

POST-DISASTER RECONSTRUCTIONS IN RURAL AND URBAN AREAS OF TURKEY

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Abstract

Disaster assessment refers to the survey and information collection activities carried out to determine the effects of a disaster on the affected population, and their resulting needs. The assessment process is usually conducted at two distinct stages of a disaster: Immediately after a disaster, a *preliminary assessment* is conducted to obtain an early but full assessment of the geographical extent of damage, and the number, categories, location, and circumstances of the disaster-affected population. This assessment provides a general picture of where people are, what condition they are in, what they are doing, what their needs and resources are, and what services are still available to them. It usually takes the form of an initial reconnaissance that can guide search-and-rescue and relief operations. Preliminary thematic maps that locate affected or damaged sites and infrastructure can then be produced from the results of this assessment. As needs change day by day in the immediate aftermath of a disaster (i.e., first, for rescue equipment, excavators and medical equipment, then food, medicine, clothing, and shelter), a series of rapid assessments may be needed. Their results provide valuable baseline data and a basis for monitoring the post-disaster situation to determine whether it is improving or deteriorating over time. At a later stage, a more *detailed assessment* is done to collect more specific information about the nature, location, and extent of losses and damages, and the resulting needs of the affected populations. The more specific information collected from this assessment are useful for planning and implementing reconstruction programs. Types of Disaster Assessment. For the recovery and reconstruction phase of a disaster, various types of detailed disaster assessment are

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most relevant: *Damage Assessment, Needs Assessment, Technical evaluation of structural damage, Inventory of Affected Assets, Sample survey*. Light of these; effects of disasters will be analyzed on urban and rural settlements in Turkey and other countries.

Keywords: *Post-Disaster reconstructions, Housing, Disaster assessment, Disaster Vulnerability, Local Knowledge and Capacity, Disaster, Risk, Risk Management, Cultural Heritage*

INTRODUCTION

To provide sustainability of interventions undertaken as part of post disaster reconstruction is one of the serious challenges confronting the developing countries. There are sufficient examples to show that in many cases, reconstruction serves to reinforce and sometimes-even increase the vulnerability of rural and urban areas. This is well exemplified in Turkey by the case of reconstruction following 1999 Marmara earthquake in 1999, with the light of these challenges, the paper will focus on the methodology, post disaster reconstruction and risk management, which are readdressed from a holistic and dynamic perspective. The term 'risk' is redefined in an integrated manner with respect to exposure to one or more hazards as well as other factors determining vulnerability in developing countries. The term 'vulnerability' is assessed not only as product of hazard exposure but in a progressive manner resulting from social, economic and underdevelopment processes, before, during and after disaster situations. The paper will further attempt to redefine disasters as a continuum where actions taken during various phases have an impact on each other, thereby emphasizing the need for establishing various backward and forward linkages while deciding various actions and interventions at various stages. The paper will conclude by elaborating on the proactive tools, techniques, strategies and actions for risk assessment and control at various stages with respect to a disaster situation and thus address various types of risks in an integrated and dynamic manner.

Developing countries like Turkey are faced to various natural risks leading to disasters, which cause immense loss of life and property. The Marmara Earthquake of 1999 is enough to substantiate this argument. Such an immense disasters require effective planning and programming for post disaster reconstruction, needs not only providing of burrows, but also rehabilitating Physiologic, social and economic

infrastructures which are badly mutilated as a consequence of these disasters. Ensuring sustainability of interventions undertaken as part of post disaster reconstruction is certainly one of the crucial challenges while undertaking post disaster reconstruction. This is enough examples to show that in many cases, reconstruction serves to reinforce and sometimes-even increase the vulnerability of settlements. This is well exemplified in Turkey by the case of reconstruction following Marmara earthquake in 1999, where 'city-like' steel stake layout for apartments and import of 'modern' technology for construction of urban housing has failed to reduce peoples' vulnerability to future earthquakes. On the contrary, these have increased physical as well social and economic vulnerability of the local communities. (Jigyasu, 2002)

Reducing Disaster damage from viewpoint Physical and psychological

The principal causes for increasing disaster damages, both in pre and post disaster situation are in actually related to the existing psychological, social, economic and political context and existing policy approaches for post disasters reconstruction. in many examples are result of existing development processes, on rural and urban settlements, whose implications are in the form of social and economic poverty, market economy and undeveloped education system. Some main issues and challenges are clear in the context of rural and urban areas of Turkey and developing countries for reducing their disaster damage through building local knowledge and capacities. These are: Loss of material and land resources (from rural communities), Loss of Traditional Skills, Acquiring a Different Cultures of external interventions, Increasing Social and Economic poverty and inequity, Weakening of Municipalities and city administrations. (Jigyasu, 2002)

Redefinition of Disaster's Damages

Relationships between Vulnerability and Economic and Social Capacity

Vulnerability is happen a set of negative conditions within a people, which may be derived from several factors. This may be grow out of inherent weaknesses of these rural and urban settlements or derived from external threats. In contrary, knowledge and capacity of local administrations are result of positive conditions in a society. It represents the internal strengths of these societies and their external opportunities. However these negative and positive conditions do not cause and

capacity as mutually exclusive. In fact disaster damnifications are both the cause and effect of losing knowledge and capacities of local administrations and of conditions of poverty. (Anderson-Woodrow, 1989) Which does not explore the relationships between vulnerabilities and capacities as mutually effective conditions, rather looks at them independently

Disaster damnification is complex in the following respects: It can encompass various aspects such as physical, social, attitudinal, economic and psychological. - It may hold true with respect to one risk or multiple risks. It may hold true for the whole society or specific sections of it. While to explore the inter-linkages between damnification and capacities of aggrieved societies, a significant aspect is their dynamic nature. This implies that damnification does not unchangeable the same over a given time process, especially after a natural risks such as earthquake and hurricane. On one hand, certain aspects of injury before the risks form the context or setting for the disaster. On the other hand, reactive actions (as relief and rehabilitation process) may help in eradicating or reducing certain kinds of damnification, changing certain damnifications to different kinds and reinforcing or compounding or strengthening or even increasing others. The damage conditions can also change with time on their own through certain inherent community coping mechanisms or other practices. Vulnerability to natural disasters can therefore be understood as 'products' and 'processes', existing before as well as after a disaster. Certain aspects of disaster vulnerability precede a disaster, and thus create a setting for the disaster, thereby contributing to its nature and severity. These can get reinforced and changed after a disaster as a result of various response decisions, as well as the overall social, economic, political and institutional context. In spite of good Intentions, certain aspects of damnification are carried forward since the underlying causes remain. Also knowledge and capacity of local administrations that have potential for disaster mitigation are accumulative, continuously updating or changing (in positive or negative direction) in response to various situations, which are taken as part of learning processes through local initiatives. The internal world views or perceptions dictate these learning processes and communication mechanisms, which develop over time, leading to creation, reception and accumulation of new knowledge. Considering the dynamic nature of damnifications and knowledge and capacities local administrations, Societies are always in transition and as such, their damnifications and capacities increase or decrease accordingly. Besides, there may be some hidden capacities and vulnerabilities,

which may not be linked to one risks or another but nevertheless characterize the strength and weakness of these societies in general. Moreover, in many situations, damnifications and capacities pertaining to various risks may compliment each other. When seen in a time continuum, disaster vulnerabilities and capacities in the context of rural communities in India and Nepal can be described as the processes, which are the 'products' of Inherent social, cultural and economic transformation processes within communities. Normal (under) development process, Immediate and long-term disaster response, including those of emergency relief models by various NGOs. These three factors affect the vulnerability and capacity of rural and urban societies, and also affect each other. In the following discussion,

Damnifications: Social, Cultural and Economic Transformation Processes within Societies

The rural and urban areas and societies in Turkey have traditionally been coherent entities with distinct social hierarchy but well-defined roles and relationships. However these societies are transforming in many respects, one of which relates to inherent structural changes in traditional patterns and relationships within societies, which determine their mutual support systems. These contribute to lessening their damnification, although one must admit that some of these patterns and relationships are exploitative in some respects and lead to increasing damnification of certain groups. Moreover, the inherent transformation processes of these societies also extend to changing perceptions and thinking processes, which strive for anything which is modern', whether it is the way of life or the built form. These structural changes are mainly due to the predominant forces of globalization and changing political and economic context, because of which the traditional systems and social and resource relationships that have defined these communities for generations are breaking up. Social vulnerability in the context of South Asian rural communities is very much linked to widening social and economic segregation, which gets further reinforced with local political power structure. This has weakened the collective coping and response mechanisms of the communities. As a result, social and economic inequity has further increased, resulting in increasing vulnerability of certain marginalized sections. Looking from an inter-generational perspective, the present generations of these communities can rightly be described as one of the "Lost" generations, since they are neither able to use their traditional systems, nor able to adjust and take the benefits of 'modernization'.

Damnifications of normal development Process

Damnification of Turkey urban and rural societies is certainly a direct or indirect result of the dominant paradigm of development. Such a paradigm is by and large made up of the some resulting practices. In some form or other development has implied modernization the transformation of "traditional" society (characterized by dependence on particular social forms and cultures, as well as on the whims and dictates of nature) towards "modern" society (characterized by control over nature, by individual free choice, and by independence as freedom from given social and natural reality. Also such a paradigm assumes that 'Development can be created and engineered'. It is something, which is brought, to and for some, by others who presumably are more developed. Moreover, it is assumed that development is linear and predictable. Put another way, there is a direct line between cause and effect, between input and output. Such predominant notions of externally driven 'modern' development are having negative implications on rural communities. Firstly, the agencies in charge of development perceive 'modernization' as panacea for development of 'backward' urban and rural societies, without actually comprehension of the local frames of reference -their worldviews, needs and priorities. The result of this is cultural incompatibility and non-sustainability of interventions. As a result, rural development approaches in Turkey have failed to some extent to meet their basic needs and enhance their capabilities. The consequence of such a development process on rural communities is that they are increasingly losing access to local resources, especially land. The question of choice and access to resources is fundamental in any discussion on rural poverty. Increasing rural poverty in the region is also driving rural people to urban areas, leaving behind their skills and knowledge, to search for opportunities. However, most of them end up getting marginalized in urban areas also. Vulnerability as Product of immediate and long-term disaster response It is also a product of external human interventions and myths or perceptions of decision makers, undertaken as post-disaster decisions or actions, both immediate relief and long term rehabilitation, that in fact are originally intended to reduce vulnerability against such natural events. This is either because of wrong official policies for undertaking relief and rehabilitation or in many instances, a result of emergency, relief and rehabilitation models by NGOs. Many of these policies and models are dictated by the dominant paradigm of development, which is explained in the previous section. The negative consequences of these in the long run are evident in the Marmara's case. Also in these areas,

provision of reconstructed houses is thought of as an end product for development of villagers and urban dwellers. Besides wrong policies, the ineffectiveness may be due to the overall social, economic and political context, within which disaster management takes place. In fact, existing context shapes disaster management, which in turn also shapes the context. In fact wrong policy approaches can reinforce and in some cases, even increase existing resource dependencies, social inequity and at the same time, overlook local knowledge and capacities. Moreover, social participation in disaster management depends largely on the local power structure, which ironically, is reinforced by existing social segregation. Theoretical discussion on this issue will be done later. Another significant issue pertaining to disaster management practiced in Turkey subcontinent is that it has become a highly specialized discipline and various professionals and decision makers perceive various approaches for mitigation and rehabilitation within their own disciplinary field. For example, policy makers perceive relocation as a safe option based on the technical criteria of seismic safety, without considering the relationships to land, culture and livelihoods. Similarly, housing reconstruction is seen as a physical end product, without paying heed to the process of urban and rural housing and its link to social structure, way of life and local economy. Similar issues emerge on the questions of transferring technology, which can make the structures highly resistant to earthquakes, but throw open questions on their affordability, cultural compatibility and sustainability in the context of rural communities in the region.

Redefining 'Risks' and 'Disasters'

The above discussion throws light on the perspectives to the fundamental question; what is a disaster. (Quarantelli, 1998) Conventionally, we tend to categorize various phases in relation to disaster (as pre, emergency and post disaster) for the sake of management. However one needs to question whether disaster is a 'reality' or a 'construct' as it has been made out to be through these categorizations. (Jigyasu, 2004) The complexity and dynamism of vulnerabilities and capacities, makes 'disaster' a very loose and vague denomination, which does not have a starting or an ending point as these points can only be measured by developing objective indicators. Therefore, disaster situations need to be looked in a continuum, as actions taken during various phases have an impact on each other. This means that we need to establish backward and forward linkages while deciding various actions and interventions at various stages. vulnerability and development

This also implies that disaster can only be measured for the phenomenological discussion of the nature and the increase and decrease in vulnerabilities and capacities before and in response to specific natural hazards. Therefore, discussion of phases as pre-disaster or post disaster will not be appropriate.

Rather, the shifts in magnitude, scale and severity of vulnerabilities and capacities need to be looked at various stages with reference to the particular hazard event, that catalyses these processes into disaster situation. These stages are: In the normal situation (without impact of natural hazard). In the emergency situation (when the natural hazard has struck, extending to a few days or months after the event) in the transition phase from relief to recovery (extending to a few months to a year after the event) in the rehabilitation phase (over the years, when the rehabilitation process takes place). After the rehabilitation phase in the long run (Cannon-Davis-Wisner, 1997) (to assess the impact of post natural risks interventions). This model essentially describes how vulnerability situations develop by elaborating on the causal relationships. However, the model is linear in its conception and conceives disaster as an end-product. In the above discussion, development is a fundamental context within which all the above situations are intervened and take shape on the ground. Such a development is either externally driven or driven by the local communities. Therefore, in the disaster management cycle, development is not a phase in itself, rather it interacts and affects separately, each of the above situations and in turn, each of them are affected among themselves, ultimately shaping the developmental context itself

To Realise Of Risks

However disasters are very much a part of the overall risk framework. The term 'Risk' is understood as the product of Risks and Vulnerability. In conventional terms, the risk of a site or a property is understood in relation to one hazard such as earthquake, floods etc. and vulnerability is understood as exposure of that site or property to that particular hazard in focus at one particular time. Moreover vulnerability is understood mainly in physical terms. Contrary to conventional means, the integrated method of understanding risks to a site or property may stem from exposure to one or more hazards and other determinants. This implies that we need to facilitate a holistic understanding of risks from various hazard sources (fires, earthquakes etc.) as well as to understand vulnerability processes, and at the same time, to incorporate specific actions / strategies for specific kinds of hazards. This

also implies that we need to link physical vulnerability of both movable and immovable aspects of a site or property to that resulting from social, economic and under development processes. For example, the risks to the physical fabric are not only linked to the structural weakness but area also inherently linked to the social, political and economic context in which they are located. Besides, the local meanings and perceptions are also worth taking into account, while understanding risks and disasters.

Post Disaster Re Constructions and Integrated Risk Management

'Risk management' is a well-developed subject with well-defined components and universally accepted terms and definitions. It includes various proactive tools, techniques, strategies and actions for risk assessment and control at various stages with respect to a disaster situation. Therefore we need to organize the subject of risk preparedness, primarily under the universally accepted phases of risk management (e.g. risk identification and analysis, risk evaluation, monitoring, prevention/itigation, disaster preparedness, emergency response, long term recovery etc.) and then address the various types of risks. The risk management framework is a prerequisite for a disaster management framework. This implies that various activities undertaken during preparedness, response and recovery phase of disaster must be subject to risk identification, analysis, assessment and control.

Various activities, tools and techniques for risk management in post disaster situation need to be part of the integrated risk management, so that their interrelationship with activities undertaken in pre-disaster and emergency situation can be explicitly articulated, besides the implications of the actions in the long-term perspective.

Integrated Risk Assessment

Risk Assessment undertaken, as part of integrated risk management will involve integrated vulnerability analysis on one hand and integrated hazard mapping on the other. Integrated vulnerability analysis involves taking into consideration social, political, economic and attitudinal aspects of vulnerability along with physical aspects for their impact on each other. Moreover vulnerability is not only considered

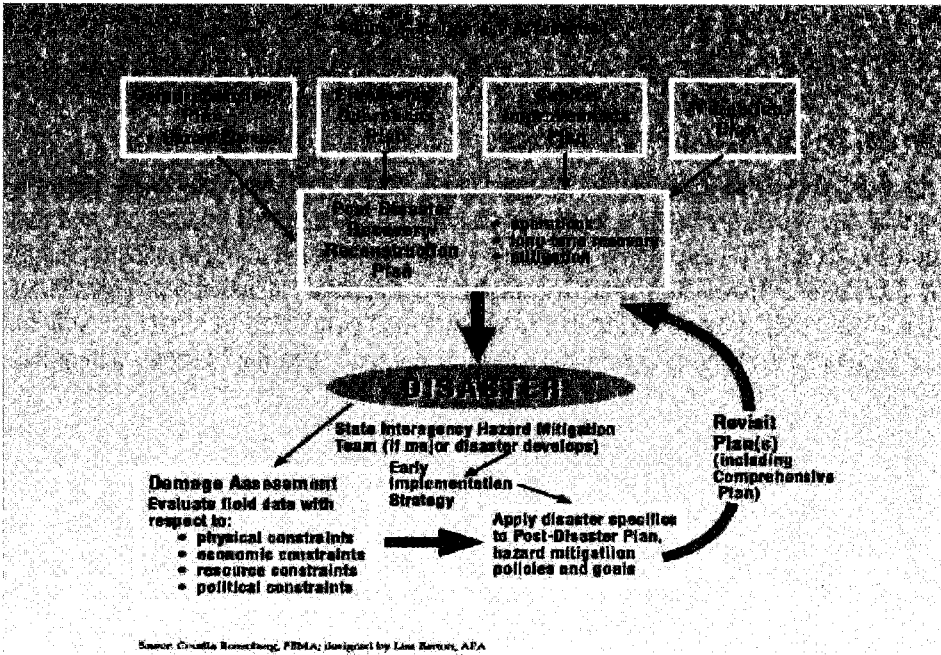
as a product in the form of exposure to one or more risks at a particular time but also as a process over time.

Damage and Needs for Reconstruction

Disaster assessment refers to the survey and information collection activities carried out to determine the effects of a disaster on the affected population, and their resulting needs. The assessment process is usually conducted at two distinct stages of a disaster: Immediately after a disaster, a preliminary assessment (sometimes called rapid assessment or situation assessment) is conducted to obtain an early but full assessment of the geographical extent of damage, and the number, categories, location, and circumstances of the disaster-affected population. This assessment provides a general picture of where people are, what condition they are in, what they are doing, what their needs and resources are, and what services are still available to them. It usually takes the form of an initial reconnaissance that can guide search-and-rescue and relief operations. Preliminary thematic maps that locate affected or damaged sites and infrastructure can then be produced from the results of this assessment. As needs change day by day in the immediate aftermath of a disaster first, for rescue equipment, excavators and medical equipment, then food, medicine, clothing, and shelter), a series of rapid assessments may be needed. Their results provide valuable baseline data and a basis for monitoring the post-disaster situation to determine whether it is improving or deteriorating over time. At a later stage, a more detailed assessment is done to collect more specific information about the nature, location, and extent of losses and damages, and the resulting needs of the affected populations. The more specific information collected from this assessment are useful for planning and implementing reconstruction programs.

Damage Assessment

Collects the following types of information which are most valuable for the purpose of reconstruction planning. Damage to housing and buildings, damage to livelihood (e.g., shops of small traders, salt pans, industrial units), damage to agriculture and animal husbandry (crops, fruit trees, livestock), damage to services (educational, health, recreational facilities) and government buildings, damage to infrastructure and utilities (water supply, sewerage, roads, bridges, electricity, telecommunications, etc.)



Source: Cecelia Rosenberg, FEMA; designed by Lisa Barton, APA

In each of the above, specialists in each sector determine the damage. Structural or civil engineers, for example, examine the damage to housing, commercial and public buildings, physical infrastructure, and utilities. Agronomists and agricultural specialists determine losses to crops and forests, among others, and economists determine damages to the local economy. Their implementation extends much further. Many special plans developed by local governments also deserve such attention.

Neighborhood plans, for instance, allow an ideal opportunity to sharpen the focus of post-disaster planning. Neighborhoods in hazard-prone areas, especially if they are developed with a high level of citizen participation, can serve well to raise citizen awareness of the need for preparedness and mitigation and of possibilities for more sustainable methods of rebuilding (such as improved energy efficiency in more

disaster-resistant structures) in the aftermath of a disaster. Could better storm water detention systems that resulted in the construction of swales or that took better advantage of natural runoff patterns ease a neighborhood flooding problem? Might fire-resistant landscaping requirements for a subdivision or homeowners association help avert disaster? What access patterns could be changed to benefit residents and improve public safety? Under what conditions treasured but vulnerable historic buildings and homes should be demolished? Linking the post-disaster element with the development of neighborhood plans presents an opportunity to nail down details of post-disaster reconstruction and mitigation that might otherwise escape notice in the larger scheme of things. (PAS Report, 2005)

While damage assessment is usually the work of sector specialists, it is essential that the disaster-affected families participate in damage assessment surveys involving their housing units, as discussed below.

Needs Assessment

Determines the level and types of assistance required by the affected population, their priorities, and their preferred strategies to meet these priorities. Common needs include: housing needs, livelihood needs, personal needs (of the injured, handicapped, orphaned, those suffering from disaster caused trauma), and needs for services (water supply and sanitation, electricity, schools, health centers. The information collected from this assessment help in identifying and prioritizing needs that lead to appropriate types of assistance and inputs for reconstruction in the medium and long term.

Given these problems, it is axiomatic that reconstruction would be more effective and less onerous if it were well planned. Planning needs to be holistic, in that it is not merely a question of replacing damaged building stock and infrastructure, but also one of reconstructing communities, ensuring equity, access to resources and equality of opportunity for the most disadvantaged members of those communities, and reducing community vulnerability to hazards. (Lewis, 1999)

Methodology of Disaster Assessment **chnical evaluation of structural damage.**

The objective of this assessment is to determine the precise nature and extent of damage to all buildings in disaster affected areas, using pre-defined categories in which to classify structural damage. Different categories represent different degrees of damage. Judgments concerning damage categories are made on the basis of direct onsite visual evaluation of building exteriors,

Harmful and Needs for Reconstruction

Taking, into account damage to the foundation, load bearing walls, ceilings, or roofs of the structure. This is usually conducted through a street-by-street house by-house survey in the disaster-affected area. It is essential that the surveyor/assessor consult with each affected family during this assessment to develop a reasonable consensus on the method and basis for classifying the affected housing unit under a given damage category. (Quarantelli, 1998) It is also important for the surveyor/assessor to evaluate every structure within the area, even if the structure is not affected. This ensures that isolated undamaged homes are identified and recorded, and also helps pinpoint the specific cause of damage to those that are affected. The information obtained from this assessment provides the basis for the level of housing assistance allocated to affected families. The latter should be informed of the damage assessment results as soon as possible, providing clear interpretation of the assessment findings and its financial assistance implications.

Inventory of Affected Assets.

This involves a detailed survey of all losses that resulted from the disaster, taking into account loss of assets and income. Important inventory categories include such assets as shops, workshops or worksheets, stalls, tools/ equipment, livestock. When compiling these inventories, the owners/household heads may be required to countersign them to minimize the possibility of subsequent claims or disputes regarding claims. It's on the basis of this assessment that special financial provisions are given to the affected people. (Anderson-Woodrow, 1989)

This involves more detailed surveys relying on interviews of a sample of the affected population and on collecting statistical information on the affected population. Generally, sample surveys are used for needs assessment, on the basis of which appropriate types of assistance and interventions are determined. There are

several different types of sampling Techniques that can be used for conducting needs assessment: simple random sampling. Every member of the target population is equally likely to be selected, and the selection of a particular member of the target population has no effect on the other selection; systematic random sampling. Every fifth or tenth member on a numbered list is chosen; stratified random sampling. The population is divided into categories; members from each category are then selected by simple or systematic random sampling; then combined to give an overall sample; and, cluster sampling. The sample is restricted to a limited number of geographical areas ("clusters"); for each of the clusters chosen, a sample is selected by simple or random sampling. Sub samples are then combined to get an overall sample

Tools for Post Disaster Reconstruction

Checklists or Worksheets are the most common and perhaps the easiest tool used in disaster assessment. A checklist or worksheet is simply an abbreviated list that provides the assessor with a comprehensive, yet flexible guide to the types of information needed to be collected. (Cannon-Davis-Wisner, 1997) It is usually a form structured and formatted in such a way that surveyors can easily remember key points and ask certain questions to fill it out. It is essential that the format of the checklist is standardized and is as simple as possible to facilitate the process of analysis and collation. Likewise there should be common understanding of the terminology used and consistency in spelling names, e.g., of the affected villages or towns to avoid confusion and ensure that the information collected can be presented in a way that is most helpful to the users. Formatted checklists are normally used for damage assessments. Questionnaires are most commonly used in needs assessments. A questionnaire is simply a list of questions used for interviewing the total affected population targeted for the assessment survey, or a sample of this population. The individual being interviewed can answer the questions orally or in writing. Questionnaires are useful for obtaining detailed information about the needs of the affected families and other vital statistical information about their post-disaster condition. Its tabulated results can facilitate a good analysis of the impact of a disaster at the individual and family level. Questionnaires are a more useful method for obtaining specific, detailed information for planning purposes, but are not a good tool for rapid assessments in the immediate aftermath of the disaster.

CONCLUSIONS

Following implications and conclusions can be drawn from the discussion that has been initiated in this paper: It implies establishing / strengthening the management systems of both tangible and intangible, 'historical' and 'living' dimensions of our cultural sites and properties and establishing systems which address risks to the site and property in an integrated manner through preparedness before, during and after disaster situations. After all, integrated risk management of living cultural heritage is about addressing the knowledge and skills accumulated in the past, surviving in some form in the present with a potential for reducing disaster vulnerability and increasing capacity for the future. It is about managing the change in order to link past, present and future, It implies proactive (and not merely reactive) approach, which imply not only reacting to the risks from disaster but addressing the underlying causes which create the disaster itself in pre as well as post disaster situation. Integrated Framework for Risk Management implies addressing larger forces (and not merely hazards), which put cultural heritage at risk. Risk preparedness initiatives for cultural heritage can be strengthened by integrating the concerns / needs for living heritage in the existing disaster management systems at national and state level. This requires re-addressing existing development policies and their impact on the risks to cultural heritage. Risks are a shared reality -spanning individual, village, block, district, state, nation and even region - and have to be responded with a multi-prong approach. "In the complex Indian reality, it also implies involving diverse group of stakeholders and integrating their concern in the overall policy initiatives. Considering the complexity of cultural heritage both in its scope and nature as well as the present reality, there can be no single policy initiative to address risks to cultural heritage. Rather, there have to multiple initiatives at various administrative levels through involvement of multiple stakeholders (public as well as private). This requires a dialogue and subsequent collaboration and coordination

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