Planners have a choice of models to guide their efforts during recovery and reconstruction: rational or incremental planning. Rational planning is the more deliberate and requires more resources to undertake. Rational planning seeks to identify all the possible options, exhaustively analyze each option in turn, and select the "best" option. Faithfully followed and fully resourced, rational planning can take into account all interests, identify unique tailored ways to solve problems, and result in selection of the "best" solution. Rational planning is useful in developing long range plans that can focus efforts and give the community hope that things will be better if they stay the course. The disadvantages to rational planning are that it requires time to complete, relies on complete and accurate information, and has difficulty responding to complex and fluid situations (Campbell and Fainstein, 2009; Lindblom, 2009). Countries or communities without a tradition of planning or whose planning capability is degraded by the natural disaster can find the detail and discipline needed to follow a rational planning approach daunting and slow to produce results. The provision of outside experts and assistance can help a community overcome the obstacles to using rational planning.

Incremental planning is a more modest approach to planning that uses successive limited comparisons to develop discrete policy changes to accomplish short-term, realistic goals. Incremental planning is better adapted to complex, fast changing situations and to providing continuity with previous plans and policies. Incremental planning can provide a perception of stability to a community suffering through traumatic times by retaining at its core the land uses, ownership, and design the community residents are familiar with. This stability can serve as a foundation upon which the individual can visualize and plan their rebuilding efforts. Incremental planning also favors an iterative approach to planning making it suitable for a planning

environment characterized by incomplete information and changes in the assessment of the situation. The disadvantages of incremental planning are that it can fail to identify unique solutions to problems, fail to identify and capitalize on opportunities presented by the situation, and can perpetuate out of date or harmful policies for the sake of stability (Campbell and Fainstein, 2009; Lindblom, 2009). Incremental planning's focus on short term goals in a changing situation does not imply that it is ad hoc. Planners must base options on current information, have a good knowledge of the resources available, craft options that solve problems, and seek to lay a foundation for continued improvement after the recovery and reconstruction phase has ended.

In reality, no response to a natural disaster will follow either a pure rational or incremental planning process. The need to make rapid decisions based on incomplete information favors an incremental approach. The need for a post recovery vision and goals to provide context for the day-to-day decisions and to help identify opportunities to shape the environment for future improvement requires a more deliberate approach. Therefore, an ideal planning process would contain elements of both rational and incremental planning.

Challenges to Perfect Planning

Post-disaster literature is full of calls for the government to seize the opportunity presented by the natural disaster to make dramatic changes in land use, ownership, and design to build back a better community. However, changes of this magnitude amidst the chaos and hardship of recover and reconstruction are difficult. The comprehensive and reasoned planning process needed to undertake this effort demands a high degree of governmental capacity both in planning and in implementation. There are number of challenges that make carrying out a rational planning process difficult to undertake (Ross and Leigh, 2000; Schwab et al., 1998; UNSP 2010; World Bank, 2010). The following section reviews some of the land use challenges that make deliberate, rational recovery and reconstruction planning so difficult and incremental planning more realistic-- government capacity to plan, land security and tenure, shelter, the ecosystem, and building back better.

Capacity to plan

Most of the literature on post-disaster recovery and reconstruction emphasizes the importance of government capacity to recovery and reconstruction (Schwab et al., 1998; The World Bank, 2010). The elements that make up capacity are the ability to identify the challenges confronting recovery, the authority to make and enforce decisions, the ability to set priorities and control the allocation of resources, and the ability to communicate decisions and oversee implementation (The World Bank, 2010; Schwab et al., 1998). A capable government can balance the competing demands of incremental and rational planning. A less capable government will find it difficult to simultaneously pursue both short-term recovery goals and long-term visionary goals, without outside assistance.

The literature makes clear that a lack of government capacity is not unique to the developing world and that ability to respond can vary over time. A case on point is Japan. The Japanese Government is generally praised for its handling of the recovery and reconstruction from its 1995 Kobe Earthquake to include the implementation of a moratoria, the development of a comprehensive plan, and its discipline and equitable implementation (Risk Management Solutions, 2005). The Japanese government has proven less capable in dealing with the earthquake and tsunami that struck on 11 March 2011. Fairclouth and Barat (2011) point out that the Japanese government's inability to make critical decisions on allocating resources and on where to build hazard mitigation projects has deprived local governments of resources and guidance and has resulted in a stalled recovery. Therefore, while developed countries are generally better prepared based on resources and past practice there is no guarantee they have the capacity to respond to a natural disaster.

Organizing for the task at hand

One of the main challenges to a government's capacity is what Farmer (2011) refers to as lack of absorptive ability. Absorptive ability is the government's ability to assess the situation, develop plans, and make and enforce decisions when confronted with multiple challenges and incomplete information (Ibid.). The challenge is compounded by the need for the government to deal with all aspects of the disaster while simultaneously still handling the government's day-to-day responsibility, especially if the natural disaster strikes only a portion of a government's jurisdiction.

The government's responsibilities are made even more challenging when the disaster kills, displaces, or otherwise incapacitates its trained and experienced personnel and destroys its records, facilities and equipment. Haiti, as Farmer (2011) points out, was particularly vulnerable

to this because its civil service personnel, records, and facilities were concentrated in the Capital of Port au Prince, which suffered greatly during its recent earthquake. As a result of over centralization, the outlying regional and municipal governments were unable to support recovery and reconstruction or to continue their day-to-day duties, even though they were physically unaffected by the earthquake.

Early decisions on how to organize government to deal with recovery and reconstruction are critical. Schwab (1998) identifies three options: 1) exercise recovery planning through existing departments and agencies supervised by the executive and legislative branches; 2) task a subordinate department or agency to oversee recovery and reconstruction; or 3) create a recovery and reconstruction authority/task force. The advantages of exercising planning and implementation through the existing government departments is that existing authorities and resources are used, personnel have established relationships with subordinate and adjacent departments, and the personnel and equipment are already in place, ready to begin work. The main disadvantage is that recovery and reconstruction planning and implementation can become all-consuming and the government's other responsibilities will suffer. Tasking a subordinate entity to assume the lead in planning and implementation retains the advantage of using already established personnel and resources, but adds the need to provide one element of the government with increased authority and resources. This option can overwhelm the tasked entity causing its standard responsibilities to suffer and can sometimes create inter-department conflict. The third option is to create a new authority or task force to oversee recovery planning and implementation. This is a common option recommended throughout the literature (Schwab et al., 1998; Economist, 15 June 2011; Government of the Republic of Haiti, 2010; Brookings Institute-University of Bern, 2005; Dzeamesi, 2008; Monday, 2002; UNHSP, 2010). The

advantages are that the newly created organization can focus on cross department planning and implementation, the rest of the government can focus on the larger more enduring issues, provision of extra ordinary powers to one element can facilitate a more rapid recovery, and there is a lead entity able to coordinate recovery and reconstruction efforts with other adjacent and supporting government departments and municipalities (Schwab et al., 1998). There are some disadvantages. This new organization must be stood up, staffed, equipped, provided resources, and begin work in a short time and under difficult conditions. The new organization will have to establish working relationships with higher, adjacent, and supporting organizations that may not see their priority as supporting the newcomer. Resentment from other departments can also lead to conflict with existing departments and organizations.

Whichever method the government chooses it must provide the lead department, agency, or task force with the authority and resources needed to accomplish its assigned tasks. The government must also establish and communicate to all affected parties the powers the new organization has, to whom it reports, from whom it receives guidance and clarification, and who will establish its priorities, and how disputes will be arbitrated. The government should also provide dates for key actions, such as publication of a plan, and criteria for success and dissolution. An additional consideration is whether the government's goal is to maximize the opportunity to build back a better or to limit itself to a goal of providing for a faster more stable recovery process (Schwab et al., 1998; The World Bank, 2010; Christopolos, 2010). If the government choose to build back better it must define better in the terms of reducing hazards from future disasters, more sustainable use of resources, greater access to goods and services for the whole population, improved transportation options, use of safer and healthier building

materials and standards, more open space and recreational opportunities, or better aesthetic design.

Controlling chaos: Multiple actors with multiple agendas

Another challenge to the government's ability to plan and implement recovery is the presence of outside entities such as nongovernmental aid organizations. The literature provides numerous examples of governments struggling to control of the recovery and reconstruction phase because outside organizations bypass the government and provide aid directly to selected elements within the affected population (Farmer, 2011; Christopolos, 2010). While bypassing government can provide speedier near term relief to selected groups it can create larger problems for the long term. First, this method fragments response and can create, albeit unintentionally, disparity in support between similar communities and organizations due to differing agendas and variances in the resources of the various organizations. Second, it can undermine the government's capacity. When the outside organizations depart they create a capability gap that a weakened and underfunded government is incapable of dealing with. This deficiency will be most evident in the more intractable and enduring problems (Farmer, 2011; Christopolos, 2010).

Land Administration: A Foundation To Build On Or An Impediment To Recovery?

Another key aspect of government capacity is a functioning land administration system able to deal with issues such as tenure and security, settlement planning, and transition to more sustainable land uses. In many places the land administration system is incomplete and outdated and instead of aiding in recovery and reconstruction can in fact magnify problems. A common problem is incomplete or destroyed records. This is particularly the case in rural areas that rely on traditional or customary methods of land transfers, or have a more communal approach to land ownership. Another common problem is that land administration is often broken up

between levels of government or across multiple departments making it difficult to identify ownership and use and to resolve conflicts. In many places the procedures for recording land transactions or acquiring information are overly complex making keeping up-to-date records difficult, time consuming, and inaccessible to the public. Access can also be hampered by an overly centralized systems that relies on either one or a very few locations that could be damaged or destroyed during the disaster and which are inconvenient for outlying areas to access. Finally, the land administration systems may lack clear, timely, accessible, and transparent procedures for adjudicating land disputes (Farmer, 2011; The World Bank, 2010; United Nations Settlement Program, 2010; Schwab et al., 1998).

Pre-disaster problems will only be made worse after a natural disaster strikes because trained personnel may be displaced or killed, communication systems rendered inoperable, and valuable records destroyed or inaccessible. In some disasters, such and earthquakes, volcanic eruptions, and tsunamis, the land itself could be changed rendering pre-disaster ownership and land use plans inaccurate. A country or region with a poorly functioning land administration system is also susceptible to issues of equity. Institutional fragmentation, incomplete records, and lack of access to the area make it easier for unscrupulous officials and individuals to acquire land illegally or profit from bribes from those seeking to skirt laws and regulations (Farmer, 2011; UNHSP, 2010; The World Bank, 2010).

Therefore, it is important to identify during the rapid assessment and PDNA deficiencies, pre-existing or disaster induced, in the land administration system and for higher levels of government, international organizations, or nongovernmental organizations to provide resources to aid the land administration offices in the stricken area. One method is to temporarily provide trained land use personnel to augment the affected region's land administration personnel. In the

United States the Stafford Act provides assistance to municipalities that suffer a natural disaster and are subject to a Presidential Disaster Declaration (Schwab et al., 1998). This method can provide trained and experienced personnel down to the lowest level where they can interact with the "customer" and have access to land records and personnel familiar with area and it requires no change in authorities and responsibilities. However, the additional personnel will not be familiar with local regulations and stakeholders, there may not be space and equipment available as a result of the disaster, and damage to the area's communication systems may decrease awareness and connectivity. Another method is for the national or regional government to assume responsibility for the area's land administration. The advantages of this method are that the lines of authority and responsibility are maintained, higher levels of government have access to more resources, and communications connectivity is normally better. The disadvantages of this system are that it centralizes land administration in a location more removed from the community making planning and advocacy with the local population more difficult and higher levels of government will already have a full plate of responsibilities and duties and these additional tasks will be an additive burden.

A third method is to task an unaffected neighboring jurisdiction to support the affected area. The advantage to this method are that their personnel will have similar training and experience, they may be relatively close to the stricken area, and they may be more objective in resolving disputes since they will not be invested in the area's politics. The disadvantages are that they will lack specific knowledge of the area and its issues and, unless relieved of their normal duties, they may not be able to dedicate their full attention to the assignment (The World Bank, 2010).

Capacity to plan is important to recovery and reconstruction. The disaster is likely to challenge the government's capacity to manage recovery and reconstruction and day-to-day operations simultaneously. Stability and familiarity can do a lot to provide the community with confidence in themselves and their government. Delay and indecision can exacerbate already dire conditions and force people to take matters into the their own hands. Plans that provide timely incremental solutions to the problems confronting recovery can speed recovery and lay and alleviate immediate needs. A more deliberate rational plan can put the community on a path for creating a better place in which to live and work, but the price can be extended hardship for those most at risk and resistance from community groups that are not ready to deal with dramatic change while fighting to meet daily needs. Striking a balance between these extremes goes to the heart of government capacity -- can it identify the problem and resources and can it develop a and implement a plan under adverse conditions.

Land Security And Tenure

Another issue that will make planning challenging is land security and tenure (UNSP,2008). Conditions created by a natural disaster can force individuals and families to abandon their land, at least temporarily, to seek shelter, food and water, safety, and other support. Once separated from their land it can sometimes be difficult for individuals and families to return and temporary departures can then become permanent creating a landless class. Landlessness, the state of having no security of tenure, falls into two broad categories. First, there are those informal land holders who lack legal documentation to the land. Second, are the secondary rights holders such as renters and tenants whose right to land are denied by the principal landowner. Without documentation of land ownership informal landowners and secondary rights owners can find themselves vulnerable to being excluded from the recovery and

reconstruction process. Without legal title legal landowners and secondary rights holders will be unable to secure loans against their land and they may be ineligible for recovery and reconstruction aid. Finally, they may be excluded from participating in land use planning due to a lack of standing (United Nations Settlement Program, 2010; The World Bank, 2010).

There are number of things government can do to protect the rights of informal land owners and secondary rights holders. First and foremost is for government officials to publically acknowledge the problem, affirm the rights of informal land owners and secondary rights holder, and provide guidance to ensure that their unique needs are considered during planning (UNSP, 2010). Second, assistance can be provided to owners of multi-family rental units to aid them in repairing their damaged properties or to rebuild destroyed properties in order to bring them back into commerce. Third, aid can be provided to landowners, both within the disaster area and in adjacent areas not affected by the storm, to provide additional housing units - single and multi-family - to meet the needs of the landless. Fourth, the government and aid providers can relax the restrictions on eligibility requirements for providing housing assistance to enable informal land owners and secondary rights holder to participate. Fifth, the government can take actions to clarify and acknowledge the land rights of informal land holders, especially when the informal nature of the title is based on traditional or customary rights. Lastly, the government can conduct a land inventory to identify available land that could be provided to meet transitional needs and that could be swapped with impaired land to allow families and businesses to resettle (United Nations Settlement Program, 2010; The World Bank, 2010, Christopolos, 2010; Schwab, et al., 1998; The Sphere Project, 2011).

Clarifying unclear rights of informal land owners and second party rights holders is essential to an orderly and equitable recovery. In many countries the laws are generally sound,

though the stress of the disaster may reveal or magnify faults that need to be corrected. In these cases changes are marginal and do not require a wholesale rethinking and reworking of land tenure laws in order to recover from a natural disaster. In those cases where land tenure and use laws either do not exist or are inadequate then a more comprehensive and reasoned review and rework of land use and ownership laws must be undertaken. Deciding on the balance between providing stability and correcting unfair laws must be made quickly, for once recovery and reconstruction begins the task of changing becomes exponentially harder.

Fixing land tenure and security issues can be complex and it can take years to resolve all the attendant issues. In the meantime, displaced individuals and families can find themselves forced to live in substandard shelter or expend a large portion of the their income on housing to the detriment of other necessities such as food, health care, or education. Therefore, the focus during recovery and reconstruction should be on returning individuals to their homes or other suitable long term shelter and not with fixing enduring, deeply ingrained land tenure and security issues. This objective emphasizes the importance of making incremental changes to deal with the problem at hand and leaving the larger more complex issues to be dealt with through a more deliberate and rational process. If the resources are available this more deliberate and rational process should occur concurrent and feed input into the more incremental process seeking to restore stability and livelihood. Where resources are lacking, the focus should be on alleviating near term suffering.

Where to Shelter the Displaced

Another challenge to planning is providing shelter for those displaced by natural disaster. Kennedy and his fellow authors emphasize that shelter is not just an object or a piece of ground to occupy but instead "...an ongoing exercise in supporting livelihoods, health, and security

needs" (Kennedy, 2008, p. 25). When thinking about providing shelter planners need to consider the physical and psychological health, privacy and dignity, physical and psychological security, livelihood support, and the feeling of home and community in addition to protection from the elements (Kennedy, 2008).

The literature generally divides the shelter into two categories -- temporary and transitional (The World Bank, 2010; UN Settlement Program, 2010; UN Environmental Program, 2008). Temporary shelter is a place where and individual or family can live immediately following a disaster until they can return home or move into more suitable transitional shelter. Temporary shelter is intended to be of short duration and may involve groups living together with little if any privacy. Transitional shelter is a habitable, covered living space which provides a secure, healthy living environment where an individual or family can live in privacy and dignity during the time period between when a natural disaster strikes and a permanent shelter solution is available (The World Bank, 2010). The World Bank lists six options that are used to shelter evacuees. The first is for host families to take in and shelter evacuees. This method characterizes the initial response to Hurricane Katrina in the United State's Gulf Coast and the response to the 2005 earthquake in Pakistan (Government of the Islamic Republic of Pakistan, 2010). The method, while immediately available, is not suitable for any length of time because of the burden it places on the host family, the impact on the evacuees' physical and psychological health, and the difficulty for the government to identify and provide support to all the disparate locations being utilized (Brookings Institute, 2005; UNHSP, 2010).

Options two and three are urban self-settlement and rural self-settlement. These options involve individuals and families taking shelter in any available space. These options are

unsuitable for any period of time because they leave people exposed to the elements, force them to live in unsuitable and unsafe conditions, leave them vulnerable to exploitation and eviction, and make it difficult for the government and aid organizations to provide aid and services. This method was used early on, and many cases continues up today, in Haiti because the government lacks the capacity to provide more robust and secure shelter (Farmer, 2011; Government of Haiti, 2008).

The fourth option is collective centers such as gymnasiums and fairgrounds provided by the government, host communities, or aid organizations. Collective centers allow for centralized logistics, services, and management and can temporarily provide a sense of community and mutual support. The collective centers are normally not suitable for transitional shelters because they usually lack privacy and security of personal property and expose at risk groups such as women and children to threats. The location of collective centers can make it difficult for the evacuees to return to their home to begin rebuilding and to access their jobs. Lastly, the disruption of communication and social networks can cause a sense of isolation from the rest of the world (The World Bank, 2010). Japan experienced many of these challenges in trying to care for its population displaced during its recent earthquake, tsunami, and nuclear disaster (Barta, 2011).

Option five is self-settled camps. Self-settled camps are camps established by groups of people on any available plot of land with the intent of occupying the site for an extended period of time. The construction of tents and other structures to live in is done using materials provided by aid organizations or the government or with whatever material is on hand in the area of the camp. While the camp can provide some protection from the elements, the ad hoc nature of the camp's layout and construction can create problems with drainage and waste management and

make it difficult to provide clean water and a stable energy source. The flimsy nature of the building materials and the overcrowding of structures and people make privacy all but impossible; increase the risk of violence towards minorities, women, and children; and make the camp ripe for the spread of fire and disease. Self-settled also connotes a lack of government planning and support. The government's absence can lead to a lack of aid and services being provided to the camp's inhabitants. Lack of government support can also lead to lack of protection if landowners seek to have the camps torn down and the inhabitants evicted.

While self settled camps may be less than ideal, in some places they may be the only option if the government is incapable or unwilling of planning and organizing camps. Just such a situation took place in Haiti after its 2011 earthquake. A lack of government capacity due to pre-disaster deficiencies magnified by the loss of governmental officials and facilities forced the people to construct camps wherever they could. Predictably, aid provision was inefficient, conditions were austere, and disease ran rampant through some of the camps (Farmer, 2010; Economist, 18 Feb 2010).

The last option is government or at least nongovernmental organization planned camps. The advantages of this method are greater assurance that landowners will not seek to reclaim their land and have evacuees evicted and that needed supplies and services will be provided. While planned camps are often perceived to be a better option for providing extended transitional shelter, long term occupation of a camp still runs the risk of damaging the physical and psychological health of the inhabitants as they are forced to live in substandard conditions reliant on the aid of others for their existence (The World Bank, 2010). Planned camps are often fewer in number and therefore may not be located in close proximity to the camp habitant's homes and jobs. The provision of only a few planned camps can lead to overcrowding as refugees and IDPs

flock to the perceived safety and support that planned camps provide. Overcrowding increases concern for security of property and person and increases the threat of the spread of disease. A good example of this occurred in Kenya during 2011. A drought in neighboring Somalia forced the Somalis to abandon their land and seek refuge in the Dadaab camps in Kenya. These already full camps began to receive over 10,000 refugees per week, and many of the refugees arrived starving and suffering from drought related diseases. The influx of such large numbers quickly overwhelmed one of the world's longest lasting, largest, and best supported refugee camps emphasizing the importance of remaining flexible and to not become locked into planning based on historic data and past experiences (Muhumed and Mwihia, 7 July 2011; Montclos and Kagwanja, 2000).

What makes providing shelter so difficult is that no one option will suffice. An individual could find themselves cycling through options -- self settlement to a self settled camp, to a planned camp to a neighbor's house -- as their needs and resources change. This fluctuation make providing aid more complex and require constant reassessments to maintain awareness of needs and to identify problems early. The constant fluctuation based on a number of variables makes developing and implementing ideal solutions difficult and tends to support incremental solutions that are made and remade continuously. However, there is a need for a vision for how the community will be sheltered post recovery to provide context to the incremental decisions. Without context, the community will find it cannot transition from emergency or transitional shelter to permanent shelter solutions (Lindblom, 2006).

The Ecosystem: Embodiment Of Complexity

The need to address damage to the ecosystem will also challenge planners and their processes. The ecosystem encompasses a broad range of functions such as food, water,

medicine, and clean air as well as processes such as crop pollination, vector control, and disease prevention and can aid in mitigating the impacts of extreme natural events (Mainka and Mcneely, 2011). Therefore, the repair of ecosystem must be considered when recovering from natural disasters.

Consideration for the ecosystem must occur early in planning because decisions made immediately after the disaster to alleviate human suffering can have unforeseen negative impacts on the environment and can compromise long-term recovery (Mainka and McNeely, 2011). The United Nations Environmental Program provides a list of activities that commonly take place early in the recovery phase that can adversely impact the ecosystem and therefore must be considered during planning and implementation.

A main concern is to the water systems. The displacement of the population and their concentration in temporary and transitional camps can change where and how water is acquired and place water sources at increased threat of point and nonpoint contamination. One threat comes from the over extraction of aquifers. The loss of water can necessitate the deepening of wells in the near term and lead to a lack of water in the long term. Salinity and higher concentrations of heavy metals are also a concern. As aquifers are drawn down there is an increase in the concentration of heavier chemicals in the remaining water requiring additional resources, energy and money, be expended to make the water drinkable and suitable for agricultural purposes. The cost of drilling deeper and additional filtration will fall heavily on already struggling communities (Mainka and Mcneely, 2011).

The natural disaster and initial actions in relief and recovery can also impair available ground water. Broken sewer lines and improperly contained, treated, and disposed of waste from self settled evacuees, self settled camps, and even planned and supported camps can contaminate

ground water and even penetrate to the aquifers. Contaminated water can quickly lead to the spread of highly contagious diseases, such as cholera outbreak that devastated Haitian camps and urban centers after their 2011 earthquake (Farmer, 2011).

Shelter construction materials can also cause problems. Use of what is available can cause enduring problems. Importing materials can bring new problems that can disrupt the delicate balance of the ecosystem. Often the ramifications of these decisions are not apparent when a decision is made during recovery and reconstruction making deliberately incorporating mitigation efforts into the original plan impractical.

When the population is forced to build shelters from locally found materials deforestation can result. Deforestation of local areas, especially hillsides, can increase the threat of flooding by reducing the land's ability to hold water and can increase the risk of landslides that destroy homes and infrastructure. Deforestation can also lead to soil erosion and the degradation of the land's ability to support agriculture. Importation of shelter material brings it owns risks. Hastily imported materials may not be properly treated or inspected and can result in invasive species being inserted into the ecosystem. Invasive species can do great harm to an area's agriculture, livestock, and homes and can be difficult if not impossible to eradicate creating unforeseen, enduring problems that the community may be ill prepared to cope with.

How to dispose of debris created by the disaster, demolition of damaged buildings and infrastructure, and from rebuilding must also be thought through. Debris should be sorted to ensure hazardous materials are separated out and disposed of properly and that material that can be reused or recycled are separated out and put back into use. A determination must be made as to whether existing facilities, landfills and incinerators, can handle the disposal of the debris or whether additional sites need to be opened. If the new sites are only intended to temporarily hold

debris then a plan how the material will be onward moved to its final disposal site will need to be made and implemented. Finally, sites that have reached their limit will need to be properly capped. Failure to develop and implement a debris removal and disposal plan will increase the risk of contaminating the ecosystem and the threat to the community's health as well as increasing the cost of recovery and reconstruction (The World Bank, 2010; UN Environmental Program, 2008; St. Tammany Parish, 2008).

While upfront costs to repair the ecosystem can be daunting the expense is cheaper than the costs of dealing with enduring problems and decreased protection from natural hazards caused by damage to the ecosystem. Lack of resources from donor fatigue is also a problem. Early on ecosystem problems such as the loss of wetlands, deforestation, loss of topsoil, and contamination of water sources can be more clearly tied to the natural disaster and therefore are more likely to garner sympathy and support from the national and international community. As time passes the connection will become more tenuous making it difficult to tap into outside resources. The enormity of the task to repair and restore the ecosystem and the very real possibility that decisions to aid the populace during recovery and reconstruction could further harm the environment make including ecosystem considerations into the planning process challenging (The World Bank, 2010; United Nations, Environment Program, 2008; Mainka and McNeely, 2011). The enormity, complexity, and interconnectedness of ecosystem problems make it tempting to undertake major changes to improve the ecosystem in conjunction with recovery and reconstruction. The difficulty is that there is often not sufficient time to fully analyze plans for all their ramifications and what looks like an ideal long term solution can turn out to cause more damage than a return to pre-disaster conditions. Therefore, achieving a

balance between speed and deliberation when considering the ecosystem is a particularly difficult task for planners and leaders.

Building Back Better

A recurring theme throughout the literature is "Building Back Better" (Monday, 2002; Kennedy et al., 2008; Chrisotopolos, 2006; Schwab et al., 1998; Sphere Project, 2011; The World Bank, 2010). Building back better is generally defined as taking advantage of rebuilding to correct previous mistakes and instituting new policies to create a more sustainable community. The goal is to better protect the ecosystem while also improving the health, safety, and welfare of the community (Kennedy et al., 2008). This philosophy is based on the concept that the damage to the buildings and the displacement of the people provides an opportunity to remake the land.

Monday (2002) in particular advocates for incorporating sustainable goals and actions into recovery planning and implementation. In order to achieve a more holistic approach to sustainable recovery and reconstruction Monday proposes six principles. The first principle is to maintain and, if possible, enhance the resident's quality of life. The second principle is to enhance local economic vitality by providing for sufficient job opportunities and diversity and by providing the infrastructure needed to support economic development. The third principle is to promote social and intergenerational equity. The disaster will affect different elements of society differently. The poor will be more affected than rich, and the elderly, women, and children will be more at risk than the young men. These disadvantaged groups will likely be even more vulnerable to future natural disasters if efforts are not made to improve their condition. Assisting these groups is also to the advantage of community as a whole, since they will act as a drag on the economy if their situation remains in such dire straits. The fourth principle is to maintain and, if possible, enhance the quality of the environment. In addition to whatever shock the

disaster inflicted on the environment there is likely to have been pre-disaster uses and actions that were already degrading the environment. Failure to tackle pre-disaster environmental problems can undermine recovery efforts and waste valuable resources. The fifth principle is to incorporate disaster resilience and mitigation into decisions and actions to enable the community to better endure and more quickly recover from future natural disasters. The last principle is to use a consensus-building, participatory process when making decisions. Often local residents will have a good understanding of what is needed to build their community back better and they will have had practical experience in what works in their area.

Christopolos (2006) identifies a number of reasons why building back better is achievable. There is likely to be a new found awareness of the community's risk to a natural disaster which could be translated into a broad consensus on what needs to be done to make the community safer. A disaster can make visible fault lines in development policies that made the community more susceptible to the disaster or that might increase risk in the future. Old vested interests that controlled the pre-disaster system may be shown to have been deficient allowing newer interests to come to the forefront. The disaster may have swept away or damaged beyond repair aging substandard infrastructure providing an opportunity to build newer more efficient, and effective infrastructure. Regional, national, and international response to the disaster may provide resources -- money, expertise, and materials -- that would not otherwise have been available. Finally, recovery from the disaster may bring with it the political will needed to make things happen, especially in areas neglected by the political leadership pre-disaster (Christopolos, 2006).

However, there a number of obstacles to building back in a way that better provides for the long term health, safety, and welfare of the individual and the community. The need to

relieve immediate suffering can lead to decisions that undermine plans to build back better. People self-settled in urban and rural areas or living in camps will return to their homes as soon as possible to secure their property. Business owners will return to repair their facilities and resume production. Blocking them increases their hardship and delays the recovery of the economy. Allowing them to return produces facts on the ground that can negate plans to rebuild more sustainably (Kennedy, 2008).

Another obstacle to building back better may be the government itself. The disruption of the normal communications and social networks makes it more difficult for the leadership to connect with the people and gain support for their plans. Loss of personnel and resources, either because they were dispersed after evacuating or were killed, make planning and communicating with the community more difficult. Lack of experienced and trained personnel and a sense of haste can lead to changes in government policies that can stall recovery and waste resources. The result is that the government is unable to develop and promulgate a timely coherent plan. The absence of a plan can force the people and business owners to take matters into their own hands, even if that means ignoring their government (Kennedy, 2008).

These initial deficiencies can be further exacerbated by political leadership stating early on that they are committed to rebuilding the city back as before, only better. The leadership will seek to ease the displaced population's anxiety by assuring them that they can return to their homes and resume their livelihood as soon as possible. At the same time groups will strongly advocate for using the opportunity to make changes to land to better protect the community and the environment. Absent a pre-disaster plan that laid out a concept and policies to remake the community, the general populace will resist efforts to dramatically remake the city. The people will focus on the "as before" and will be skeptical of and "only better" plan, especially if they

perceive that its calls on them to sacrifice some of their rights and property. Attempts to explain the need to sacrifice on behalf of the greater good will be resisted and the political leadership may lack the will to carry through plans over their resistance (Monday 2002).

Long-term comprehensive solutions must be the result of a deliberate rational process that considers all the requirements and ramifications to the environment and the community. The compelling desire for community members to reoccupy their homes and businesses favors an incremental planning approach -- deal with the immediate obstacles to recovery and reconstruction and leave long term sustainability for a later when time and resources can be committed to solving the problem. Balancing the desire to build back better with the need to alleviate hardship is another reason for not choosing a pure incremental or rational planning model. The better method is a hybrid planning model focused on a mix of goals and not on one fixated on process.

Conclusion

Recovery and reconstruction from a natural disaster is based on the government paying attention to land use considerations and its ability to develop and implement a plan under challenging circumstances. Land provides an individual shelter from the elements and a place to secure their private property. The land's use for agriculture, manufacturing, or retail can provide a livelihood for individual and their family as well as provide security for a loan. Therefore, a natural disaster's ability to drive people away from their land is particularly devastating, and the longer they are forced to remain away the harder it is to return and rebuild their lives. Equity is also a concern. When individuals are forced away their homes there is a chance they could be precluded from returning because they lack legal title or the land administration system is dysfunctional. The resulting landlessness often falls heaviest on minorities and other disadvantaged groups such as women and children. Planners must be active in advocating for the rights of the landless by seeking to codify the rights of informal landowners and secondary rights to return to their land. The sooner people can be returned to their land the sooner recovery can begin and the sooner the community can return to prosperity.

The use of land during recovery and reconstruction also presents challenges to the health, safety, and welfare of the community. Buffers that would ideally separate incompatible land uses may be removed or impractical during recovery and reconstruction exposing the people and the environment to hazards. Establishing measures such as temporary zoning, performance standards, overlay districts, and demolition regulations to mitigate these threats must be considered and enacted early during the recovery and reconstruction process to be effective.

It is the government's responsibility to aid the population to return home, rebuild, and resume their livelihood. The government's capacity to accomplish these responsibilities relies

heavily on its ability to develop and implement a plan. There is also a point of view that the devastation of the manmade structures and the displacement of the population provides an opportunity to remake the community into a more sustainable place. However, the longer people are kept from their homes and livelihoods to await the perfect plan the more acute becomes their plight. People and nongovernmental organizations will grow inpatient and seek to bypass the government and begin rebuilding. Their efforts will create facts on the ground that could preclude the government's grand plan or force the government into the unenviable position tearing down what the people have built. Also, while buildings may be destroyed the land will still be bound by property rights, social ties, and cultural heritage. Abrupt changes, especially if the people feel they have not been consulted, will generate resistance and will further slow down recovery and expend valuable resources (Nelson et al., 2007).

Given the constraints of time and the still extant ties to pre-disaster land uses and ownership it is unrealistic to think that a deliberate, rational plan that calls for major changes can be developed, approved and implemented as part of recovery and reconstruction. What is more realistic are incremental changes that improve safety and quality of life and provide a foundation for greater change in the future (Kates et al., 2006; Lindblom, 2009). However, a focus on recovery and reconstruction planning to alleviate immediate hardship does not negate developing and implementing a comprehensive plan to make the community more sustainable and livable. Given sufficient resources - time, money, personnel, and will by the leadership - a parallel effort can be pursued to develop a comprehensive plan and to provide input into the recovery planning to make the long range vision more achievable.

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Vita

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