From Vision to Implementation: Enhancing the Recovery Process through Integrated Knowledge, Planning, and Project Management

By

Scott R. Manning, D.Sc. Student

Institute for Emergency Preparedness
Jacksonville State University
Jacksonville, AL 36265

Personal Contact Information:

Scott R. Manning
361 Clubhouse Drive
Roanoke, VA 24019
(540) 529-2563
mantis2735@yahoo.com

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Introduction

The post-disaster environment is inherently complex and problematic, as there is often tremendous pressure to advance recovery operations, and ultimately restore community permanence in rapid fashion. Nonetheless, such reactive, pressure-driven decisions "often fail to address the root causes of vulnerability and, in the long term, may even amplify the social, economic and environmental weaknesses that turn natural hazards into large-scale disasters" (Ingram, 2006, p.1). This reality is further complicated by the fact that disaster recovery is poorly understood and underdeveloped on all levels (Rubin, 2009). Indeed, communities often lack not only sufficient knowledge of their underlying conditions and hazard systems, but also adequate planning and management capacity to properly address their negative effects. These deficiencies underscore the need to improve "analytical capabilities by taking on more complete, comprehensive, and dynamic approaches… [that] allow for adaptive strategic postures" (Weichselgartner and Obersteiner, 2002, p. 76). As such, the purpose of this article is to explore a more comprehensive and systems-based framework for enhancing the recovery process – one that centers on integrated knowledge, planning, and project management.

The Context of Disaster Recovery

In the wake of disaster, communities are forced to struggle with not only physical damage and destruction, but also a range of competing needs, divergent interests, and impending, socio-political demands. Moreover, there is often confusion regarding proper function and responsibility, as well as heightened pressure for immediate action or *status quo* restoration, which often subverts disaster resistance and resilience initiatives. These conditions invariably

layer the post-disaster environment with immense complexity and, in turn, aggravate systemic problems that pervade the community fabric in both acute and chronic fashion. Indeed, as Claire Rubin (1985, p. 11) suggests, disaster recovery is an "ongoing process… [that] encompasses all domains of community life", from the individual to the governing structure and beyond. As such, the recovery concept is generally defined as "the process of restoring, rebuilding, and reshaping the physical, social economic, and natural environment through pre-event planning and post-event actions" (Smith and Wenger, 2006, p. 237). This descriptive framing implies a multitude of *ex ante* and *ex post* recovery activities, to include, but not limited to vulnerability analysis, recovery planning, resource provision, socio-economic redevelopment, environmental rehabilitation, hazard mitigation, and physical systems restoration and/or reconstruction. Taken together, these measures are "intended to remedy negative disaster impacts, restore social units as much as possible to their pre-disaster levels of functioning, enhance resilience, and ideally, realize other objectives such as mitigation… and improvements in the built environment, quality of life, and long-term sustainability" (Kreps, et al., 2006, p. 148). Without doubt, these conceptual elements appear well-defined and understood, at least from a theoretical perspective; however, the actual state of recovery practice is quite fragmented and uneven on all levels.

Beyond the aforementioned socio-political constraints, the recovery process is further complicated by functional disorder, narrow focus on the built system, and patterns of existing vulnerability. The process orientation of recovery, for instance, suggests that post-disaster activity unfolds in staged or linear progression from disaster impact to final recovery outcome. In fact, Eugene Haas et al. (1977) divided the recovery process into four distinct, yet overlapping periods: the emergency period, the restoration period, the reconstruction period, and the development period. Each of these periods shows variance in temporal scale and functional

scope. The emergency and restoration periods, for example, are typically dedicated to short-term measures, such as critical infrastructure repair and provision of immediate community assistance, while the latter periods address structural rehabilitation and targeted or systematic community betterment, to include strategies for enhancing socio-economic and political adjustments. Nonetheless, such notions of orderly progression are inherently flawed, as the recovery process has proven to be highly differentiated, not only for social units within a defined geographic area, but also across multiple jurisdictions experiencing similar events in varying space and time (Kreps et al., 2006). To this effect, the post-disaster environment is more accurately characterized by chaotic patterns of reactive diffusion, with many activities occurring simultaneously and without defined leadership or managerial control, thereby resulting in uncoordinated and unrelated outcomes (Rubin, 1991).

Moreover, in many cases, it is equally clear that past recovery outcomes have been skewed toward, and ultimately gauged by the extent of post-event structural repair and/or replacement; thus indicating, at least, that certain elements of the linear model are omitted or lost in the post-event environment, especially those dedicated to long-term, socio-economic recovery. Indeed, as Thomas Campanella (2006, p. 142) argues, "[t]he process of building is a necessary but, by itself, insufficient condition for enabling recovery and resilience." The narrow focus on structural systems, however, reflects the overriding consensus that "communities rebound well from disasters and that, at the aggregate level and net other factors, the impacts of disasters are negligible" (Kreps et al, 2006, p. 166). From this, misconceptions are often drawn, which prompt local tendencies to simply equate the *look of recovery* with *real* or *complete recovery*. Nonetheless, as Gary Kreps et al. (2006) demonstrate, these findings are often driven by oversimplified or macro-level analyses, which fail to capture important data regarding sub-

groups or lower-level system elements, both within and across affected communities. This conclusion is particularly relevant to evaluative studies that measure recovery outcomes with limited metrics, such as extent of structural restoration or aggregated political and/or economic continuity. Such myopic studies, at best, provide mere snapshots of the community façade, while ignoring the more ingrained aspects of its very fabric. To be sure, as Daniel Alesch (2003, p. 2) argues, "…communities change, usually irrevocably, after some extreme events" and its members "struggle to achieve viability in a new context and a new environment."

This unfortunate reality leads to the disclosure of two distinct, yet interrelated truths or principles regarding disaster impacts and subsequent recovery outcomes. First, as Kreps et al. (2006, p. 167) illustrate, "disasters, even large ones, typically do not in and of themselves result in significant change in the societies they affect"; rather they exploit system vulnerabilities and intensify or accelerate pre-existing social conditions. In this sense, communities characterized by systemic social or economic decline may, in fact, witness a rapid or exponential down spiral of such traits in the wake of extreme natural or technological events. Second, in areas exhibiting vulnerable properties, the impacts of disaster will be disproportionately distributed among not only more fragile economic sectors and entities, but also lower-income, minority, and other special populations. Without doubt, these specific sub-groups routinely experience heightened exposure to hazard risk and disaster, as they often inhabit substandard dwellings in hazardous areas, and have limited access to critical resources and/or support systems, particularly when compared against more affluent or robust social units (Kreps et al., 2006). Such conditions – exposure and vulnerability – serve to reduce, if not diminish individual and organizational capacity for inherent and adaptive resilience, thereby leading to more complicated and unpredictable recovery outcomes. In fact, as Melanie Gall and Susan Cutter (2007, p. 199) note,

these "vulnerable groups… often find it impossible to recover" as they struggle "more acutely [with] unemployment, defaulted loans, foreclosure, ruined credit, crowded living conditions, deterioration of physical and/or mental health, and much more."

The convoluted nature of disaster recovery is certainly a difficult and unfortunate reality, yet its persistence underscores the need for broad-based systematic analysis and comprehensive, pre-event planning and strategy development. Such proactive functions serve to not only rectify or effectively manage tactical problems, but also, through direction and vision, ensure movement beyond mere *status quo* initiatives. The unavoidable problem, however, resides in the fact that disaster recovery is the least investigated and understood phase of the disaster cycle. As Rubin (2009) argues, recovery practice stands "virtually uninformed" by existing research and remains operationally deficient, as requisite knowledge, ability, and leadership continue to be grossly underdeveloped. Moreover, it is clear that recovery, as an agenda item, is subordinate to more immediate planning and/or public policy issues on all levels, not to mention that "[p]oor recovery planning is characteristic of emergency management programs throughout the country" (Daines, 1991, p. 182). In fact, during a recent assessment, most state and territory emergency management programs exhibited glaring deficiencies when evaluated against national standards, with only 26% and 14% engaged in pre-event recovery and continuity planning respectively (Lucus, 2006, p. 5). Such ominous findings are perplexing, especially given the scope and magnitude of disaster events, yet they are indicative of imminent recovery failure and, therefore, relevant to future direction and development needs. As Joseph Scanlon (1991, p. 97) denotes:

> If change is to happen, it must come quickly. As each day passes, support from dramatic action will weaken. That means that development plans must be ready before disaster strikes. A disaster is not just a calamity but an opportunity, and a manager who is prepared can use it to alter the public agenda.

Confronting the Hazard System: The Power of Knowledge and Integration

The advent of successful recovery does not occur by mere happenstance; to the contrary, it evolves from the development of factual knowledge of community conditions, and the consequent integration of that knowledge within the overriding structure of comprehensive planning and community development. This process begins with the systematic analyses of both community hazards and community systems vulnerability. The former task requires not only the identification of all hazard elements – natural, technological, and/or willful – affecting the jurisdiction, but also their characterization by event-specific conditions, such as "the speed of onset, availability of perceptual cues, the intensity, scope, and duration of impact, and the probability of occurrence" (Lindell et al., 2006, p.156). Community systems vulnerability analysis, on the other hand, examines the antecedent or pre-event conditions within the community system itself, as a means to delineate hazard exposure and identify the sub-elements of physical and social vulnerability. The aspect of hazard exposure centers on the geographic proximity (or closeness) of community elements to hazard conditions and is generally defined by "the probability of occurrence (or, equivalently, the recurrence interval) of events of a given physical magnitude and scope occurring in different locations" (Kreps et al., 2006, p. 72). As an extension of hazard exposure, physical vulnerability analysis deals with hazard susceptibility and, therefore, attempts to assess the capabilities of select system elements, particularly engineered structures, to deflect or withstand negative event impacts. Social vulnerability analysis, however, moves beyond physical human susceptibility in order to describe existing social patterns and, in turn, forecast behavioral responses to disaster impacts. More specifically, it seeks to identify individuals or groups that lack the "capacity to anticipate, cope with, resist

and recover from the impacts of… hazard", as these sub-populations are disproportionately affected when compared against the aggregate population (as quoted in Kreps et al., 2006, p. 73).

Generating Knowledge through Information Analysis

The combined analysis of community hazards and vulnerability is relevant not only to understanding the causal processes associated with the hazard-community interface, but also in measuring the extent of negative impact potential. This baseline knowledge is critical to developing effective emergency management interventions. These measures function to reduce physical and social vulnerability through a mix of disaster resistance and resilience initiatives, such as natural hazards mitigation and community capacity building. Still, regardless of intervention quality and extent, it is important to note that unforeseen agent- and/or response-generated demands will inevitably result in varying degrees of improvised response and recovery operations (Rubin, 1991). As Michael Lindell et al. (2006) demonstrate, the coupling of pre-event conditions, hazard characteristics, and improvised response ultimately produce the physical impacts of disaster, which, in turn, interact with the elements of improvised recovery to generate a range of post-event social impacts. This dynamic interplay, as well as the influence of emergency management interventions, is further illustrated in Figure 1 below.

In reviewing the model, it is important to understand that the output level for each variable is conditioned; that is its impact or effect is dependent upon its descriptive attributes. The conditional output for hazards characteristics, for instance, is related to the event-specific conditions (speed of onset, scope, intensity, etc.) resulting from any given hazard under analysis, with some event types rendering more severe impacts than others. The outputs for the variables under pre-event conditions are viewed in similar fashion, with higher-level exposure and vulnerability resulting in commensurate levels of systemic damage and disruption. It should be

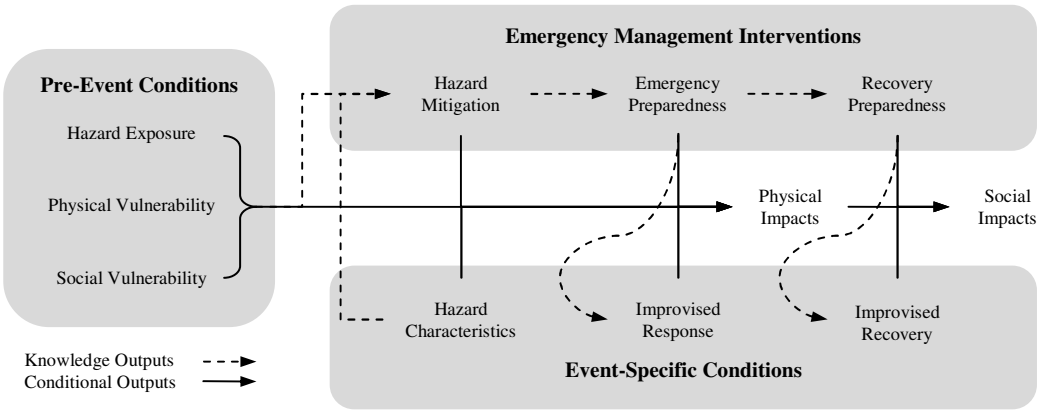

Figure 1: Disaster Impact Model (adapted from Lindell et al., 2006)

noted, however, that the combined effects of these negative variables together – hazard characteristics and pre-event conditions – cannot be construed as simply additive; rather, in most cases, they exhibit rapid, reinforcing feedback mechanisms that lead to exponential growth in negative disaster effects, as well as the potential for runaway collapse in various system elements over time (Meadows, 2008).

This understanding is critical to the design and implementation of effective interventions, which ultimately function to counter or balance these feedback mechanisms. Nonetheless, the effectiveness or relative quality of emergency management interventions, whether viewed individually or together, is not absolute and, therefore, hinges on two distinct, yet interrelated conditions. The first condition centers on the development of thorough and accurate knowledge regarding impending hazards and community vulnerability. This process, as previously discussed, requires far more than superficial examinations of static community data; rather it demands comprehensive, systems-based analyses to cultivate a deep understanding of the dynamic interactions both within and between complex community systems. The acquisition of such high-level knowledge is compulsory to the formulation of diverse and productive intervention strategy alternatives; thus underscoring the significance of the analytical process.

The second condition, which is contingent upon the quality of the knowledge outputs from the former, revolves around proper strategy selections and the consequent implementation of a balanced strategic approach. Indeed, as Lindell et al. (2006) and many others illustrate, the ability to effectively manage community hazards demands a broad, yet appropriate mix of mitigation and preparedness activity. The conditional outputs of emergency and recovery preparedness, in particular, are not only relative to attenuating hazard characteristics and impacts, but also in establishing baseline knowledge and capacity for effective post-impact improvisation.

Integrating Hazard Knowledge with Community Planning and Development

Given the complexity of disaster, it is clear that comprehensive knowledge of the community system, to include its hazard conditions, is paramount in developing effective emergency management interventions, yet its application to these functions alone can significantly limit its utility. The fact that disaster events "have the potential to disrupt so many aspects of normal activity" and leave few community operations unaffected is testament to this claim (Schwab et al., 1998, p. 65). In many cases however, there is not only a lack of intervention planning and commitment, especially in the areas of mitigation and recovery, but also a propensity to conduct such planning in isolation from the broader community planning and development structure. Although offering some technical advantage, the use of fragmented or stand-alone planning mechanisms is inherently problematic, particularly when viewed from a systems perspective. As Raymond Burby et al. (1999, p. 249) argue, such mechanisms foster limited vision by focusing "solely on the areas exposed to hazards, [which] can inadvertently promote increased occupancy of those areas", thereby further exacerbating hazard conditions. Such unintended or secondary effects are the direct byproducts of incomplete knowledge and/or

myopic thinking, and unfortunately reflect a common, yet disturbing trend in contemporary hazards management. Beyond this, the issue of fragmentation often results in overlapping or conflicting planning objectives, as well as unwarranted competition among different entities or planning programs to secure funding and other resources. Indeed, it is rather ubiquitous for separate agencies and organizations, even their own departments, to move with little to no knowledge of the other, and to do so in aggressive fashion, which often equates in zero-sum games or adversarial posturing, especially in times of fiscal crisis. This reality is even further complicated by overriding budget systems that are forced to allocate limited funds across a broad spectrum of policy objectives, leaving many programs to face stagnation or mere incremental progression. In fact, as Jim Schwab et al. (1998, p. 66) indicate, it is not uncommon for long-term mitigation and recovery objectives to "remain unfunded for years" and, as a result, be virtually "forgotten by the time [an] event occurs." Another, yet closely related problem is the issue of buy-in or stakeholder support, which many stand-alone plans and programs fail to achieve. The reason such plans exhibit weak support systems resides in their inherent ambiguity and narrow focus on low-probability events, which run contrary to immediate concerns and, therefore, hold little traction on the public agenda. Still, perhaps the most deleterious aspect of fragmentation resides in the disjunction of interdisciplinary perspectives, professional expertise, and collaboration, all of which are critical to successful intervention outcomes.

Taken together, it is clear that fragmented or isolated planning initiatives can foreclose opportunities to not only realize the synergies of various community plans, but also to reshape the broader patterns of precarious and/or unsustainable development (Schwab et al., 1998). Such deficiencies lend strong credence to integrated planning processes, as a means to facilitate a shared community vision and, in turn, properly align or coordinate multiple planning initiatives

with its underlying goals and objectives. As illustrated in Figure 2 below, integration maintains a broader view of the planning landscape to ensure directional alignment while also providing a more conducive framework for interdisciplinary relations and diverse stakeholder involvement. Moreover, it permits the development of multiple planning functions that essentially inform and

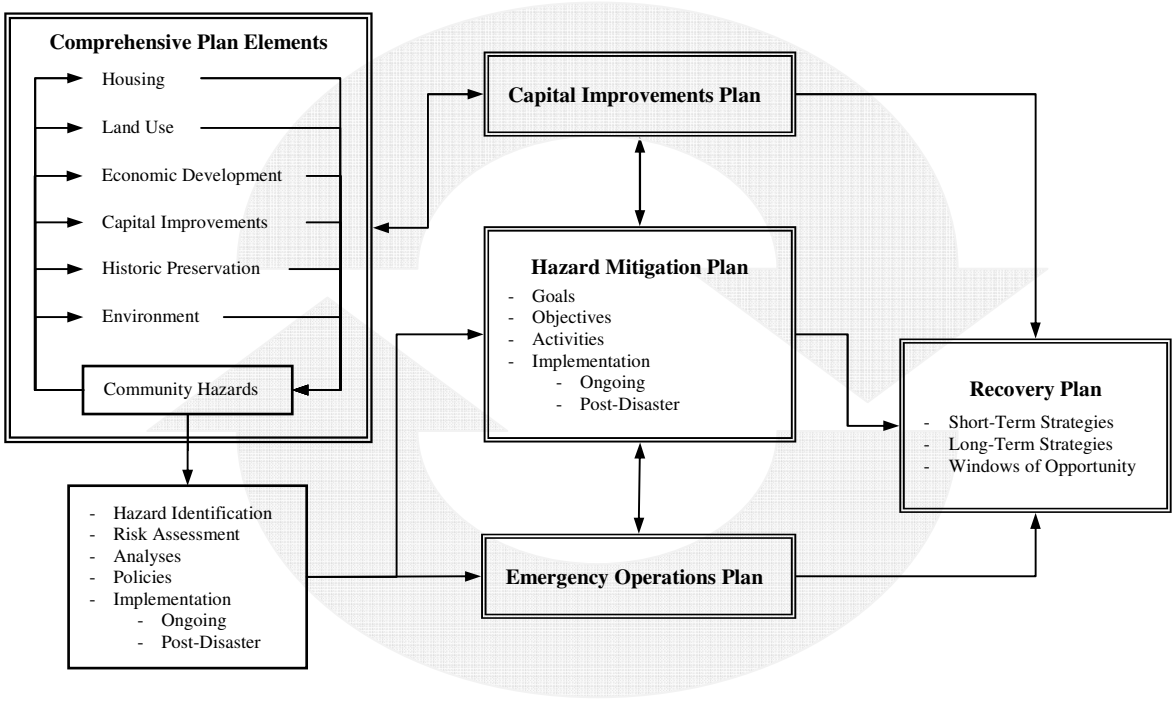

Figure 2: Integrated Planning Framework (adapted from Schwab et al., 1998)

feed off one another to promote innovation, collaboration, and potential synergy. These linkages are critical to emergency management programs in particular, not only in providing a sense of unified policy direction, but also in promoting hazards awareness and its consequent attachment to the routine decisional matrix (Schwab et al., 1998). The basic point is that hazard-related issues must be explicitly considered within the broader aspects of community planning and decision-making, and with sufficient cross-referencing with emergency management interventions in order to effectually impart real and positive change. As such, the integrative process should begin with, and subsequently evolve from the general guidance and policy

statements found in the community comprehensive plan, which serves as the primary strategic framework for managing future growth and development. As Burby (2005) denotes:

> Local government comprehensive plans are policy documents [as opposed to operational or tactical documents], developed through expert analysis and active citizen involvement, that marshal facts about existing and potential community problems stemming from urban growth and development, specify goals for achieving a vision of a better future, and propose policies and prioritize specific government actions to accomplish each.

In this sense, the comprehensive plan provides the most appropriate reference point for defining specific community objectives, as well as developing the more refined operational or tactical planning elements to meet them over time. Such broad referencing, in turn, cultivates systems thinking and prompts multi-disciplinary inquiry into how various planning initiatives – individually or together – can best remediate isolated and/or overlapping community problems, while maintaining the overriding goals of community betterment. These inquisitive processes are inherently beneficial to any planning endeavor; however, they are quintessential to recovery planning and execution, both of which are fundamentally holistic, goal-directed, and strategy-driven. Indeed, effective recovery draws from a multitude of available resources in order to instill positive alterations across all community systems – built, social, economic, and environmental. As Jane Ingram et al. (2006, p. 4) indicate:

> The hasty application of post-disaster policies with long-term repercussions may only amplify socio-economic inequalities and compromise livelihoods, community structure and complicate environmental protection… Instead, it is crucial that cautious analysis be given to developing an adaptive plan that aims to reduce long-term vulnerability to future hazards by considering the many social, physical, environmental, economic and political components that interact to influence vulnerability.

To this end, the recovery plan may be viewed as a logical, post-disaster extension of each element (or select elements) in the community planning matrix, which functions to identify recovery priorities, guide post-event decision-making and activity, and ultimately seize opportunities for hazards-vulnerability reduction across all community domains – particularly

through measures that are infeasible or non-existent during routine or normal times. More specifically, the plan delineates tactical objectives and strategies; organizes human capital, functional roles, and responsibilities; establishes flexible post-impact procedures and regulations; and identifies multiple funding sources for short- and long-term recovery activities (FEMA, 2011). The intent, as such, is to anticipate and rectify the primary concerns and problems of recovery well before event impact, as a means to ensure not only efficient and effective post-event actions, but also more secure and sustainable recovery outcomes.

Disaster Recovery as Integrated Project Management

The Inherent Problems of Traditional Management

The responsibility to effectively manage the recovery environment, regardless of event severity or external assistance, ultimately resides with the affected locality. Certainly, as the previous sections illustrate, the development of sound knowledge and integrated planning are paramount to this function, yet they represent mere precursory elements for successful event outcomes. The notion of planning in itself does not equate to management, nor do sound knowledge and/or planning activities guarantee effective management results. Indeed, the inherent complexities of the recovery period present monumental challenges to traditional management systems, which are generally fragmented, and constrained by their own bounded rationality and reliance on linear or reductive problem solving. Moreover, the entities charged with recovery management are typically bureaucratic structures and, therefore, may be further inhibited by their rigidity, inefficiency, and functional apathy (Bier, 2006). These attributes are simply not conducive to the recovery environment, not to mention they are more susceptible to demand overload, such as the "overaccumulation of interruptions" phenomenon – a condition of complexity that often, yet improvidently disintegrates resilient community systems to "fragile,

self-escalating regimes" (Rudolph and Repenning, 2002, p.1). Such management deficiencies are not uncommon, especially in complex environments, yet their persistence holds severe consequences for positive recovery outcomes. Unfortunately, the prevailing literature tends to focus on the generic conditions or characteristics of effective disaster recovery while neglecting the aspects of tactical execution. The general principles and guidance espoused by the newly published *National Disaster Recovery Framework* (2011) are a clear example of this observation. There exists little doubt that successful recovery demands holistic vision, strategy development, collaborative partnerships, commitment, and community consensus; however, it must be understood that these elements are primarily the antecedent conditions for effective action and, therefore, reflect only partial means to an ultimate end. In the simplest terms, there is an understanding of the desired inputs and outputs of the recovery process, but a lack of clarity regarding the most appropriate throughput.

According to Rubin (1985, p. 14), the advent of disaster invokes a "complex web of intergovernmental relationships" that directly influences the outcomes of the recovery process. In most cases, the extent and quality of these relationships exhibit considerable variability, from cooperative to highly conflictual; however, their ultimate disposition is generally a function of three basic elements – knowledge, leadership, and ability to act. All three elements are "necessary to ensure efficient community recovery", as well as to keeping the recovery process under local influence and control (Rubin, 1991, p. 232). The knowledge element reflects individual or group comprehension of community conditions, impending hazards, and emergency management systems. This includes a thorough understanding of declaration procedures, assistance programs, and other external resources. Nonetheless, as previously noted such knowledge is primarily an antecedent condition and should be developed well before

disaster strikes. The only exception is the knowledge generated through damage assessments and other post-impact condition analyses, which are event-specific and critical to defining recovery scope and direction.

The notion of leadership, on the other hand, is required in both the pre- and post-disaster environments. In the former, leadership reflects the ability to establish vision or direction, forge partnerships, instill credible commitments, and influence open collaborative processes, to include broad-based stakeholder and community involvement. In the latter, the practice of leadership remains paramount, not only in maintaining planned structural, social, and process cohesion, but also in managing new or emergent relationships, demand-related changes, and the advent of community adversity, all which can negatively impact recovery direction. As Rubin (1985, p. 24) denotes:

> In the communities where recovery was observed to progress rapidly and competently, community leaders exhibited vision. That is to say, they had a concept not only of what their community was at the time of disaster, but also a vision of what it should and could be in the future. When major systems and numerous structures in a community have been destroyed, local leaders have to adjust their sights and their future actions to what they envision the community will be. Having a vision for the community and setting goals for recovery are essential to achieving a speedy and successful recovery.
>
> Another hallmark of effective local public leaders is that they tune into what constituents want and neither greatly exceed nor underestimate the extent of the effort desired by the community. Finally, the effective leader turns adversity into opportunity… [and views] the disaster as an opportunity to implement plans that previously have been "pipe dreams". The key here is that a disaster may provide an opportunity to those who are assertive and know where they want to go, in terms of community development.

Given these remarks, it is clear that leadership provides fundamental "direction and motivation"; however, the ability to act or properly execute recovery operations requires not only knowledge and leadership, but also the effective utilization of administrative, technical, and tangible resources. The capacity for administrative proficiency, however, demands careful attention, as it ultimately binds the recovery system together, and facilitates managerial efficiency and control. As Rubin (1991, p. 236) indicates, an "excessive dependence" on external resources can hinder

local effectiveness and efficiency, thus it is imperative that local officials display assertive leadership and competent administrative capacity to "maximize [their] control" over the recovery process. Still, even when leadership is strong, it should be noted that complex problems can emerge from the innate weaknesses or deficiencies found in the existing administrative system, particularly its underlying management elements. As previously discussed, the issues of fragmentation, bounded rationality, and reductive problem solving are frequently coupled with and further aggravated by rigid policies and procedures, hierarchical structuring, and overall tactical inefficiency, all of which function to constrain administrative capacity. The negative impacts of these conditions tend to accumulate in rapid fashion, and serve to accelerate loss of control and strategic drift, especially in the absence of clear objectives and proper quality assurance. There are also pressures of functional duality (or the need to balance recovery efforts with returning demands for normal service delivery) that provoke further administrative stress. This issue is particularly problematic in the wake of inexperience and uncertainty, which often prompt risk-averse behavior and strict procedural conformity – both resulting in varying degrees of functional contraction (Rosenbloom et al., 2002). Although certainly not all-inclusive, these deficiencies, in and of themselves, dramatically increase the risk for incomplete or unpredictable recovery outcomes and, therefore, underscore the need for a more integrated and robust management paradigm. Indeed, as Mikko Koria (2008, p. 128) argues, beyond the complexity of the work itself, the shear diversity of recovery stakeholders demands the adoption of a "common management protocol", one that can be found in integrated project management.

Disaster Recovery as Integrated Project Management

The recovery process is both a strategic and tactical endeavor; one that unfolds in varying stages, facilitates a multitude of activities, and requires planning, organizing, leading, and

controlling. In this sense, it may be conceived as a unique community program that functions to coordinate and execute a variety of social, economic, construction, and environmental projects, which serve to not only address the immediate needs of the post-disaster period, but also to support the long-term goals of community betterment. This conception provides a suitable frame of reference in that it acknowledges the functional permanence of the recovery process while eliciting its tactical mode of operation – the coordination and subsequent execution of recovery projects. The project construct in this sense refers to:

> An endeavor in which human, material and financial resources are organized in a novel way, to undertake a unique scope of work, of a given specification, within the constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives (Turner and Muller, 2003, p. 1).

As such, projects represent transient and unique activities that terminate upon the completion of specific goals or objectives. This concept is distinct, yet closely related to the overriding program element, which is often permanent and more strategically focused. In some cases, programs are simply defined as "a group of projects managed in a coordinated way to obtain benefits not available from managing them individually" (PMI, 2000, p. 10). Such definitions conceive projects as the foundation of any given program, and properly infer that program success is highly dependent upon successful project execution. Indeed, program success is typically a function of two distinct outcomes – the proper execution of individual projects and the generation of multiple project outputs that complement and sustain the overriding strategic vision. In this sense, the manifestation of project-level failure and strategic drift, occurring individually or in tandem, are inherently problematic and may result in systemic, programmatic collapse over time. This reality implies a decreased capacity for long-term error and variance and, therefore, underscores the need for a uniform and consistent management approach across all program and project elements. Project management, in turn, is particularly suited for

successful program maintenance, not only because it provides a uniform, consistent, and flexible management structure, but also because it can be utilized as a powerful strategic tool.

As a tactical element, project management is defined as "the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations" (PMI, 2000, p. 6). This managerial process often requires a delicate balance between differentiated stakeholder requirements and internal project-related demands, such as scope, cost, time, and quality. Moreover, it necessitates understanding and constant monitoring of the external project environment, as projects are "contextually dependent and continuously contingent on environmental relations" and other external variables (Soderholm, 2007, p. 84). To accommodate these conditions, projects are effectively managed through a set of interdependent processes, which often overlap and interact throughout the project life cycle. As Figure 3 shows, these processes include initiating, planning, executing, controlling, and closing. The activity of one process or process group may result in a specific project deliverable or it may simply provide

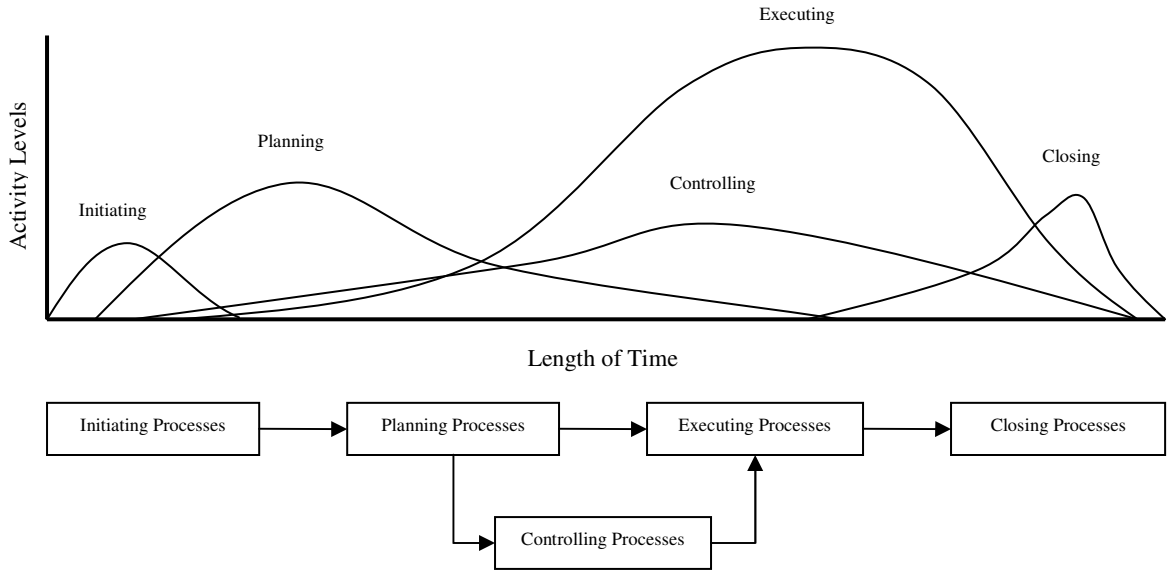

Figure 3: Project Management Processes (adapted from PMI, 2006)

the necessary inputs for the next process group. Taken together, these processes provide a robust, systems approach to managing the complexities of the project environment, both internally and externally. The initiating process group links the project with the overriding program and its strategic vision, and ultimately commences project activity. The primary outputs of the initiating process are the project charter and preliminary scope statement for each identified project (PMI, 2006a). In the aftermath of disaster, these items are not only contingent upon existing community data, but also various impact analyses and community assessments, which are utilized to define event-specific recovery needs. The planning process group functions to "capture all the elements (such as budgetary, human capital, risk management, performance measures, [and] project constraints) necessary to complete the project according to the agreed-upon goals" (PMI, 2006a, p. 11). These elements are essentially divided among core and facilitating functions or sub-processes, as shown below in Table 1. Once complete, these sub-processes are integrated into a comprehensive project management plan, which serves as the guiding framework for executing, monitoring, and controlling all subsequent project-level activity. The executing and controlling processes, in turn, function to implement the project management plan, maintain project activity to its specifications, and ultimately "produce the deliverables required to achieve the goals of the project" (PMI, 2006a, p. 18).

Core Project Functions	Facilitating Project Functions
▪ Scope Planning and Definition ▪ Activity Definition and Sequencing ▪ Activity Duration Estimating ▪ Schedule Development ▪ Resource Planning ▪ Cost Estimating and Budgeting	▪ Organizational Planning ▪ Staff Acquisition Planning ▪ Communications Planning ▪ Quality Planning ▪ Risk Management Planning ▪ Procurement Planning

Table 1: Core and Facilitating Project Functions (adapted from PMI, 2000)

These processes are intricately related and normally work in parallel fashion, with the executing process group facilitating project tasks and administration, and the controlling process group providing general and technical oversight, to include regular feedback on overall project performance and direction. Indeed, the ability to continuously monitor and control project variables is paramount to project success, as well as to ensuring strategic adherence over time. The project management function, in this sense, must remain proactive and readily adaptable to changing circumstances and/or emerging problems, which are even more complex and profuse in the post-disaster environment. The controlling process is particularly important to proper change control and risk aversion, as any deviance must be dealt with through efficient, yet systematic and collaborative problem-solving. As the final stage, the closing process serves to finalize the activities that were initiated in the former processes, as a means to "clearly demonstrate the end of the project to all stakeholders, other implementing agencies, private donors, and the appropriate government" (PMI, 2006a, p. 27). This is accomplished through verification of activity completion, administrative closure, and final contract close-out (PMI, 2000).

Throughout this managerial cycle, project success is measured against the internal objectives of cost, time, and performance; however, it must be understood that success is also a function of external perception and strategic impact. As Dennis Lock (2007, p. 25) insists, "… the true measure of project success or failure depends on how the project is perceived by all stakeholders." Moreover, it is judged not only by its direct impacts on the receiving organization or community, but also its generation of long-term benefit (Shenhar et al, 1997). These broader perspectives move project management beyond its underlying tactical function and, in turn, underscore its requisite capacity for strategy development. Indeed, the ability to meet specific goals and/or adhere to an overriding vision, especially through the long-term, demands that

future projects are managed in proactive and strategic fashion. This is accomplished through the development and consequent management of project portfolios. According to the *Project Management Institute* (2006b, p. 5), portfolio management is "an approach to achieving strategic goals by selecting, prioritizing, assessing, and managing projects, programs, and other related work based upon their alignment and contribution to the organization's strategies and objectives." The utilization of portfolios, in this sense, dramatically heightens strategic awareness while providing a proper decisional framework for selecting the right projects and maximizing return on investment (Wessels, 2007). To this effect, project portfolio development stands as an antecedent condition to efficient and effective recovery management and, therefore, should be formally integrated in the pre-disaster recovery planning process.

Bridging the Gap: Understanding the Process of Pre-Disaster Recovery Planning and Project Portfolio Development

The function of pre-disaster planning is critical to effective recovery, not only in establishing a framework for post-disaster community action, but also in developing a shared vision for hazard-vulnerability reduction and community betterment. As Figure 4 illustrates, the process begins with the assessment of recovery need and quickly moves to the establishment of a community recovery task force. The initial needs assessment requires a meticulous review of disaster history and hazard-vulnerability data, as well as a preliminary analysis of recovery capacity and financial constraints (FEMA, 2011). In this context, the assessment must be especially sensitivity to areas of high exposure, and to vulnerable sub-populations and economic systems that exhibit low resource redundancy and/or adaptive capacity (Longstaff et al., 2010). After establishing need, the next step centers on the formation of a community recovery task force, which serves as the principal coordinating and facilitating element of the overriding recovery planning process, both before and after event impact. As Schwab et al. (1998, p. 75)

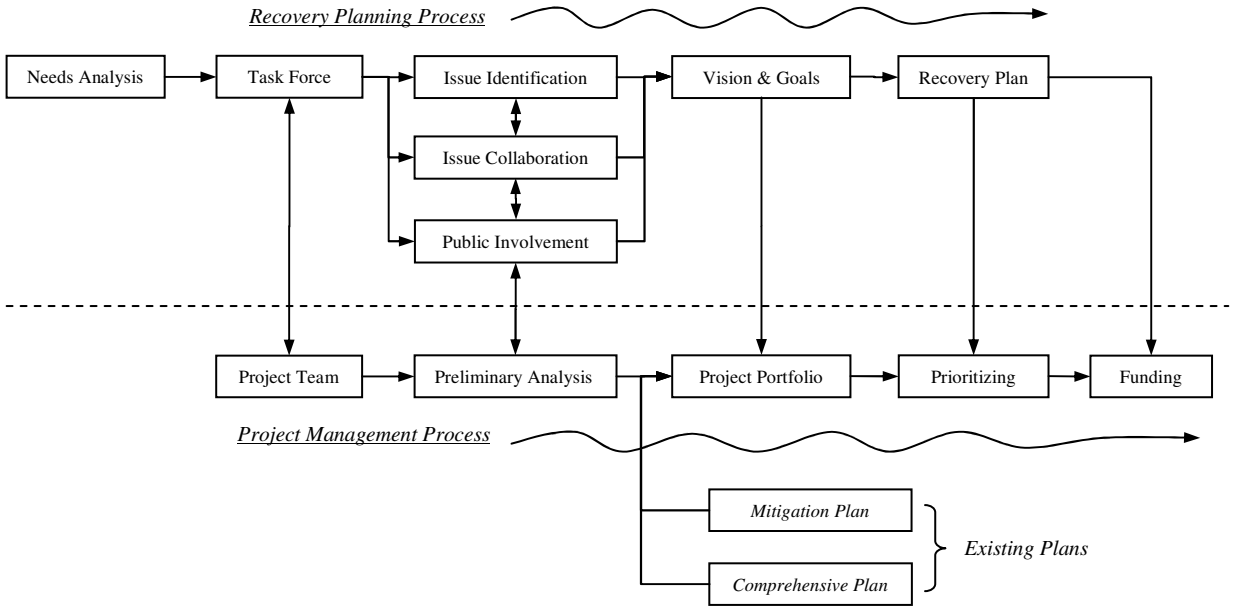

Figure 4: Recovery Planning and Project Portfolio Development

indicate, effective planning requires "a uniquely broad combination of resources and expertise in order to reflect the complex realities that must be addressed", thereby underscoring the need for interdisciplinary composition. Ideally, the task force should draw from all community domains, both public and private, and be organized around the functional support elements in the *National Disaster Recovery Framework*, with expertise properly represented in each functional area. These functional areas include:

- Community Planning
- Community Capacity Building
- Economic Development
- Health and Social Services
- Permanent and Temporary Housing
- Transportation and Infrastructure Systems
- Natural and Cultural Resources

As a requisite condition, the task force structure should also incorporate project management expertise within each functional area, thereby creating two distinct, yet interrelated planning streams. The recovery planning process stream serves to identify and analyze community problems, facilitate collaboration and community involvement, develop alternative strategies for

remediation, define recovery objectives and priorities, and finalize the recovery plan. The project management process stream, on other hand, provides technical support and input to the recovery task force, compiles project-related data, conducts preliminary feasibility studies, and develops the recovery project portfolio. Although performing different functions, these planning streams are mutually supportive and interact in dynamic and cyclical fashion, thereby synchronizing the planning process, with the former setting strategic direction and the latter preparing for its tactical implementation. The acquisition of project management talent, in this case, may come from a number of local agencies and/or private contractors or consulting firms that specialize in project development and execution. In turn, the final element of the task force structure is the identification of a principal leader or recovery champion, which may be an individual or small group of individuals. The task force leader(s) functions as the image, voice, and point of contact for the recovery process and, therefore, must command the respect, admiration, and attention of all relevant stakeholders, to include the general constituency (FEMA, 2005). According to Schwab et al. (1998, p. 79):

> Ideally, this role should fall to the community's chief executive, whether that be a mayor, city or town manager, or county executive or board president. However, it is not uncommon for this executive official to delegate lead agency responsibility to some other official. When this happens, it remains important that the chief executive has initiated or at least blessed the process and that this surrogate retains the active support of the chief executive.

After solidifying the task force structure, the initial needs assessment should be carefully reviewed through the interdisciplinary lens of all task force members, as a means to synthesize perspectives and further expand member comprehension. This analytical process heightens systems thinking and facilitates better understanding of the linkages or causal processes between impending hazards and various community system elements – social, economic, natural, and built. Moreover, it facilitates preliminary consideration of possible strategies for remediating

isolated and/or overlapping community problems, especially those dealing with high-risk areas and special populations.

In conjunction with issue identification, the task force should also begin reaching out and establishing collaborative partnerships with other local, state, and federal agencies, area colleges and universities, private sector firms, and select non-governmental organizations, to include professional associations and local media outlets. These entities are vital to the recovery process and often provide technical assistance, advice and insight, and financial or other resource support. Nonetheless, these relationships cannot be static; to the contrary, they must be cultivated and strengthened through routine contact and discussion (FEMA, 2005). There are a number of methods for enhancing external coordination, to include, but certainly not limited to:

- Inviting external personnel to join the task force
- Conducting routine conference calls or webcasts
- Holding regular meetings for local and regional participants
- Inviting external support organizations to public meetings

However, although external support is beneficial and necessary, it is imperative that the task force maintains a sense of control over the communication process, thereby focusing these collaborative engagements on community-specific issues and needs (Rubin, 1985). The ability to ensure such focus also demands the committed solicitation of active community involvement (Michaels, 2001). Indeed, as Schwab et al. (1998, p. 83) suggest, the task force must "seize strategic opportunities to raise and maintain the profile of natural [and other community] hazards as a public issue", not only to gain traction on the public agenda, but also to catalyze the community participation process. As such, the task force should harness the power of technology and local media outlets to develop and implement broad-based, community notification and educational campaigns, which should provide clear messages and exude thematic undertones of community ownership and personal responsibility. This mass approach may include:

- Television, radio, and print media
- General literature provided by high-profile establishments (schools, churches, etc.)
- Websites, social media, electronic newsletters, and mass emails
- Strategically located satellite stations or kiosks with recovery representatives

These broad campaigns are extremely profitable, but still remain limited in terms of reach and motivation, particularly for minority, elderly, and other special populations. Such limitations, therefore, cannot preclude more aggressive outreach strategies, to include directly contacting neighborhood organizations and conducting door-to-door solicitation (Chrislip, 2002).

Without doubt, the ability to properly secure external support and community involvement, as well as to draw these individuals and/or groups to a common platform of collaboration is a tremendous task, yet it is a fundamental requirement for planning success. As Chrislip (2002, p.50) insists, "[i]f you bring the appropriate people together in constructive ways with good information, they will create authentic visions and strategies for addressing their shared concerns of the organization or community." The next step, therefore, centers on the execution of the collaborative process; that is the collective analysis, discussion, and ultimate disposition of the problems at hand. Indeed, the existence of hazards and community vulnerability are truly complex or wicked problems that demand adaptive learning and innovation for effective remediation. This approach moves beyond traditional learning methods and transforms individuals or groups from passive receptors of information to active contributors, thereby "stimulat[ing] change of individuals and systems through an ongoing process of learning and negotiation" (Reed et al., 2006, p. 415). Such learning and knowledge development are best facilitated through a progressive process, such as that described by Sarah Michaels (2001), which includes:

- *Participatory Action Research* – knowledge generation process to empower participating groups and individuals with the task force representatives serving support roles

- *Collaborative Learning* – constructive exchanges of information that centers on common understanding, problem-solving and strategy development, and feasibility of select action
- *Multi-Objective Planning and Management* – goal development, strategy selection, and discovering the means to carry out numerous activities to meet specific outcomes

This progressive approach not only empowers all participating stakeholders, but also strengthens community bonds and commitment through a sense of ownership over the collaborative process, as well as the future direction of the community itself. By utilizing open collaboration, the recovery process is more properly linked to the broader community, as opposed to being viewed in isolation, which further enhances perceptions of social justice and overall community value and benefit. Moreover, it provides an effective platform to critically examine existing community conditions and problems, identify post-disaster opportunities for community improvement, establish networks of responsibility for post-event action, and evaluate a number of methods or means to implement vital improvements. Still, it is imperative that the process is continuously moderated to ensure fair, balanced, and open exchanges – that it remains truly collaborative, impermeable to elitism or group dominance, and holistic in its approach to community problems and issues across all domains.

The principal outcomes of the collaborative process are typically a renewed community vision, specific goals and strategies for post-event community action, and clear definitions of individual and organizational roles and responsibilities, all of which are consensus-driven and solidified in the final recovery plan. Throughout this process however, it is important to recognize that the project management team, as a supporting element, works hand-in-hand with all participating stakeholders, especially task force representatives, to identify, develop, and prioritize goal-related projects; to evaluate post-disaster risks and constraints; and to proactively streamline the recovery management process. As such, the project management team is vital to not only helping transform collaborative ideas and strategies to tangible project concepts, but

also in ensuring their alignment with the overriding goals and community vision. Project concepts, in this case, are simply the tactical instruments or deliverables for meeting select community goals, and are typically divided among two broad categories – needs-driven and vision-driven recovery projects – which makeup the recovery project portfolio. The former project category is event-specific and, therefore, defined by the extent of damage and disruption experienced. Such projects include the distribution of community assistance, structural demolition and debris management, infrastructure restoration and replacement, building systems and housing reconstruction, economic revitalization, and so on. The latter project category represents community "pipe dreams" or "project wish lists". These projects are developed to capitalize on post-event windows of opportunities, and may be utilized to expand upon existing mitigation and comprehensive planning initiatives, with the purpose of enhancing community betterment. This category may include, but is certainly not limited to land acquisition or relocation, environmental preservation and restoration, sustainable construction or infrastructure development, and long-term community resilience and capacity building. Taken together, these broader project categories may be further divided into more manageable components or sub-project areas within the social, economic, environmental, and structural domains (PMI, 2000).

For each concept generated, the project management team, in conjunction with select stakeholders, helps define its preliminary scope and, in turn, conducts a feasibility study to evaluate its strengths and weaknesses, identify its opportunities and threats, and determine its overall resource requirements, which are often compared against available or forecasted resource capacities (Wideman, 2007). This process demands not only careful attention and general input, but also intimate discussions with agency, contractor, and/or vendor representatives that specialize in its given sector or functional area. Such close interaction is necessary to

understanding the complexities of the project environment, as well as to ensuring appropriate knowledge transfer regarding requisite skills and best practices. Once complete, the findings are collectively reviewed by the recovery task force, and each project is then judged by its overall recovery value, to include sectorial cross-cutting or overlapping benefit, prospective viability, and general alignment with overriding goals and community vision. The notion of recovery value, in this sense, is defined as the capacity of a given project to help facilitate the community recovery process, with higher-level capacity resulting in heightened perceptions of underlying project value. In fact, according to the *Federal Emergency Management Agency* (2005, p. 50), a high-value recovery project will:

- Fill a post-disaster community need
- Provide leveraging and create linkages for other projects and funding
- Be related to the physical damage from the disaster
- Encourage private investment
- Have strong community support
- Have access to the resources needed to carry out the project
- Be realistic in its outcome – is achievable
- Avert future losses
- Use resources efficiently
- Have community-wide impact

These descriptive attributes, particularly when viewed together, are not only indicative of overall recovery value, but also project viability and likely success, thus they provide the most objective and legitimate base for defining and ultimately prioritizing the final recovery project portfolio.

In most cases, this descriptive data can be transformed to more decisive metrics through quantitative scaling or weighting, both of which permit score calculations and the use of systematic, rank-order evaluations (Wideman, 2007). As such, the projects exhibiting cumulatively higher scores across all evaluative criteria are essentially granted higher priority. Such hierarchical ranking is particularly relevant to all vision-driven projects, which are essentially discretionary and forced to compete for limited resources. The prioritization of needs-

driven projects, on the other hand, will obviously require careful balance, and may be limited to sequencing activities rather than strict hierarchical ranking due to their inherent uncertainty, as well as the need to avoid preferential disputes and unwarranted conflict. Nonetheless, it is important to realize that the prioritization process cannot be limited to mere formulaic analyses alone; rather, it must be further reviewed, scrutinized, and eventually decided upon in open forum, as a means to capture community input, generate consensual agreement, and solidify its final disposition (FEMA, 2005).

As the prioritization process matures, the recovery task force should begin refining project details and exploring a variety of funding strategies to support implementation. The preliminary scope of each project must be identified and consequently defined, at least to the fullest extent possible, in order to delineate project-specific activities and resource requirements, as well as to avoid the problems of delimitation or scope creep (PMI, 2006a). Project scope, in this sense, defines the "work that must be done" and essentially subdivides the "major project deliverables into smaller, more manageable components" (PMI, 2000, p. 51). This concentrated focus lends to better activity sequencing and scheduling, as well as to improved cost estimating and overall budgetary analysis. These latter elements – schedule and budget – are inherently linked and essentially build upon one another in progressive fashion. As such, the preliminary schedule should reflect specific milestones generated by the scoping process, while the sequence and temporal duration of schedule activities provide the basis for all project cost estimating (PMI, 2006a). Each project should also be appropriately phased or logically subdivided across specific work accomplishments, as a means to enhance managerial oversight and permit partial implementation in wake of limited funding. Beyond this, the project management team should also engage in other preliminary planning activities, to include, but not limited to:

- Reporting Processes and Communications
- Human Resources and Staff Management
- Quality Assurance and Evaluation
- Procurement and Logistics
- Risk Analysis and Contingency Planning

The outcomes of each planning element should be formally documented and subsequently assembled into a preliminary plan for each portfolio project. For most vision-driven projects, these elements are essentially static or predictable and, therefore, can be analyzed and documented with relative accuracy. However, the inherent uncertainties associated with any needs-driven project will require more advanced tactics, such as scenario analyses or disaster modeling, to properly gauge its post-event processes and requirements. In any event, the point is to advance the project initiating and planning processes as close as possible to the execution phase, which not only reduces the burden of excessive post-disaster planning, but also effectively streamlines the implementation process.

Without doubt, the development of viable funding strategies is tantamount to such planning activity, as the ability to implement any recovery project is contingent upon adequate resources and available funding. Therefore, the recovery task force must aggressively seek resource and funding opportunities throughout the recovery planning process, with more refined strategies being developed as the recovery plan and project portfolio are finalized. This requires an in-depth review of all local resources available for project implementation, both public and private. In addition, it demands considerable knowledge of available state and federal programs that not only support disaster recovery operations, but also assist in general economic and community development. Such programs may include:

- Individual/Household Assistance and Loans
- Home Investment Partnership Grants
- Urban Renewal and Redevelopment Funding
- Community Development Block Grants
- Economic Adjustment Grants

- Hazard Mitigation Grants
- Historic Preservation Grants
- Public Assistance Project Grants

These programs, as well as many others are detailed in the *Catalog of Federal Domestic Assistance* and the FEMA 229 Publication, *Disaster Assistance: A Guide to Disaster Recovery Programs*, both of which should be consulted to the fullest extent. Given the limited nature of these programs however, the recovery task force should pursue "several levels or sources of funding to leverage project development", as well as to encourage further stakeholder commitment and participation (FEMA, 2005, p. 73). Indeed, the cultivation of long-term partnerships with multiple agencies and organizations is perhaps the most critical element in developing successful funding strategies – as these relationships often provide a direct link to sustainable funding and support.

> Communities will be more effective and garner greater support over a longer duration if they first develop relationships with potential partnership (and funding) agencies. This relationship allows the community to fully understand the policies, timelines, limitations, and parameters of the partnering agency. It also allows the community to communicate and "sell" the project and the scope of redevelopment to the partnering agency.
>
> This 'partnership' approach encourages an agency to become a vested partner in the development of projects… this relationship building will create a long-term partnership between communities and agencies that can endure long after community recovery has been accomplished (As quoted in FEMA, 2005, p. 71).

Once completed, the prioritized project portfolio, along with its funding strategies, should be integrated with the final recovery plan and sent to executive leadership for final approval. The approval process, in turn, should be conducted in ceremonial fashion, as a means to display executive commitment and promote feelings of community pride and accomplishment. From this point, the recovery task force should concentrate on further developing plan comprehension and recovery capacity through various training and education campaigns, to include the use of community seminars and recovery workshops. This process should also include the utilization of recovery drills and exercises to test or evaluate the plan's effectiveness over time (FEMA, 2011).

In this sense, the recovery plan should always be viewed as a "living document", one that requires periodic review and updating to reflect changing conditions and community needs.

Concluding Remarks

Without doubt, the advent of disaster presents monumental challenges to the community and its governing structure, not only in dealing with the resulting physical damage and destruction, but also in managing the underlying complexities of the recovery environment itself. Nonetheless, it is clear that effective recovery does not occur by way of chance or simple momentum; rather it is a function of both strategic and tactical capacity. As such, this article has explored a more comprehensive and systems-based framework for enhancing the recovery process, which centers on integrated knowledge, planning, and project management. The acquisition of knowledge regarding the current state and causal processes of the hazard-community interface is paramount to this approach, as it provides the foundation for proper strategy development and intervention planning. In turn, such knowledge must be integrated with the overriding community planning matrix, as a means to expand hazards awareness, cultivate planning-related synergies, and ultimately synchronize community vision and strategic direction. The utilization of project management further strengthens the planning process, while providing a more robust, uniform, and consistent management paradigm for post-disaster project execution and control. Indeed, the practical application of these conceptual ideas, in conjunction with stakeholder involvement and collaboration, holds strong potential for enhancing not only recovery efficiency and effectiveness, but also community capacity and overall disaster resilience.

References

Alesch, Daniel J. (2003). Complex urban systems and extreme events: Toward a theory of disaster recovery. *Public Entity Risk Institute*. Retrieved from https://www.riskinstitute.org/peri/images/file/Alesch_Complex_Urban_Systems_and_Extreme_Events.pdf.

Bier, Vicki (2006). Hurricane Katrina as a bureaucratic nightmare. In Daniels, Ronald J. et al. (eds.), *On risk and disaster: Lessons from hurricane Katrina* (243-254). Philadelphia, PA: University of Pennsylvania Press.

Burby, Raymond J. et al. (1999). Unleashing the power of planning to create disaster-resistant communities. *Journal of the American Planning Association*. 65(3), 247-258.

Burby, Raymond J. (2005). Have state comprehensive planning mandates reduced insured losses from natural disaster. *Natural Hazards Review*. 6(2), 67-81.

Campanella, Thomas J. (2006). Urban resilience and the recovery of New Orleans. *Journal of the American Planning Association*. 72(2), 141-146.

Chrislip, David D. (2002). *The collaborative leadership field book: A guide for citizens and civic leaders*. San Francisco, CA: John Wiley & Sons, Inc.

Daines, Guy E. (1991). Planning, training, and exercising. In Drabek, Thomas E. et al. (eds.), *Emergency management: Principles and practice for local government* (161-200). Washington, D.C.: International City Management Association.

Federal Emergency Management Agency. (2005). *Long-term community recovery planning process: A self-help guide*. Retrieved from http://www.fema.gov/pdf/rebuild/ltrc/selfhelp.pdf.

Federal Emergency Management Agency. (2011). *National disaster recovery framework: Strengthening disaster recovery for the nation*. Retrieved from http://www.fema.gov/pdf/recoveryframework/ndrf.pdf.

Gall, Melanie and Cutter, Susan. (2007). 2005 events and outcomes: Hurricane Katrina and beyond. In Rubin, Claire B. (ed.), *Emergency management: The American experience 1900-2005* (185-205). Fairfax, VA: Public Entity Risk Institute.

Haas, Eugene J. et al. (eds.). (1977). *Reconstruction following disaster*. Cambridge, MA: Massachusetts Institute of Technology Press.

Ingram, Jane C. et al. (2006). Post-disaster recovery dilemmas: Challenges in balancing short-term and long-term needs for vulnerability reduction. *Environment Science and Policy*. 9(8), 607-613.

Koria, Mikko. (2009). Managing for innovation in large and complex recovery programmes: Tsunami lessons from Sri Lanka. *International Journal of Project Management*. 27, 123-130.

Kreps, Gary A. et al. (2006). Facing hazards and disasters: Understanding human dimensions. *The National Academies Press*. Retrieved from http://books.nap.edu/catalog.php?record_id=11671.

Lindell, Michael K. et al. (2006). *Fundamentals of emergency management*. Washington, D.C.: Federal Emergency Management Agency. Retrieved from http://training.fema.gov/EMIWeb/edu/fem.asp.

Lock, Dennis. (2007). *Project management (Ninth Edition)*. Burlington. VT: Gower Publishing Company.

Longstaff, Patricia H. et al. (2010). Building resilient communities: A preliminary framework for assessment. *Homeland Security Affairs*. 6(3), 1-23.

Lucus, Valerie. (2006). Analysis of the baseline assessments conducted in 35 U.S. state/territory emergency management programs: Emergency management accreditation program (EMAP) 2003-2004. *Journal of Homeland Security and Emergency Management*. 3(2), 1-15.

Meadows, Donella H. (2008). *Thinking in systems: A primer*. White River Junction, VT: Chelsea Green Publishing Company.

Michaels, Sarah. (2001). Participatory process. In *Holistic disaster recovery: Ideas for building local sustainability after disaster*. Fairfax, VA: Public Entity Risk Institute. Retrieved from http://www.colorado.edu/hazards/publications/holistic/holistic2001.html.

Mileti, Dennis S. (1999). *Disaster by design: A reassessment of natural hazards in the United States*. Washington, D.C.: Joseph Henry Press.

Project Management Institute. (2000). *A guide to the project management body of knowledge*. Newtown Square, PA: Project Management Institute. Retrieved from http://www.cs.bilkent.edu.tr/~cagatay/cs413/PMBOK.pdf.

Project Management Institute. (2006a). *Project management methodology for post-disaster reconstruction*. Newtown Square, PA: Project Management Institute.

Project Management Institute. (2006b). *The standard for portfolio management*. Newtown Square, PA: Project Management Institute.

Reed Mark S. et al. (2006). An adaptive learning process for developing and applying sustainability indicators with local communities. *Ecological Economics*. 59, 406-418.

Rosenbloom, David H. et al. (2002). *Public administration: Understanding management, politics, and law in the public sector*. New York, NY: McGraw-Hill.

Rubin, Claire B. (1985). The community recovery process in the United States after a major disaster. *International Journal of Mass Emergencies and Disasters*. 3(2), 9-28. Retrieved from http://www.ijmed.org.lib-proxy.jsu.edu/articles/197/download/.

Rubin, Claire B. (1991). Recovery from disaster. In Drabek, Thomas E. et al. (eds.), *Emergency management: Principles and practice for local government* (224-259). Washington, D.C.: International City Management Association.

Rubin, Claire B. (2009). Long-term recovery from disasters: The neglected component of emergency management. *Journal of Homeland Security and Emergency Management*. 6(1), 1-17.

Rudolph, Jenny W. and Repenning, Nelson P. (2002). Disaster dynamics: Understanding the role of quantity in organizational collapse. *Administrative Science Quarterly*. 47(1), 1-30.

Scanlon, Joseph. (1991). Reaching out: Getting the community involved in preparedness. In Drabek, Thomas E. et al. (eds.), *Emergency management: Principles and practice for local government* (79-100). Washington, D.C.: International City Management Association.

Schwab, Jim et al. (1998). Planning for post-disaster recovery and reconstruction. *Federal Emergency Management Agency*.

Shenhar, Aaron J. et al. (1997). Mapping the dimensions of project success. *Project Management Journal*. 28(2), 5-13.

Smith, Gavin P. and Wenger, Dennis. (2006). Sustainable disaster recovery: Operationalizing an existing agenda. In Rodriguez, Havidan et al. (eds.). *Handbook of disaster research* (234-257). New York, NY: Springer Science & Business Media, LLC.

Soderholm, Anders (2008). Project management of unexpected events. *International Journal of Project Management*. 26, 80-86.

Turner, J. Rodney and Muller, Ralf. (2003). On the nature of the project as a temporary organization. *International Journal of Project Management*. 21, 1-8.

Weichselgartner, Juergen and Obersteiner, Michael. (2002). Knowing sufficient and applying more: Challenges in hazards management. *Environmental Hazards*. 4, 73-77.

Wessels, Don J. (2007). The strategic role of project management. *PM World Today*. 11(2), 1-9. Retrieved from http://www.pmforum.org/library/papers/2007/PDFs/Wessels-2-07.pdf.

Wideman, R. Max. (2007). *Ten steps to comprehensive project portfolio management*. Retrieved from http://www.maxwideman.com/papers/index.htm.