

IDENTIFICATION OF LEGAL AND POLICY BARRIERS TO TIMELY  
POST-DISASTER RECONSTRUCTION AND STRATEGY  
DEVELOPMENT FOR EFFECTIVE RECOVERY PROCESSES IN  
UNITED STATES

By

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## Abstract

# IDENTIFICATION OF LEGAL AND POLICY BARRIERS TO TIMELY POST-DISASTER RECONSTRUCTION AND STRATEGY DEVELOPMENT FOR EFFECTIVE RECOVERY PROCESSES IN UNITED STATES

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Communities resilient to disasters have the ability to return to the normal state quickly and with the least possible delay; however, the causes of delays in the post-disaster recovery phase remain an important concern. Yet, different scholars have studied the long-term post disaster recovery process, barriers in the long-term disaster reconstruction have been studied rarely. This study fills the major gap in the research by identifying barriers in post disaster reconstruction and best practice to increase the speed of the recovery. In this regard, an in-depth review of more than one-hundred scholarly papers in this area was performed, policies and legal barriers to timely post-disaster recovery were identified, the identified barriers were categorized, and recommendations for ways to avoid delays in the recovery process are presented. Fifty- eight barriers were found from the past studies and, they were assigned to one of the seven disaster recovery categories. To validate the identified post-disaster reconstruction legal and policy barriers, ten practitioners and professionals with extensive experience and knowledge in emergency management were invited to participate in a semi-structured interview. Key findings suggested that lack of community consultation and improper land use determination are two major barriers to effective post-disaster reconstruction processes. The findings of this study help decision-makers to understand how the barriers cause delay in post-disaster recovery processes and propose recommendations to minimize them.

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## Chapter 1

### Introduction

Recently, high-intensity disasters have happened in the United States in the form of hurricanes and earthquakes that have had destructive impacts. Disasters affect millions of people all around the world every year, which necessitates preparedness for immediate reactions and timely recovery to return the communities to their normal life. In most cases, overlooking the natural disasters makes the communities more vulnerable to them, and eventually results in delays in achieving recovery and sustainable development after a disaster (Fothergill & Peek, 2004; Ingram et al., 2006).

#### 1.1 What is Delay in the post disaster recovery

Long-term disaster recovery begins when the affected area is cleared from chaos, crowds, and vehicles, and the process for rebuilding and reconstruction initiates. Sufficient resource allocation in the long-term phase is important to the speed of recovery, and the causes of delays in post-disaster recovery need to be identified for comprehensive and effective planning and policy making (Berke & Campanella, 2006; Moatty & Vinet, 2016). Firdhous and Karuratane (2018) recognized the temporary loss of learning opportunities and the breakdown of traditional family support, respectively, as short-term and long-term impacts of delays in the post-disaster recovery.

A shortfall of disaster recovery funds delays the developmental investments and eventually delays the recovery (Wein et al., 2011; Rouhanizadeh et al., 2019b). Delays in the recovery cause improper allocation of the resources as a short-lead need, and lead to inefficiency in the governmental response (Siriwardana et al., 2018).

At the local level, delays in the recovery postpone the formulation of disaster risk reduction programs as a short-term goal of the disaster recovery (Amaratunga et al., 2018).

## 1.2 Problem Statement

The literature demonstrates that in post-disaster recovery, the focus has been on the immediate response, and the long-term recovery has frequently been neglected (Moatty & Vinet, 2016).

In recent years, many disaster recoveries have been delayed by manmade rather than natural causes, which further acts as a barrier to recovery. Hence, to find the causes of the delays, the disaster recovery phase has been well studied, but the long-term recovery phase has not been studied in detail (Hettige et al., 2018; Rouhanizadeh et al., 2019d).

Additionally, researchers have found that all of the activities in the post-disaster reconstruction phase go through the governmental departments and agencies (Moe & Pathranarakul, 2006; Kermanshachi et al., 2019). Hence, this paper focuses on legal barriers to the post-disaster reconstruction.

## 1.3 Goal

The primary goal of this study is to improve the post-disaster recovery of affected communities and assist the policymakers in being a more effective advocate for the communities during future events. This study will make a significant effort to analyze post-disaster recovery from a legal point of view.

## 1.4 Scope and expected outcome

With the help of an in-depth review of 100 scholarly papers in the area of post-disaster reconstruction and recovery, the scope of this study is to:

- (1) Identification of legal and policy barriers that cause delays in post- disaster recovery process;
- (2) Categorization of the identified barriers;
- (3) Validation of the identified barriers from officials and practitioners in the disaster recovery;

(4) and recommendations to decrease recovery delays, based on the identified barriers.

Expected outcome: -

The specific expected outcome from the study are: -

(1) Identification and classification of maximum number of barriers in disaster reconstruction

(2) Validation of all pre-identified barriers in disaster reconstruction.

(3) Best practices for every barrier found in this study.

### 1.5 Contribution

The results of this study will allow policymakers, like governmental organizations; stakeholders, such as volunteer groups; international agencies; disaster-stricken communities; and researchers to evaluate the legal barriers in order to achieve a sustainable recovery. Furthermore, the results will help academic scholars to further conduct research and give perception about the indicators which will increase the speed of the recovery.

### 1.6 Thesis Layout

In a brief summary, Chapter 1 of this study gives an introduction about the significance of the research topic, Problem Statement, Goal and Objectives and Contribution of the research for the future work. Chapter 2 gives an in-depth literature review about the research efforts made in the post disaster recovery. Chapter Three explains the research methodology with the help of a comprehensive review of 200 scholarly papers in the area of post-disaster reconstruction and recovery. A detailed interview protocol was developed from extensive literature and interviews were taken of different official and practitioner working in different emergency management services to

validate the work.

Comprehensive data collection is performed and expressed in Chapter 4. Chapter 5 discusses the interview questionnaire in detail. Chapter 6 gives in depth analysis of data to assess the results of respondents. Chapter 7 draws the conclusion and recommendations for future work.

## Chapter 2 Literature Review

Implementing policies and regulations during post-disaster recovery results in the appropriate and timely return of the communities and governments to their normal life. Four main categories of federal laws are initiated for disaster management: mitigation, preparedness, response, and recovery. Furthermore, local and state governments always have policies that they use while dealing with disasters. The Federal Emergency Management Agency (FEMA) is one of the primary entities that implements these legislations. The identified categories are Coordination, Location, Resource and Document, Approach and Attitude, Construction and Infrastructure, Social and Community Participation, Finance and Economic.

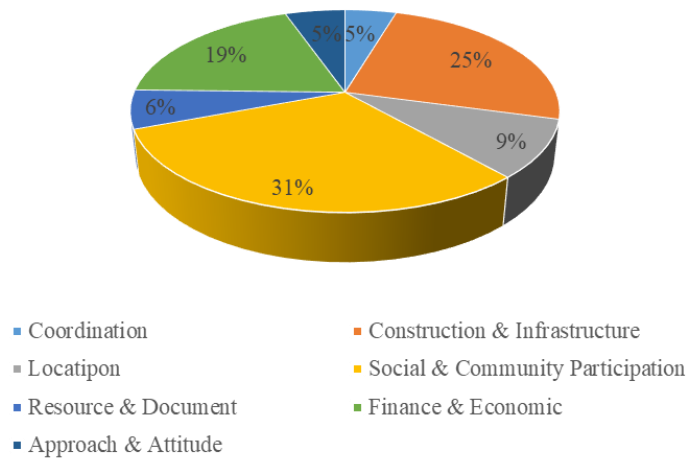


Figure 1. 1 Percentage of studied papers based on each category

### 2.1 Coordination

Coordination of all the segments of a system is required to achieve a strong and reliable product. Even though communities are increasingly taking greater responsibility for disaster management, they are not engaged in the process of disaster management policymaking (Walker et al., 2010; Rouhanizadeh et al., 2019b). A major obstacle to the

disaster preventive approach is the shared government dilemma where the higher level of government has a strong stake in promoting policy, but lower governing bodies are unwilling partners (Berke et al. 2014). Research findings show that the broader the participation of disaster-affected stakeholders is in recovery policymaking and planning, the more effective and successful are the mitigation plans and policies (Burby et al. 2006; Hanger et al., 2018). The presence of certain stakeholders, such as environmental NGOs, improves plan quality in great extent (Brody 2003; Rouhanizadeh and Kermanshachi, 2019c). The participation of those suffering from the impacts of disasters, and the ones who are the first responders after the strike of a disaster, can have significant implications because they are closely dealing with the local issues, and their experiences provide awareness to the decision makers, helping them avoid delays in recovery.

Post-disaster recovery policy and legislation have been considered by several researchers as necessities for efficient and timely coordination of the reconstruction process (Birkland, 2006). For example, after Hurricane Katrina (2005) it was demonstrated that without pre-existing legislation and policy, speedy recovery was not possible because there was no coordination among the different entities (Rotimi J.O. et al., 2009). Berke and Campanella (2006) have recommended the policies in the governmental approach such as more focus upon performance based environmental risk reduction targets, more emphasis should be placed upon land use planning, pay greater share of public infrastructure costs through insurance, government should make active participation of the local people. Inappropriate legislative can also extensively restrict the recovery progress and hinder the use of reconstruction resources and cause delays in the recovery practices (Lyons, 2009; Chang 2010). Inappropriate governmental systems and lack of the coordination may impact the speed of the recovery process too.

Therefore, there is a need to address different concerns in the coordination between different stakeholders prior and post disaster duration in order to speed up the

overall post disaster recovery process. Table 2.1 shows the list of the identified barriers which affect the speed of post disaster recovery particularly due to lack of the coordination.

Table 2. 1 Post Disaster Coordination (PC) Barriers

ID	Barriers
PC 1	Lack of consultation with community for recovery policymaking
PC 2	Poor coordination between federal and state agency recovery programs
PC 3	Weakness of pre-existing legislation for post-disaster recovery
PC 4	Inappropriate governmental system and organization for recovery
PC 5	Lack of proper coordination among provincial, district and sub-district administrative officers, NGOs and Volunteers

## 2.2 Construction and Infrastructure

Construction and reconstruction of the critical infrastructure networks are very complex processes which become more challenging when dealing with post-disaster disruptions and damages. Due to the high complexity of rehabilitation projects, it is suggested that practitioners and stakeholders adopt strategies and best practices which manage the unintended outcomes of project complexity. In this regard, Kermanshachi et al. (2016a and 2016b) developed list of prioritized strategies which overcome complexity challenges from the conception till end of project execution. In addition, Dao et al. (2016a and 2017) developed a decision-making tool which utilizes multiple sets of complexity indicators (Dao et al. 2016b) to effectively allocate human, machinery, financial, and information resources among various aspects of projects and enhance project cost and schedule performance.

A major challenge with reconstruction of the affected areas is that most homeowners are not willing to relocate after a disaster due to unclear and uncertain risks that may be encountered by relocating, but their resistance to relocation leads to delays in recovery (Bukvic et al., 2018; Rouhanizadeh and Kermanshachi, 2019a). Therefore, it is important to be very delicate in communicating with the homeowners, renters, and business holders for post-disaster buyouts or relocation programs in order to prevent any conflicts that would lead to delays in the process of recovery. Berke et al. (2012)

recommended that state and federal governments should require local adoption of coordinated comprehensive plans as an integral component of environmental protection aspect. In post-disaster conditions, an increase in the need for construction labor and materials is normal (Labadie, 2008). The demand for undamaged housing and commercial space also significantly increases (Vahanvati & Mulligan, 2017). Therefore, additional intermediacy and help by local governments or other recovery associates to ensure that relocations occur smoothly is required. Burby et al. (2006) proposed two ways to encourage local government to prepare comprehensive plans. First, the disaster mitigation act of 2000 could be amended to require that regular mitigation plan updates mandated by the legislation be integrated into local comprehensive plans, where they exist, to avoid ignorance in local government decision. Second, the flood insurance act could be amended to add the preparation of local comprehensive plans with hazard mitigation provisions as a condition for continued participation in the program.

In addition, special relocation issues are necessary for low-income homeowners, the elderly, and minorities, and these can slow down the recovery process. Many social and environmental justice arguments may emerge and need to be handled sensitively by the governors and policymakers to avoid delays in the recovery. Infrastructure service conveys the meaning of a facility that meets some public demands. Frequency of maintenance of infrastructure is a measure of the level of performance and service provision (Amaratunga et al. 2018). If maintenance interval is not appropriately determined, there is a possibility of infrastructure malfunctioning during the post-disaster recovery period, which causes delays in the recovery process. Maintenance procedures and intervals should be controlled and determined by the decision makers and policymakers. For example, the quality of a road infrastructure is substantially related to the capacity of the local governments to maintain the road (Gu et al. 2015). In all parameters, there is a strong need of in depth analysis of the construction and infrastructure barriers in post disaster recovery to address the issues stated above. Table 2.2 shows the identified barriers



that are related to the construction and infrastructure category which need to be addressed in order to speed up the recovery process.

Table 2. 2 Post Disaster Construction and Infrastructure (PCCI) Barriers

<b>ID</b>	<b>BARRIERS</b>
<b>PCI 1</b>	Slow and unorganized mass relocation in recovery process
<b>PCI 2</b>	Relocation from the impacted area to insufficient areas in order to receive temporary government-sponsored housing
<b>PCI 3</b>	Inadequate installed infrastructures to be used in recovery process.
<b>PCI 4</b>	Inappropriate infrastructure maintenance policies leading to more vulnerable infrastructures and malfunctioning in recovery process
<b>PCI 5</b>	Obstructive policies developed to eliminate nonconforming structures
<b>PCI 6</b>	Illegal construction during peak period of the recovery
<b>PCI 7</b>	Lack of controlling legislation for post-disaster blight

### 2.3 Location

Disasters initiate changes in land use to prevent rebuilding in hazard-prone areas (Burby et al., 2001). However, large-scale land-use changes rarely take place, even during the post-disaster time period, because the buildings and infrastructure affected by the disaster are not in a distinct area. Therefore, conflicts about reconstruction in high hazard areas may arise between the homeowners and the governors, causing the recovery process to slow down (Ismail et al., 2014). Also, some of the policies developed for controlling the settlements in urban and rural areas are not powerful enough to prevent the owners from constructing in unplanned or unauthorized areas (Etinay et al., 2018).

Stevens et al. (2014) concluded the specific areas of weakness in the plan quality publications are the descriptions of the coders involved in content analysis, the coding procedures, the use of the pretesting procedures and the assessment of the reliability of the data generated. Improper urbanization is one of the reasons for the increase in the number of unauthorized settlements in the rural areas near big cities (Friday et al., 2018). Increasing urbanization is considered a source of vulnerability in the literature (Moreno & Shaw, 2018).

For example, the collapse of high-rise buildings in the center of urban areas causes

the assistance disbursement alongside the area to be slow. In addition, mega projects do not usually consider the redevelopment of neighboring properties; therefore, policies must be in place to prevent such negligence and to make the redevelopment or reconstruction process as fast as possible. By understanding the areas in which plans are deficient, states can be more effective in the establishment of a cooperative and proactive policy framework aimed at achieving disaster resiliency (Berke et al. 2012). Table 2.3 shows the identified barriers that are related to the location category.

Table 2. 3 Post Disaster Location (PL) Barriers

ID	BARRIERS
PL 1	Improper land-use determination for rebuilding in high hazard areas
PL 2	Improper Urbanization rules
PL 3	Obstructive policies developed to eliminate nonconforming land-uses
PL 4	Weakness of the legislation against unplanned and unauthorized settlements in urban and rural areas
PL 5	Lack of policies against insufficient considerations to neighborhood redevelopment when developing mega projects

#### 2.4 Social and Community Participation

To attain resiliency in a society, there must be equity in a, and resources must be accessible to all parts of society (Nakagawa & Shaw, 2004). One of the characteristics of a resilient society is its ability to return to its normal condition as fast as possible (Cutter et al., 2014; Nipa et al. 2019). This is highly dependent upon the policies and legislations that have been determined by the federal and local governments (Kuwabara et al., 2008). Using statistical approach in Texas and Florida, Brody et al. (2009) empirically revealed the importance of the organizational capacity in the flood mitigation strategies, additionally giving the importance to the capable, adaptive and collaborative public decision-making institution. Therefore, the policies for post-disaster recovery should consider the social equity, as well as participation of the community, to lessen the probability of recovery delays (Chamlee-Wright & Storr, 2009). With detailed content analysis, Burby (2003) defined that in hazard mitigation policy area, if environmental, property owner groups had participated more frequently, the strength of plans, and plan implementation would have

been enhanced. In addition, there should not be any difference between people from different social classes. In this regard, the policies and legislation should be conducted in order to distribute the recovery services in an unbiased manner, and even should consider that the poor people may need more help than the others (Lindell & Prater, 2003).

The effects of natural disasters are greater on poor social classes, and they are more vulnerable to the negative effects of these events (Fatemi et al., 2017; Kermanshachi and Rouhanizadeh, 2018). Building codes, as well as land-use policies and other standards, are designed to reduce the effects of disasters and increase the resiliency of a community (McDaniels et al., 2015). However, many of the poor individuals neglect these codes in an effort to reduce their expenses (Alipour et al., 2015). This may increase the level of devastation, thereby reducing the speed of recovery. On the other hand, due to their social connections, high-income citizens have the opportunity to directly access the policymakers. The decision makers will cover their needs simply by direct negotiations. Since, when disaster happens, the poor are more vulnerable to the resulting damages, they need quicker help than the rich. When they receive assistance late, the catastrophe expands, and the time for the recovery process extends. Overall, it is most important to address these issues as these issues are repeatedly getting unaddressed causing delay in the post disaster recovery scheduled. After careful study of scholarly papers, six different indicators were found which is yet to be addressed. Table 2.4 shows the identified barriers that relate to the social and community participation category. Awareness of the vulnerabilities of residents and the different types of infrastructures, transportation networks, services, and critical facilities result in the generation of various programs that focus on disaster risk reduction, integrated strategies, structural measures, etc. (Bukvic et al., 2018), which accelerate the recovery process. Table 2.4 shows Post Disaster Social and Community Participation (PSCP) Barriers.

Table 2. 3 Post Disaster Social and Community Participation (PSCP) Barriers

ID	BARRIERS
PSCP 1	Inappropriate policies leading to fear and distrust of individual on governmental organizations
PSCP 2	Weakness of the policymakers to encourage poor people to perform prescribed actions for recovery
PSCP 3	Biased recovery service allocation for high-income people due to possibility for them to negotiate with the system
PSCP 4	Ignorance of land-use and construction standards by poor people in reconstruction process
PSCP 5	Negligence of condition of low-income victims in the regulations for recovery
PSCP 6	Weakness of policymakers in receiving public acceptance on legislation changes in the post-disaster condition

## 2.5 Resource and Document

Awareness of the vulnerabilities of residents and the different types of infrastructures, transportation networks, services, and critical facilities result in the generation of various programs that focus on disaster risk reduction, integrated strategies, structural measures, etc. (Bukvic et al., 2018), which accelerate the recovery process. One of the most important matters in post-disaster recovery is resourcing (Chang et al., 2012). The coordination of sufficient resourcing is difficult due to the complexities that arise from the large number of resources that need to be allocated (Telford & Cosgrave 2007). In fact, the affected mass competes for the resources, due to high demand, which makes the resourcing difficult for the decision makers. In this situation, a comprehensive resource database, prepared by local governments in the pre- disaster period, is a basic requirement toward optimized allocation of resources. For example, a list of historic and vulnerable structures should be prepared so that resources can be assigned to them immediately after the disaster. Inadequate and uneven disbursement of the resources affects the timing of the recovery negatively, because when there is a need somewhere for resources, in some areas extra resources are provided. In addition, documents that include the standards and codes should be updated to address requirements while recovering. Out-of-date standards cause practical problems and make the recovery process slower than normal due to their not conforming to the existing condition. Table 2.5 shows the identified

barriers that are related to the resource and document category. Over the past decades, the economic effects of disasters have significantly increased despite efforts to improve the resilience of communities (Jordan, 2012; Kermanshachi et al., 2019).

Table 2. 4 Post Disaster Resource and Document (PRD) Barriers

<b>ID</b>	<b>BARRIERS</b>
<b>PRD 1</b>	Inappropriate federal and local assistance disbursement
<b>PRD 2</b>	Lack of adequate information and awareness for recovery
<b>PRD 3</b>	Weakness of the government in preparing high quality physical and technical assistance
<b>PRD 4</b>	Inappropriate and uneven resourcing by the policymakers
<b>PRD 5</b>	Inadequate local governments' capacity for producing materials for reconstruction
<b>PRD 6</b>	Lack of list of potentially vulnerable and historic resources and structures
<b>PRD 7</b>	Lack of qualified governmental personnel for damage inspections in post-disaster condition
<b>PRD 8</b>	Lack of comprehensive resource database
<b>PRD 9</b>	Lack of local government resources to perform relocation smoothly
<b>PRD 10</b>	Lack of specific post-disaster land development codes and standards
<b>PRD 11</b>	Out-of-date standards and codes
<b>PRD 12</b>	Lack of clear regulations and standards for repair and reconstruction of historic buildings
<b>PRD 13</b>	Weakness in relocating low-income homeowners

## 2.6 Finance and Economy

Over the past decades, the economic effects of disasters have significantly increased despite efforts to improve the resilience of communities (Jordan, 2012). Researchers have long been interested in the prominent role of economic and financial issues that are caused by disasters (Andriansyah, 2015). Planning programs should be prepared in the pre-disaster period for disaster-prone areas in order to accelerate the recovery (Xu & Lu, 2012; Dalton and Burby 1994)

Many have indicated that a connection to higher levels of government increases a community's opportunity to withstand the effects of a disaster and to recover faster (Morrow, 1999). For example, informal settlements, or people living in remote rural areas which are isolated, may be neglected during post-disaster recovery, or may receive their resources and assistance later than those living in urbanized areas (Miles & Chang, 2011).

In contrast, people who have a connection with the government may have the chance to access resources quickly, including funds for recovery, technical expertise, or even required trainings. Research studies have concluded that trainings and workshops could not only increase the knowledge of the involved parties, but also improve the relationship of the participants and stakeholders (Kermanshachi et al. 2018). Nevertheless, the federal government, which acted quickly to provide relief funds in the first weeks following Katrina, has been slow to provide funds needed for permanent reconstruction, retarding recovery in several ways (Olshansky et al. 2008). A community's access to government resources is identified as a critical element in obtaining help (Bolin, 1993). In addition, more dependence on external sources of funding for recovery causes more delays in the process; therefore, the local governments to accelerate the process (Olshansky, 2006) should provide long-term recovery funding. Since the low-income class needs more funding for reconstruction, policies and legislation should be flexible so that they can receive the financial aid and loans in a speedy manner. Tough rules prevent the poor from receiving assistance, making their recovery very slow. Table 2.6 shows the identified barriers that are related to finance and economic category which need to be addressed in order to speed up the recovery process overall.

Table 2. 5 Post Disaster Finance and Economic (PFE) Barriers

<b>ID</b>	<b>BARRIERS</b>
<b>PFE 1</b>	Weakness of local governments in funding
<b>PFE 2</b>	Delay in disbursement of emergency
<b>PFE 3</b>	Lack of economic resources for recovery
<b>PFE 4</b>	Lack of long-term recovery funding programs
<b>PFE 5</b>	Income disparity and diversification of livelihoods
<b>PFE 6</b>	Lack of legislation to enable immediate access to emergency capital (loans)
<b>PFE 7</b>	Tough legislative criteria for low-income groups to obtain strong financial assistance
<b>PFE 8</b>	Unavailability of Small Business Administration (SBA) loans
<b>PFE 9</b>	Weakness or inability of housing providers and decision makers for low-income class, coping with post-disaster financial demands

## 2.7 Approach and Attitude

Planning programs should be prepared in the pre-disaster period for disaster-prone areas in order to accelerate the recovery (Xu & Lu, 2012). Dalton and Burby (1994) recommended that the planning mandates should be reinforced in the single mandate and should be structured in the goal orientated format which then will have potential to work together effectively to accomplish state policy objectives. Technical experts are familiar with many aspects of the recovery process, as well as the probable issues; therefore, neglecting their opinions on the planning process may cause the recovery to be slow (Siriwardana et al., 2018). In addition, each area has its own traditional materials and techniques for construction, according to the environmental and market availabilities (Jordan 2012). In this regard, the standards and techniques should be modified for every area to avoid delays due to the lack of availability of materials or technologies for reconstruction. The delineation of responsibilities should be very clear to avoid any intersection, repetition, and conflict, which all lead to delays in the recovery. Also, when a disaster occurs, temporary restrictions and moratoria are needed to control the reconstruction, and are a political minefield (Wei et al., 2008; Rouhanizadeh et al., 2019d). The government is overwhelmed and needs time to perform technical investigations and, by proper risk assessments, define the sufficient construction standards (Brown et al., 2008). Even though this process is required, it is a source of delays in the recovery and should be done as soon as possible to avoid a long delay. Decision making about the funding and recovery process usually arises from conflicts among the decision makers, especially when they are from different groups. In recovery, the local and federal governments are both responsible, which leads to inevitable conflicts and are obviously a source of delays. In this study, the important policy and legal barriers affecting the timely post-disaster recovery process were identified through a comprehensive literature review, including journal articles and published governmental reports. Table 2.7 shows the identified barriers that are related to approach and attitude category.

Table 2. 6 Post Disaster Post Disaster Financial and Economic (PFE) Barriers

ID	BARRIERS
<b>PAA 1</b>	Not counting technical expertise in planning process
<b>PAA 2</b>	Not considering the traditional technologies and materials in post-disaster construction techniques and standards
<b>PAA 3</b>	Not considering the local comprehensive mandates while working for legislation
<b>PAA 4</b>	Lack of clarity in roles and responsibilities for assistance
<b>PAA 5</b>	Lack of considering sustainability in recovery planning
<b>PAA 6</b>	Conflicts between local and federal government authorities for hazard mitigation and funding decision making
<b>PAA 7</b>	Complexity of legislative consenting process for reconstruction
<b>PAA 8</b>	Slow decision making and lack of proactive approach in recovery process
<b>PAA 9</b>	Lack of institutional post-disaster recovery planning and approach
<b>PAA 10</b>	Lack of moratoria and temporary restrictions
<b>PAA 11</b>	Lack of clarity of moratoria and temporary restrictions
<b>PAA 12</b>	Lack of phase or triaged moratorium which is specific to the type of permit and not generic
<b>PAA 13</b>	Lack of considering emergency exemptions in environmental regulation development

## 2.8 Summary

This chapter contains an extensive literature review about the barriers in long term post disaster reconstruction and recovery. More than 100 scholarly papers have been studied and findings of barriers from each case have been categorized and addressed accordingly.



## Chapter 3

### Research Method

In this study, the important policy and legal barriers affecting the timely post-disaster recovery process were identified through an in-depth literature review, including journal articles and published governmental reports. The database was formed by a comprehensive review of 100 research and review papers, which thoroughly considered every aspect of the post-disaster recovery, such as the existing conditions of the disaster-prone areas, and legislation and governmental policies of different parts of the United States where the disaster occurred. Profound research was performed on different types of disasters, such as hurricanes, earthquakes, floods, and typhoons. In the second step, 58 barriers were identified by analyzing the selected and studied papers. The identified barriers were then categorized into seven groups about the literature, specifically due to Jordan (2012); Dwyer & Horney (2014); Boyd et al. (2014); Horney et al. (2017). The categories included coordination, construction and infrastructure, location, social and community participation, resource and documentation, finance and economic issues, and approach and attitude. After identification of the barriers delaying post disaster recovery, systematic interviews were taken in which different officials and practitioners were involved. They were asked some questions about disaster recovery policies, policies which act as a barrier for disaster recovery and overall efficiency of the disaster recovery process. The categories, corresponding barriers and input from the interviews were interpreted and analyzed comprehensively to define the reasons for the barriers and how they affect the recovery process. Finally, appropriate recommendations were offered in order to reduce delays in the post-disaster recovery process. Figure 1 shows schematic representation of the methodology for this study.

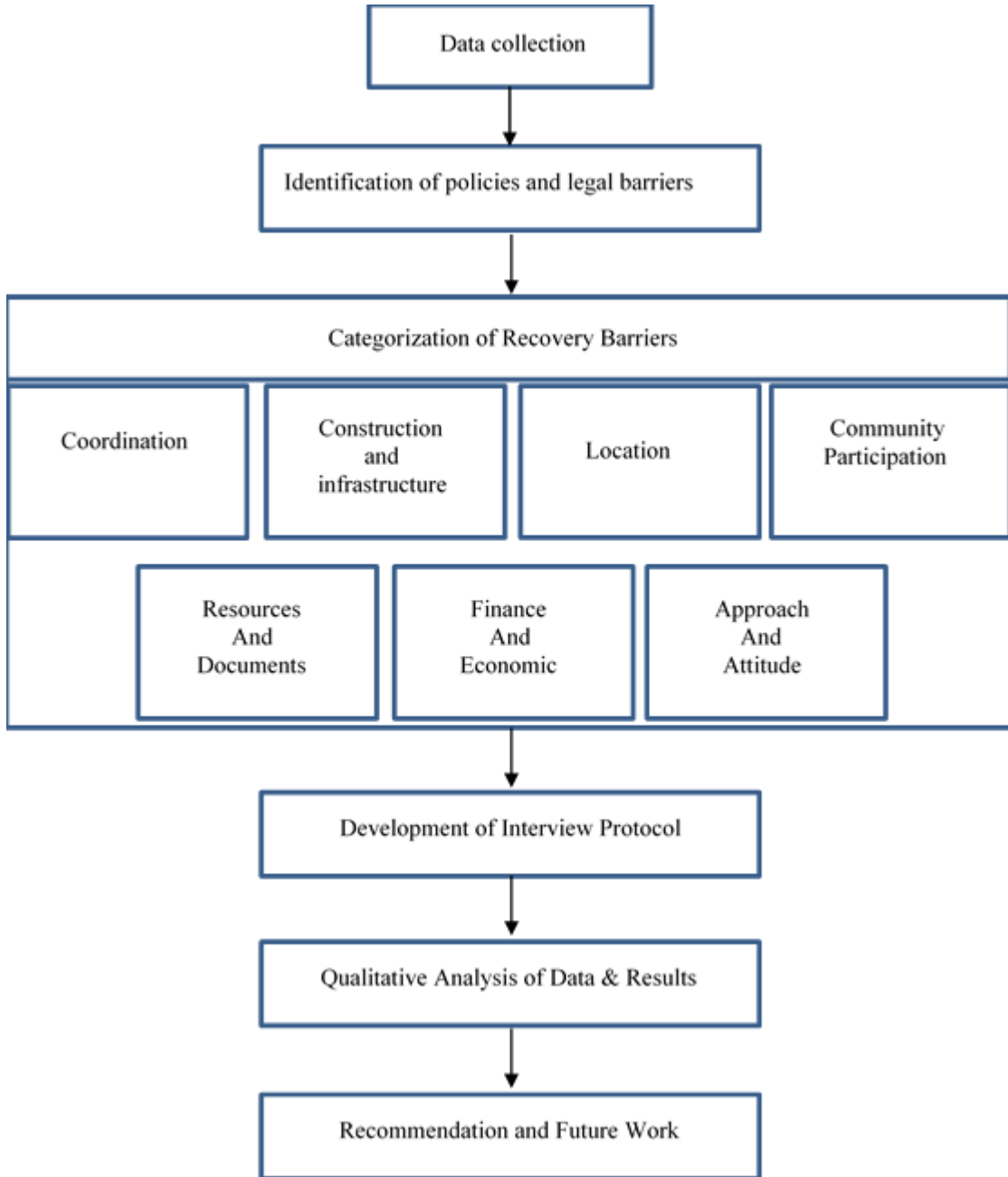


Figure 3. 1 Proposed Method.

### 3.1 Summary

This chapter explains the method chosen by the author to collect data and identify barriers, the classification of barriers in seven categories and validation by interview further recommending best practices and recommendations for future work.

Chapter 4  
Data Collection

After careful finding of 58 barriers for post disaster recovery and categorized them according to their significance, the interviews were taken of different emergency management executives and officers and academicians in the United States. 213 different federal, state and local recovery expertise were contacted with a scheduled phone interview. After consistent follow-up and scheduling timeframe, 10 officials from different states agreed to participate in the interview. Figure below shows different states in United States from where officials in the interview were targeted.

Table 4. 1. List of Professionals participated in the interview process.

PARTICIPANT	PROFESSIONALS	GEOGRAPHIC LOCATION
<b>P1</b>	Director of Emergency Disaster Services, Texas Division, The Salvation Army	Texas
<b>P2</b>	CEO/ Executive Director, Habitat for Humanity, Broward Florida Division	Florida
<b>P3</b>	OHSEP Director, Louisiana	Louisiana
<b>P4</b>	Professor, Department of Civil Engineering, University of New Orleans	New Orleans, Louisiana
<b>P5</b>	Director of Homeland Security and Preparedness for Ascension Parish Louisiana	Louisiana
<b>P6</b>	Executive Director, Habitat for Humanity- Middle keys	Florida
<b>P7</b>	Mitigation Recovery Section Chief for Massachusetts Emergency Management Agency	Massachusetts
<b>P8</b>	Senior Advisor, Federal Emergency and Management Agency (FEMA)	Washington DC.
<b>P9</b>	Lac Attorney for Federal Emergency and Management Agency	Washington DC.
<b>P10</b>	Environmental Engineer, Adura Group	Louisiana

The primary purpose to take interviews was to ask them about post disaster recovery barriers and policies implemented for recovery. Additionally, that data will validate the recovery barriers found in the literature. We started the interview process with background questions of interviewee such as What is current occupation of the interviewee? What is level of education of the interviewee? What disasters the interviewee

have been involved in? to get the perfect analysis of the interviewee. After analyzing the background of the interviewee, we divided the questions in the interview in several sections such as Economic Post Disaster Recovery Barriers (Economic PDRB), Social Post Disaster Recovery Barriers (Social PDRB), Infrastructure and Transportation, Environmental and Policy and legal.

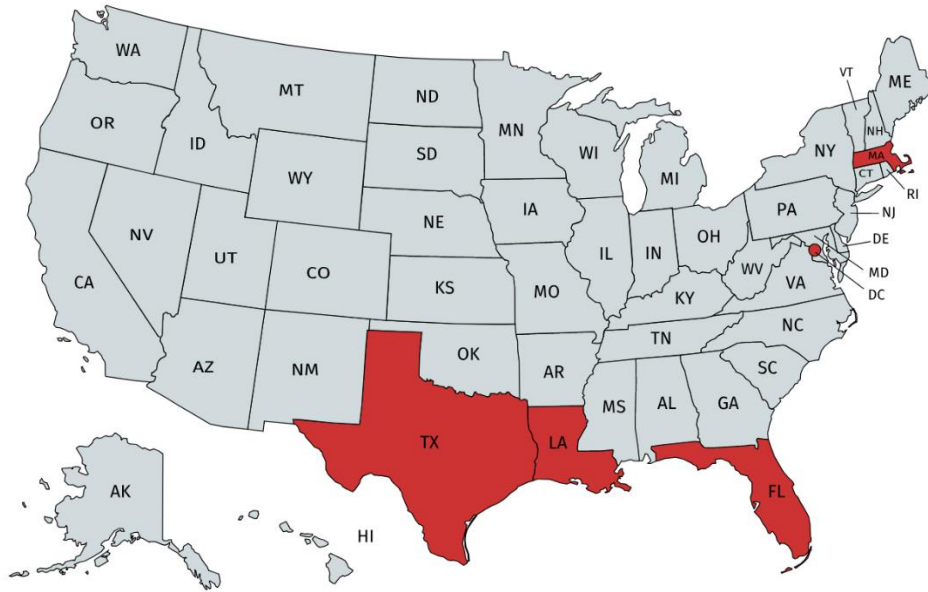


Figure 4. 1 Representation of practitioners according to their states

Interview participant #1

The participant is Salvation Army Services Director for the State of Texas. Southern territory manager who works with a team of nine. They make sure all volunteers are trained and equipped to respond to emergencies. They raise funds for recovery after initial response.

(Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials.

(A) The interviewee indicated that during hurricane Harvey, many mobile homes were affected by flooding. The water rose high enough to reach the wood floors and substrate, and over time they begin to disintegrate. Most of these people do not have insurance on their homes, so they have to wait for FEMA resources. FEMA resources began reaching these people 8 months after the initial storm causing very few resources to start. For non-profits, a big issue is fundraising. Their emergency funds reserves are shrinking each year. With more and more nonprofits being created each year, finding a sustainable funding program is becoming increasingly difficult. The biggest barrier is affordable temporary housing after disasters. After Harvey, 70,000 people needed temporary housing. Today, there are still 1400 people living in FEMA mobile homes, the repair of which is difficult.

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery, social contacts during recovery and their own way to prioritize the recovery barriers.

(A) One of the experts commented that all recovery could be guided by the local community. If a community is organized and better prepared before the disaster hits, they are in a much better position than the communities that do not have plans in place. At the county level, communities form Long Term Recovery Committees; these committees are responsible for accessing the resources available to them after disasters. In successful recovery, government, industries and private stakeholders should work together.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees.

(A) This interviewee suggested that sometimes the resources are privately owned, FEMA can access some of the resources at the state's request such as food and necessity. But, there is no policy or legal issue with the recovery effort, since the recovery begins at the local level, the most common issue is that some communities have no plan of action in place.

#### Interview participant #2

The participant is CEO/Executive Director, Habitat for Humanity, Broward Florida Division

(Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials.

(A) Giving specific importance to the flood insurance, interviewee explained that the person must have a flood insurance. In practice, majority of the properties in Florida

are either self-inured or not covered by flood insurance. If he or she does not have a flood insurance then they are on their own to repair and recover. With the help of flood insurance, people can file a claim and Individual assistance can be implemented.

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery process, Social contacts during recovery and their own way to prioritize the recovery barriers.

(A) After disasters, sharks and vultures tend to come out. This is why the news media is so important. They can help keep the public informed on scams that are taking place, what (businesses/facilities) are open, and the status of the situation. One of the barriers to post-disaster recovery is finding people that are capable of doing repair work for a fair price.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery and their way to prioritize the recovery barriers in Infrastructure and Transportation.

(A) Though, Florida is 95% recovered from hurricane Irma, housing and infrastructure took 30 months recovery time. In addition, \$600 million in FEMA funding is still coming. Hence funding availability in the sector of transportation and infrastructure is an effective barrier in post disaster recovery.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees.

(A) As a solution, Practitioner mentioned that Florida needs better county-level regulations for resource allocation. A major issue is that in order to begin repairs on damaged houses, the owner must get a denial form from insurance (because water damage

is not covered), apply for FEMA relief, and then be placed on the waiting list. Navigating through insurance is a big hinderance to recovery.

Interview participant #3

The participant is the Director of Livingston Parish Office of Homeland Security and Emergency Preparedness, Louisiana.

(Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials.

(A) The interviewee explained that Individual system and Public Assistance are the two systems during the economic recovery. As government specifically work in Public Assistance, Not knowing what rules are going to be implemented increase the time of the recovery. Also expecting the perfect recovery which don't happen in the reality delays the recovery.

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery process, Social contacts during recovery and their own way to prioritize the recovery barriers.

(A) Communities did participate in few disaster recoveries but the implementation in the rightful way takes time and the wait period in the recovery process is quite long.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery and their way to prioritize the recovery barriers in Infrastructure and Transportation.



(A) The priority of the recovery process after the disaster is to quickly repair so people can safely reach to their home (Evacuation of people) and it increases the speed of the disaster which did happen in Hurricane Katrina.

(Q) Considering the effects of Environmental barriers, the questions were asked such as impact of late removal of residual on the recovery process and their way to prioritize the environmental barriers.

(A) As a response to these questions, the officer explained that the debris is present just after the disaster and during the final stages. In the final stages, the debris removal overwhelms the people in the system of disaster recovery process because of repetitive calls during the process prior to debris removal.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees.

(A) One of the practitioners mentioned that the main policy which affects the disaster recovery speed is funding. The expense during the recovery is sometimes quite high and the financial capability is low. In these scenarios, the disbursement of funds by government takes additional 6 months to 1 year in addition to the lengthy process. During the recovery period in hurricane Katrina, the federal government funded local government. The recovery was fast. However, it did not happen again till now. There are some weaknesses, but the main weakness is sudden change of policies by federal agencies. The Local government contracts get investigated for different reasons. The investigation run in the circle for funding and sometimes the funding gets allotted very late.

#### Interview participant #4

The expert participated in the interview was an academician from University of New Orleans.

(Q) In order to get in-depth analysis of economic barriers during post disaster

recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials.

(A) Even though interviewee did not experience the severe disasters, after attending different meetings with professionals, he came to know that many poor people lost their documents during the disaster recovery. Additionally, they did not have National Flood Insurance which was big trouble. Hence, they waited too long to get the Assistance in the recovery process. Being poor can cause problems for two aspects, one is not having the documents and secondly not having the flood insurance. Some of the black people were asked to do things which they did not totally understand. Level of education, cultural affect the process of the recovery as those people did not have the clear understanding the process. Some of the people were not be able to get funding. Funding distribution was done by damage of the property value. Higher the property value, easy to get the funding due to damage.

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery process, Social contacts during recovery and their own way to prioritize the recovery barriers

(A) Interviewee disclosed that some of the black people were asked to do things which they did not totally understand. Level of education, cultural affect the process of the recovery as those people did not have the clear understanding the process. Federal and state government had poor cooperation during the Hurricane Katrina. FEMA first response was not good. It was political patronization. The communication was not that good. Half the city was dispersed in the country. Local news set up a website for announcement. Unless

and until you do have access, you were supposed to see what is going on or else you are more in black. Most of the city did not get power till 3 months after the disasters. Traffic lights were down. In terms of the recovery, problems were skilled labors were not present, con artist were present. Qualified contractors were not available. The workers were not reliable. However, Hispanic workers helped during the recovery with great labor force and Churches helped a lot during the recovery by giving free labor too. They recovered their property completely after 8 months. There was conflict between NGO and federal organization. Speaking about family connections in the government or organization might help to evacuate from the disaster point. But in the short period of time, these connections will not help.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery and their way to prioritize the recovery barriers in Infrastructure and Transportation.

(A) The Academician expressed that during the recovery of the Infrastructure and Transportation systems, there were different barriers present such as all the power was down; big transmission lines were down. They had trouble to have power from the powerplant in the city. Although, the bridges and highways were recovered quickly and recovered after 3 months, nevertheless, pump stations were flooded and took a long time to repair those. Hence temporary pumps were used for a while. These all temporary adjustments caused reduction in the speed of the recovery.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees

(A) The interviewee keenly pointed out that the predetermined planning was not present as many things were planned as per the past recovery experience and the

necessity rather than full scale disaster. There was conflict between FEMA policy and State policy. FEMA act, Stafford act had some problem particularly selecting the method for the recovery. Resources of the federal government were used tremendously which ultimately increases the time for the recovery. Lack of flood insurance and lack of qualified workman, contractors and materials.

Interview participant #5

The participating officer was Director of Homeland Security and Preparedness for Ascension Parish Louisiana.

(Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials.

(A) Practitioner gave specific example of economic barrier as If we have a disaster in low moderate income jurisdiction area, analyst will see that people living in that area may not have clear title for their home. When affected people will go to FEMA to submit the claim, they have to be the Owner of their home in order to get a claim. A lot of the people living in those areas are renters and hence cannot get the assistance if one is a renter. Less challenges one face in other disasters as they have covered with the flood insurance. When it comes down to the actual spending of the money, emergency management officers use disaster contingency funds which they use initially to respond for safety purposes. In Ascension Parish Louisiana, payment is done locally but reimbursement is done by the Federal government based upon the declared percentage which is 75% most of the time. So, local government has to provide 25%. The officers provide the funding and request for reimbursement. If the people do not have the insurance, they can claim other FEMA claims,

highest by \$30000-33000. If they are not having insurance and they are in the flood zone, they will have to build the house by their own.

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery process, Social contacts during recovery and their own way to prioritize the recovery barriers

(A) If an affected person has a second language as English, officers have to setup disaster recovery centers which is owned by FEMA where the translators should be present. The language barriers is the one which officials can see during the mega disaster recovery process. Level of education hinders understanding similar policy, getting access to the technology to check the claim and documentations. There are 2 types of recovery, one is individual from homeowners other is Government. Professionals have not seen increase the pace of government it is same in pace. but for the individual recovery case, it depends upon many factors such as do they own the house, do they have the insurance, money to rebuild. If one does not have flood insurance then he or she is on their own to rebuild. If one has a flood insurance and have filed a claim to FEMA, he or she is close to the hope. Social media has been critical clue. If officers have some issues, they put it into our social media like Facebook where they can get local access television to put information to file the claim to help the recover. In case of coordination of NGOs and organization, Ascension Parish Louisiana uses the "Unified command", where all the local government agency is present including local parish government or county government, sheriff office, municipalities, mayors, chief of police which make collective decision on how to respond the disaster.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery and their way to prioritize the recovery barriers in Infrastructure and Transportation.

(A) In transportation and Infrastructure development, utility is the first priority. For example, in no distractive testing of base of the property FEMA does not going to approve that, it will walk up and see the bridge which is collapsed. If you provide the proof of testing such as ground penetration testing, still FEMA will not approve that. It will not pay for the damage, they will assist you by taking picture of the accident if they see the damage. But infrastructure, utilities, railways bridges are the key things to look during the evacuation round.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees

(A) In terms of policy planning and conflicts due to policies, Stafford act needs to be updated. The damage to the roadways, previously one sent they appeal back to the same person that denied the claim at the first place and it needs to be approved and determined by specific board of the department. In legislation weakness, local codes and local laws needs to be updated. During 2016 floods, Louisiana coordinators stated that one has to build 3 feet above historic inundation but when food came, officers found that it was 4 ft above the historic level that one had. So one had to go back and modify that ordinates because it would have added 7 foot to the building code, so one had to modify it to have national average of 1 foot above base flood elevation. Nevertheless, if one has many homes are flooded, everybody is competing for the same labors and resources, yet it is limited so it takes time. As a solution for preplanning, officials can place emergency contracts in place that can monitor debris monitoring firm and debris removal firm. That firm subcontracts out the debris removal individual all over the south east and south and southern USA so they can come in and deploy so they should have enough resources for debris removal. Individual housing recovery is different program where Government cannot interfere in recovery, there were couple of programs in Louisiana where Louisiana get RSP

for the contractors for the shelter and home programs where they get one room available and put one back in the house till one get rest of it to complete. In case of resource allocation, professionals have to try to make sure the resources and equipment are present as much as can to need address the disaster as per the jurisdiction in case of delay.

#### Interview Participant #6

The participant is an Executive Director Habitat for Humanity- Middle Keys.

(Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recovery. Different responses were collected from different officials.

(A) The interviewee explained by saying that in coastal locations, flood, wind, and hurricane insurance are required. However, these are very expensive. Therefore, the elderly population and lineage families (lower income families that have passed their homes down through the generations) are often under or uninsured. When a storm hits and their houses are damaged or destroyed, they are the ones that must apply for FEMA aid or live in FEMA trailers. For example, the 88 year old librarian of Marathon did not have insurance on her flat, low-lying home that was built in the 1970s. After hurricane Irma, volunteers came in and tore everything out of her home (to try and prevent mold). Then the volunteers left. This elderly woman had no money or help to put her home back together. She applied for FEMA aid and received \$9000. Because Habitat for Humanity used volunteer labor to rebuild her home, it cost her \$30,000. If she had been forced to use a contractor, it would have cost her \$150,000. But she only received \$9000. For anyone to receive aid from a nonprofit or the government, they must fill out tedious paperwork (for each entity they are applying to). People who have suffered a disaster do not have the time or energy for this,

and often times, just abandon the entire process. And go without needed repairs. As a one of the solution for recovery is responses to disasters should be more organized. Only the needed items (and reasonable quantities) should be brought in, when asked for so that there is a place to store them and so they can be distributed efficiently. For the tedious paperwork, it needs to be streamlined. All the nonprofits and governmental agencies need to use the same form. (They require the same information already). This will save victims time, and encourage recovery.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery and their way to prioritize the recovery barriers in Infrastructure and Transportation.

(A) In the Middle Keys, the infrastructure, specifically is the first to recover. This is because there is a large budget for infrastructure recovery and no time is wasted in beginning the process. Although, 18 Months after Irma, the infrastructure is almost entirely rebuilt, but people are still living in FEMA trailers. As it shows inadequacy of the recovery development, it acts as a barrier in post disaster recovery.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees

(A) The interviewee mentioned that demand of the same resource may sometime cause reduction in the speed of the recovery. He further explained his opinion by giving an example that after a storm, residents often live in hotels/motels and churches. When masses of volunteers come to help, they require the same hotel rooms and church space that residents are already occupying.

#### Interview participant #7

The participant is a mitigation recovery section chief for Massachusetts Emergency



Management Agency.

(Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials.

(A) The issue with funding is usually the gap in between identification of funding and availability of funding. Especially in Texas and Louisiana, in poor communities, FEMA or FHWA will just do the repairs and they will do the emergency repair work, but the communities require assistance in the funding for the recovery process. Hence, they must wait for the funding. So, it takes long time to deliver the federal recovery. Not the short term (response) but the public infrastructure, municipal losses and long-term housing projects. FHWA is better in funding but they specifically target upon transportation. In order to improve the mitigation process, they have to approve it but it takes sometimes years for them to approve those. So many mitigation opportunities in transportation don't happen due to this. Under FEMA PA there are 4-6 mitigation which applies to repairs of damage. FEMA is limited by number of available competence staff. When there is lot of disasters, FEMA and local government demand for local expertise. The recovery factor is high and FEMA does not have the access to it. So, currently what they do in Massachusetts is they do local hires to assess the particular problem where work product suffers. These are federal, state and local tri party grants which is written badly in the first place, state and local has to work on it to make it right. In typically, it is not the in-place policies that delay things, it is lack of prior planning and prior policies. Right now, Massachusetts is developing state recovery framework plan so that if we were to get hit by bigger disaster, we can escalate the recovery to get a certain threshold to deal with the emergency management situations. Louisiana

first went through this. After Sandy, the state of New York backed into larger stakeholder groups. If you have all of the planning ahead, people get aware of it which will definitely speed up the recovery. Nevertheless, in front range flood in Colorado, they did not know CDBG- DR from nothing. Ultimately, there is lack of policy and planning that affects you more. In FEMA region where we work, mitigation branch don't manage the workflow in the unified manner in their system. They do not have clear workflow. In program management, they don't have the infrastructure to manage the program as quickly as it should be. FEMA antiquated the way they have implemented several programs in disaster, particularly in the management aspect.

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery process, Social contacts during recovery and their own way to prioritize the recovery barriers

(A) There are very specific areas where the community involvement is the key in the recovery. FEMA, HUD and CDBG- DR can fund the elevation type project buyouts located in the flood area. They try making the public and investors aware and advocating the concern like help. Other than that, too many voices confuse you on whom to believe. During Ike, I managed the gulf county program in post Ike and the county government looks very key. The Bolivar Peninsula is the long skinny low peninsula which wiped out after Hurricane Ike. The people got aware of this incident through advertising and people voluntarily participated. During the same time, FEMA deployed Emergency Support Function (ESF)-14 group to the area, they worked with community leaders and used Bolivar blue print to build a new future of how bolivar should recover. So there was a very active role driven through FEMA with having expertise to guide it. But if you have poor leadership, poor organization and you just have public meetings that are pretty shorted down, nothing will happen. In the involvement of community, you should have an executive committee, a little bit larger group of project management team and different stakeholders. The recovery

efforts are done by FEMA and you have the guidelines of what to do. However, the improvements should be done from bottom instead of the top. Therefore, planning and coordination of local level and state level is what is important. Federal governments are large and slow. During the rapid large fire in California, the federal government required one report to be done but the documentation is huge. Therefore, the bureaucracy is slow and the approach is wrong. In Texas wildfire, right after the Ike and half of the middle part of the state was burned down. The state and region were not used to have wildfire over there. They used to have flood and occasionally hurricane. Therefore, they were totally unprepared. Same thing was happened with front range flooding Colorado, they used to prepare for the wildfire but when they got flooded. So planning is key. NGOs were greatly helped if they are planned and in the process of the recovery. So, we have to prepare strong state VOAD (Volunteer Organization Act in Disaster). The state and local organization also participate in it. It will catalog the things that they need to bring in the table. They operate in your recovery framework. If there is no communication, it makes the process worse. Multiple sources of information, mixed messages can take down the process.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery and their way to prioritize the recovery barriers in Infrastructure and Transportation.

(A) Yes. It does specifically in the response operations. So, during the response of the Hurricane Irene, East to West route were cut off from the town for weeks in Colorado front range. People get nervous from outside and inside of the disaster location. The roads then get open in the immediate repair stage but in the long term price, if you have low quality infrastructure and transportation, the services, the rest of it suffers. If the infrastructure suffers, the repair and responses also suffer. One of the major obstacles is to make the repair, specifically in transportation, of the road where there is present standing water which may cause the failure of the road base. It continues to fail even after the flood

is gone. As per the policy, the FEMA should be responsible for the damage, but they will not pay for that. The storm gives those type of roads, it is not due to storms. Even we proved the FEMA with the help of radar results by giving comparison of damaged and undamaged roads. It was clearly evident but FEMA refuses to acknowledge that. On the other side, we have events like Hurricane Irene, Flash flooding which tears the growth apart. It creeps the road. In order to put the road back which is clearly within the FEMA program designed to pay for, the engineering team must define the modern way of doing it, taken the long time to develop and what if the road is washed out in certain spot around the curbs? FEMA just says we will only repair what is damaged. If your old road standards said the width of the road is 16 feet and new standard says it must be 12. Specifically, for Colorado, you have to build Winter roads, where you keep adding asphalt binder takes 2 or more years but FEMA refuses to pay the full price. Due to time constraint, we have to fill out necessary requirements as quickly as possible to get the money. Each individual project guy has to get it the job done as soon as possible and put inaccurate details in the system.

(Q) Considering the effects of Environmental barriers, the questions were asked such as impact of late removal of residual on the recovery process and their way to prioritize the environmental barriers.

(A) Solution has been explained by the officer by mentioning that debris can go one or two ways. Debris removal in large disaster, municipalities hire state or professional group. They will come and will take everyone's sign on MoU. They will hire professional haulers and monitors. It is done as quickly and as humanly possible. In the scenario of large-scale operation or in a private property, debris removal takes place as soon as possible. The disaster has to be large scale enough when it generates great amount of the debris that would affect the greater economy as a whole. When it comes to flooding, debris haulers collect the debris as much as possible. It can take a while but it is a continuous process. When I was involved in the process, I was in Texas. In Bolivar, the houses were

gone and debris was laying everywhere. The county made the case with FEMA to remove debris from private property. It took a while because of the amount. Debris operations pull ups the CDBG-DR and that process is too long including preparation of national plan, public opinion, community state coordination and during the entire process, debris is still longed on. The part of the money also comes from HUD during the big disasters.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees

(A) Interviewee mentioned that as per your state recovery planning, your policy group has to make the decision of how the resources are going to be ranked. You have to establish state priority and ranking criteria and clear rules of eligibility way ahead before the funding so that when people make application for the funding, everyone knows the priorities and it makes unified approach as whole procedure.

#### Interview participant #8

The expert participated in the interview is Senior adviser of Federal Emergency and Management Agency

(Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials

(A) The economic barriers affecting post disaster recovery at the governmental level would be lack of insurance, insured entities are covered in the disaster than the non-insured entities in the disaster. Social vulnerability where individuals or businesses are

located are in disaster prone areas or not. Now, if the disaster is presidential declared disaster and one is not insured then one has quite a way to go in achieving their post disaster recovery because one has to rebuild on their own. The state and local government has to be overwhelmed to a degree that they can no longer effectively respond to the disaster in order to the President to declare a major disaster declaration which unlocks a lot of money and resources to help people. In the case of Small Business Administration loans (SBA loans) one cannot access SBA loans unless the disaster has been declared. It does not depend upon low income of the individual but it depends upon the ability of the state and local government to respond you and therefore the request from federal government in terms of the assistance. If the affected people do not have insurance, yet the state and local government have been granted a federal disaster declaration. Those individuals are eligible over 30000 dollars in FEMA's individual assistance program as long as the disaster is Presidential declared disaster.

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery process, Social contacts during recovery and their own way to prioritize the recovery barriers

(A) First of all, the state and local government issue voluntarily evacuation where people drive themselves to the relatively safer points. Then there is mandatory evacuation where people are required to leave and, in the events, when they cannot leave, there are contracts of state and local levels buses which drive them from their point of departure to the safe shelters nearby. The challenge to do evacuation involves state local laws that some people cannot be forced to leave in vulnerable area by law and some people can be. So, the challenge depends upon what the local regulations states, Traffic is certainly is the consideration and Counterflow may delay the recovery. In terms of coordination, there are no coordination difficulties between stakeholders but there is always a disagreement between the federal and state government into the terms of what can be paid for after the

disaster by the federal government. In California, for an example, when FEMA was removing debris from private land after the wildfire, which we do not do after the hurricane, as in Florida, federal government would not pay to remove the debris because it can be pushed to the curbside. So this disagreement cause delay in the post disaster recovery.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery and their way to prioritize the recovery barriers in Infrastructure and Transportation.

(A) The transportation and Infrastructure development do not cause delay in the post disaster recovery. In Maritime or roadway or airport perspective, federal official's first priority is to recover the roadways/airports with the help of US Army Corps of Engineers and US Coast guards which quickly assess the hazards. There is no damage that one can see in the infrastructure development that affected the disaster recovery. The local economy plays a significant role. The more resilient the local economy is, the quicker is the recovery

(Q) Considering the effects of Environmental barriers, the questions were asked such as impact of late removal of residual on the recovery process and their way to prioritize the environmental barriers.

(A) In Hurricane Maria in Puerto Rico, there was plenty of food and water that was on the island but getting it to the vulnerable population was difficult due to debris covering the road. So the governor's priority, at that time, was clearing the road from debris so that food and water could be delivered. Federal officials do not have our priority, it simply depends upon the choices by the governor of the individual states that requested our assistance. Most importantly, there is an act called Environmental Historic Preservation Act (EHPA). Any sort of recovery project, for roads, schools or any sort of building that requires construction have to go through EHPA. When that takes place, there is an extensive delay in the recovery. They do extensive review on the environmental impact or historical acuties

where they are rebuilding. So, if one is reconstructing road, one has to study to make sure that the road does not go through any battlefield or any aspect of the historical nature. Also, one should not harm any sort of environment or any animal. Those study which are taking place can prolong the project for years. Hence, we need to find the way to make those study faster so as not to delay the recovery.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees

(A) There is a weakness in National Flood Insurance Program (NFIP). The national flood insurance program is not sustainable program. It does not acquire the risk for the people for living in the vulnerable areas. So, one's flood insurance program should pay the same person the equivalent amount of flood insurance rate if that person is living in a risky vulnerable area. At present, the program is in 25 billion dollars in debt. Secondly, there is a common misconception of the Stafford act which governs the federal response to the natural and manmade disasters is designed to provide the resources to make the victims back on their feet but it is not designed to supplant the insurance. Due to this misconception, there is a chance for delay in the recovery process. In terms of sudden policy change, All the governmental policies have to pass from Congress to make the changes for the extended period of time. The state and municipalities are the ones who are actually recovering from the disaster. To pass the legislation, it takes time to do make legal changes, but in the absence of the legislation which is being passed, there are some rules and regulations which governs the recovery. Hence it may cause the delay but there are alternatives to govern similar problems. The alternative is Stafford act with the help of which FEMA assist state and local government to recover from disaster. The projects which seems fit under the Stafford act gets funded through the federal funding. Unplanned activities however may cause delay due to nature of the disaster. US virgin island was hit



by hurricane Irma and Maria in rapid succession. So, unforeseen disasters take place every year. California had catastrophic wildfires in back to back years. These unforeseen disasters may take time to recover and causes delay in the recovery. In terms of the resource allocation, FEMA has a robust disaster workforce here about 20000 that are divided in the different regions within United States. They quickly deploy the personnel or team to the point where disasters hit. The process is about having enough manpower to make sure that we are covering the people involved in the disasters. In 2017, they had people in 38 states from Northern Mariana Island to the Virgin Island so they are used to be widely dispersed for catastrophic disasters across half the globe. The challenge is to balance the resources and to do that, from manpower standpoint, FEMA has to send people to the area which is decimated by the disaster. So, the challenge is to get the helping hands into the location of the disaster. FEMA face the challenge by law to care about the people who are representing FEMA in the disaster locations. Where these people are going to stay? and spend the nights. Hence there is a risk will be high if number of people in the disaster location is high. From a physical resources' standpoint, FEMA exercise and train a lot to assure that they do not see a lot of challenges. Being air traffic control power blown out in Porto Rico, FEMA could have managed a single cargo plane in 30 minutes. Hence determining the priorities of what goes in the plane is critical but it majorly depends upon the governor's request. There are different challenges that FEMA officials passed. In hurricane Katrina, Major challenge is to drain the water from the location. Same about hurricane Harvey in Texas. In Porto Rico, the challenge is getting the power back on due to extensive power outages. In volcanic eruption of Hawaii last year, the priority was to prevent the damage to the people living nearby due to the gases. When Title issues come into place and if one does not have the title to their home then they are not paying the property taxes on their home. If not, they should not be paid the taxpayers money to recovery from the disaster. But in Porto Rico, FEMA extended our period of time to get people their titles to get the federal funding to report the recovery. Many of the poor people,

on the other hand, have their names on the title of their homes. So, this is more in organizational issue which ultimately converts in economic issue. So if one does not have title to your home, he/she will not have flood insurance and which leaves them to only individual assistance which is not sufficient as per disaster point of view. Cumulatively, a successful policy is any policy that builds strong, more resilient infrastructure than previous. So, the goal is not to just rebuild the structure but to rebuild to make it more resilient such that it does not get destroyed.

Interview participant #9

The expert participated in the interview is working as an attorney for Federal Emergency and Management Agency

Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials

(A) The economic barriers to prevent the timely post disaster recovery is lack of funding, general awareness among the community, Lack of economical resources and economical resource allocation, unavailability of local government funding in which local government who want to respond the disaster do not have funding

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery process, Social contacts during recovery and their own way to prioritize the recovery barriers

(A) The community participation varies as per the location of the community. Community engage in the program if they have strong community network among

themselves which help disaster relief. The community connect each other from different programs like religion programs and communities are more active in the village areas rather than the cities or urban area. Also, more importantly, Pre-planning is important before the disaster to recover more on time.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery and their way to prioritize the recovery barriers in Infrastructure and Transportation.

(A) Yes. The damage to these sectors specifically to the key arteries cause the delay the post disaster recovery. In most of the disaster, the impact is more localized rather than widespread. Specially we have barrier Island along the coast that have limited access for coming and going. When one access among others goes down, it creates traffic jams and transportation problems which impact the disaster recovery.

#### Interview participant #10

The participant in the interview is the environmental consulting engineer who worked for state client for different disasters such as Hurricane Katrina, Rita, Sandy etc.

(Q) In order to get in-depth analysis of economic barriers during post disaster recovery, the questions were asked regarding influence of economical setbacks to different stakeholders on the overall time of post disaster recovery. The questions asked such as different economic barriers during post disaster recovery, effect of communities' status affects timely recover, influence of government's funding on timely recovery and their ways to prioritize barriers in the economic recover. Different responses were collected from different officials

(A) As per the municipality point of view, the largest barrier is uncertainty of funding. The second most important barrier, particularly in the large disaster is lack of understanding of the cash flow. If the community is getting affected by the large disaster, the funds from different resources are used to recover from the disaster. However, the part of the funds

should be preserved as a backup in the future as some of the affected people may think that part of the funds would be taken back. If not preserved, then that can cause into excess time to recover from the disaster. Ultimately, one of the key solutions is that the benefiteres should be assured that the money will not be taken back from them and could be entirely used for the disaster recovery purposes only. The primary way to bring the community back is to rebuild the infrastructure. In the infrastructure point of view, the uncertainty is that the FEMA funding takes slow pace to get there. Many of the times, it takes time for the resources to get to the benefiteres. Moreover, if the disaster is larger, second worst barrier for the recovery is inability to understand tax law.

(Q) To validate the effect of community barriers in the disaster recovery, questions were asked regarding the social impact on disaster recovery, public participation in the recovery process, Social contacts during recovery and their own way to prioritize the recovery barriers

(A) Local politicians try and delegate work to local vendors, but at the same time, these local vendors have also been affected by the circumstances. The community participation primarily depends upon their circumstances. Therefore, it's sometimes easier to outsource recovery work. If they lost their own important property, they will spend more time in their own property restoration. Cumulatively, community participation depends upon the degree of the impact they are suffering. In terms of housing recovery, a lot of policies dictate how much money can be given and who qualifies it. For an example, After Katrina, funding was given due to pre-storm property appraisal. Different people had homes that were passed down through the generations and did not have any appraisal documentations. So they could not get funding. HUD focus on low-to-moderate income people.

(Q) During the recovery process, Infrastructure and Transportation play major role. Hence questions were asked to the interviewee asking dependency of these sectors on the timely recovery process, relation between disturbance of this sector to the disaster recovery

and their way to prioritize the recovery barriers in Infrastructure and Transportation.

(A) Roads, bridges, sewer lines and power plants do not usually fall under National Flood Insurance Programs, FEMA has to cover recovery funding. In many cases, if critical access points get damaged, design-build projects are funded quickly by the Department of Transportation. The critical factor which can determine the recovery for the transportation sector is to quickly find funding for the transportation, specifically for design build efforts for critical access points. Additionally, due to less understanding of the local help, it is very difficult for some of the recovery officials to figure out which local authority could be helpful. In St. Bernard parish, water distribution systems that used to supply 40 homes, now supply 1 meaning that their distribution lines are becoming contaminated because not enough water is moving which could definitely be the barrier which affect the speed of the recovery. Also, certainty of the amount which should be repaid by different FEMA programs is also less, which could act as a barrier too. There must be coordination between different stakeholders to achieve the recovery.

(Q) Considering the effects of Environmental barriers, the questions were asked such as impact of late removal of residual on the recovery process and their way to prioritize the environmental barriers.

(A) There is always a lack of pre-planning of the resources. To improve the late debris removal during the disaster recovery process is to have corporate contracts with other municipalities, to ask for a help from external contractors etc. The key challenge in this process to see will the resources be available at the event or not. Other environmental barriers are also present. One is that the federal government needs to know that the money that one is spending to recover his or her home has no environmental impacts. HUD gives private individuals to rebuild their homes. But they spend around 3-4 months after the disaster to figure out is there any impact on the environment due to the reconstruction and recover or not. Moreover in the time when there is a requirement of the new location is to not know the utility systems such as sewer lines or water lines which cause discomfort to

the affected people.

(Q) As a policy and legal barriers, questions had wide range. Specifically, questions asked about common policies during the recovery, planned policies and implemented policies, factors affecting the speed of the recovery, Weaknesses during the recovery etc. There are different policies recommendations given by different interviewees

(A) There are two policies. One is, during hurricane Katrina, the funding to the affected people were distributed by the means of pre- disaster value of the property. As the property pass through the generations, some of the community members will not have the clear title. Which in some amount impacts the people which need help. Another policy is regarding HUD policies, as they target a specific amount of fund to low-moderate income people. They have the requirement that at least 50 % of the funds should be directed towards low to moderate income people. To make a criterion, the solution is to help the low to moderate impacted community. One of the solutions to make the policies go smooth is to allow applicants to get help from different architects and professionals to certify the damages and to start the recovery. Many of the different federal agencies and local government hire their professional people in order to assess the damage and get the job done. But sometimes it takes considerable time to assess the damage. Hence, the policies for the reconstruction should be amended in such a way that the affected people can be benefited from the different agencies also.

Sample Interview questionnaire:

Interviewee Background

1. What is current occupation of the interviewee?
2. What is level of education of the interviewee?
3. What disasters you have been involved in?

Economic PDRBs

1. What are the important economic barriers affecting post-disaster recovery?
2. How communities' economic status affect timely recovery?
3. How local/Federal government's revenue/funding affects timely recovery?
4. How do you prioritize the economic post-disaster recovery barriers?

Social PDRBs

1. What are the important social barriers affecting post-disaster recovery?
2. How the public's participation in recovery process helps to timely recovery?
3. Does having familial connections/friends of the affected people help to rapid recovery? How?
4. How do you prioritize the social post-disaster recovery barriers?

Infrastructure & Transportation

1. What are the important infrastructure & transportation barriers affecting post-disaster recovery?
2. Does the damages to transportation sectors cause delays to long-term recovery process?
3. How do you prioritize the infrastructure and transportation post-disaster recovery barriers?

Environmental

1. What are the important environmental factors affecting post-disaster recovery?
2. Does late debris removal cause delay in recovery process?
3. How do you prioritize the environmental post-disaster recovery barriers?

## Policy & Legal

1. What are the important policy & legal factors affecting post-disaster recovery?
2. How do you prioritize the policy and legal post-disaster recovery barriers?
3. What policies you used/are familiar with in the process of recovery?
4. How can we access planning and the implemented policies for post- disaster recovery?
5. What are the barriers to rapid decision-making for post-disaster recovery?
6. What are the policies delaying financial disbursement during recovery period?
7. How can the governmental organizations and NGOs cooperate for rapid post-disaster recovery?
8. What are some planning/legislation/legal weaknesses causing delay in recovery?
9. What are the difficulties of resource allocation, of all types, toward timely post-disaster recovery?
10. What policies lead to financial and economic issues causing delay in post-disaster recovery process?
11. How do you define a successful policy for timely post-disaster recovery?
12. Are there any vague policies or legislatives you can mention causing conflicts among the organizations performing recovery?
13. Other unmentioned issues causing delay in the process of recovery?

### 4.1 Summary

Chapter 4 extensively describes the data collection process and validation process. Specifically, it describes the interview process and gives the professions and geographic location of each individual, purpose of the interview etc. Furthermore, this chapter includes the response of the interviews of all the participants and detailed questionnaire which has been asked during the interview process.



## Chapter 5

### Data analysis and Results

#### Data Analysis

In this stage, the barriers which are affecting the post disaster recovery and the real policies which are collected in detail from different practitioners are analyzed cross-comparatively. Different categories such as Coordination, Construction and Infrastructure, Location, Social and Community Participation, Resources and Documents, Finance and Economic and Approach and Attitude Categories are analyzed with each response collected. From the table below, each identified barrier found from literature and from categories above is validated with real policies collected from the interviews to validate the barriers respectively. Furthermore, required strategies are mentioned to overcome the identified barriers in the post disaster recovery process.

#### 5.1 Coordination

Different questions were asked to different officials such as coordination between different stakeholders, cooperations between governmental and non-governmental organizations, resource allocation problems, availability of local expertise etc. After careful analysis of the feedback from different officials about the questions, four out of five indicators were matched with the responses. Nevertheless, it may be possible that the other barriers could be verified with in-depth research.

One of the strategies to make community involvement in the disaster recovery process is to make them trained communities which can then participate in the aftermath of the disaster furthermore can enable and increase the resiliency among the vulnerable people (Alipour et al. 2015). Additionally, the trained social groups can participate to facilitate the protection of vulnerable group to fulfill the need of the affected people in the disaster to make the entire recovery on time.

To strengthen the pre- planning of the legislation for post disaster recovery, permanent disaster risk management offices at different locations all over United States are necessary which can facilitate the funding from different governmental and non-governmental resources (Amaratunga et al. 2018).

In Philippines, this system resulted perfect coordinated approach for disaster prevention, preparedness, response and recovery where no casualties were resulted in 15 out of 17 years (UN-ISDR, how to make cities more resilient: a handbook for local government leaders, United Nations, Geneva, 2012). The governmental system should be amended in a way which will make some part of the process easy. There are two solutions specifically in the policies, one being in the Disaster mitigation act (2000) and another Flood Insurance act.

First, the Disaster Mitigation Act of 2000 should incorporate regular mitigation plan updates in local comprehensive plans to avoid the ignorance of mitigation plans. Secondly, The Flood Insurance Act could be developed in such a way that it should mandatorily consist the local comprehensive plans with hazard mitigation provisions in order to be a part of the program. In order to recover on time, resilient organizational structure is also required. There must be three components in the system with a continuous coordination.

One should be an executive committee which will make the plan happen, another must be a project management team and the third important component is local and state stakeholders and should be implemented by all stakeholders. With the coordination of these main stakeholders, it is quite possible to achieve speed in post disaster recovery through coordination. After careful analysis of the feedback from different officials about the questions, four out of five indicators were matched with the responses. Nevertheless, it may be possible that the other barriers could be verified with in-depth research.

Table 5. 1 Validation of Post Disaster Coordination (PC) Barriers

ID	VALIDATED BARRIERS
PC 1	In the process of governmental funding programs such as FEMA, HUD and CDBG-DR, they involve community and public investor for financial help and advocating the issue. If there is lack of consultation with community, it can definitely increase the time of the recovery.
PC3	In the time of catastrophic disaster, FEMA and local government demand for local expertise. The norms and conditions of contracts between federal, state and local tri party are written badly in the first place. Therefore, state and local government has to work on it later to make it legally sound which delays the recovery.
PC 4	A major issue is that in order to begin recovery on damaged houses is that the owner must get a denial form from insurance then he has to apply for FEMA relief, and then be placed on the waiting list. Navigating through insurance is a big hinderance to recovery which is an organizational issue delaying the recovery time.
PC 5	During Hurricane Katrina, Federal and State Government had poor cooperation regarding hazard mitigation. FEMA's first response during Hurricane Katrina was not appropriate making it as a political patronization caused conflicts between different stakeholders involved in the process of the disaster recovery ultimately lasting recovery stage for ten years.

5.2 Construction and Infrastructure

Different questions were asked to different officials such as Important transportation barriers in post disaster recovery, damage to the transportation sector cause delay in overall recovery process or not, the priority criteria's during the recovery of transportation etc. The strategies to improve the construction and infrastructure barriers during post disaster recovery has been mentioned below which could be implemented with future in-depth research.

Specifically, during Hurricane Katrina, 80000 people were displaced from their locality which affected their phycological health. The strategy to make the relocation in general and evacuation in particular of disaster affected people in systematic manner, the emergency management plan of the state should be improved and should be resilient. Housing economics as a market function, land use pattern and available space comes into calculation to strategize the organizational mass growth. As when evacuation shifts to the outmigration, market forces place a more importance. Hence all the stakeholders should think the mass relocation as a systematic challenge tied to large scale land use and economic pattern rather than as a simple crises time response time (Kendra et al. 2008).

To achieve resilient structures during the post disaster recovery, strategical keys include amendment of reconstruction and rebuilding policies. The reconstruction policies should include specific meaning of “Building Back Better” in order to clarify that what should be considered as a resilient structure and how that will fulfill the long term need of the people affected by the disaster (Kennedy et al. 2008). Moreover, in many places, the structures are recovered and physical policies are implemented but organizational policies, planning techniques, emergency preparedness and knowledge management skills are missing in some of the cases which should mentioned in the amendment of current policies (Palliyaguru et al. 2010). Cumulatively, in order to eliminate the barriers in the construction and infrastructure category, it is strongly required to amend the policies in such a way that the responsibilities of each stakeholders should be clearly mentioned. It is highly recommended to all stakeholders to involve in the amendment in the policies as soon as possible so that the overall mitigation efforts would be channeled smoothly. After careful analysis of the feedback from different officials about the questions, two out of seven indicators were matched with the responses. Nevertheless, it may be possible that the other barriers could be verified with in-depth research. Table 5.2 represents validation of pre-identified post disaster Construction & Infrastructure barriers.

Table 5. 2. Validation of Post Disaster Coordination and Infrastructure (PCI) Barriers

ID	VALIDATED BARRIERS
PCI 1	During mass relocation or evacuation, the challenge depends upon what the local regulations states, Traffic is certainly is the consideration and Counterflow which increases the time of the recovery
PCI 4	One of the major obstacles is to make the repair, specifically in transportation, of the road where there is present standing water which may cause the failure of the road base. It continues to fail even after the flood is gone. As per the policy, the FEMA should be responsible for the damage, but they will not pay for that which ultimately results in conflicts delaying the recovery.

### 5.3 Location

Different questions were asked to different officials such as improper land use during the recovery process, the unavailability of local mandates in the process of the construction etc. However, the strategies to improve the location barriers during post

disaster recovery has been mentioned below which could be implemented with future in-depth research. The strategy to prevent improper land use is the reformation of state and local code and regulations. The regulations should be made compulsory in the way that to be eligible for the federal and mitigation funds, local governments should produce a resilient land use plan as the part to get the federal funding when president will declare the disaster. Secondly, as most of the improper lands for reconstructions are floodplain lands, Larson and Plasencia (2001) came up with a policy of “no impact floodplain management” in which the actions of one property owner do not have a negative impact on the flood risk to other properties with the measurements of flood stages, flood velocity, flow, erosion and sedimentation. By mandating this policy in the NFIP program, at least, the risk associated with flooding during disaster ultimately increasing the time of the recovery would be less. After careful analysis of the feedback from different officials about the questions, one out of five indicators were matched with the responses. Nevertheless, it may be possible that the other barriers could be verified with in-depth research. Table 5.3 represents validation of pre-identified post disaster Location barriers.

Table 5. 3. Validation of Post Disaster Location (PL) Barriers

ID	VALIDATED BARRIERS
PL 1	Improper land use increases the recovery time because the people which are living in that land are very low-income individuals who quietly do not have other options for land use. Nevertheless, the risk for living in that area causes higher insurance premium which is high for them to pay which often delays the recovery.

#### 5.4 Social and Community Participation

Different questions were asked to different officials such as effect of community participation on disaster recovery speed, dependency of family connections of affected people on overall disaster recovery etc. However, the strategies to improve the social and community participation barriers during post disaster recovery has been mentioned below which could be implemented with future in-depth research.

One of the solutions to regulate the resource allocation is to build social institutions

specifically in the poor areas. Baade et al. (2007) mentioned that public money would be necessary to rebuild significant portion of the city, especially those area where private money is slow to return. Hence, they further recommended targeting a disproportionate amount of federal transfers towards poorer areas and areas with minority populations to stimulate growth, specifically using social institutions. Additionally, with extensive research, one of the major barriers to get the funding is the “Title issue”. Without the title of the occupant, governmental funding will not be available. Hence, the solution of this issue which is highly recommendable is pre-planned stimulation of the awareness among the society and community in the pre-disaster stage. This approach would give time to people living in the community to process their application and have the title to their homes after which different governmental agencies can help them in their recovery process to achieve on-time post disaster recovery. Table 5.4 represents validation of pre-identified post disaster Social and community barriers.

Table 5.4. Validation of Post Disaster Social and Community Participation (PSCP) Barriers

ID	VALIDATED BARRIERS
<b>PSCP 3</b>	Funding distribution sometime was done by damage of the property value. Higher the property value, easy to get the funding due to damage causing disparity and diversification of livelihood.

### 5.5 Resource and Document

Different questions were asked to different officials such as impact of loss of documents during the disaster recovery, unavailability of resources during the disaster recovery etc. However, the strategies to improve the social and community participation barriers during post disaster recovery has been mentioned below which could be implemented with future in-depth research.

One of the solutions to regulate the resource allocation is to build social institutions specifically in the poor areas. Baade et al. (2007) mentioned that public money will be necessary to rebuild significant portion of the city, especially those area where private

money is slow to return. Hence, they further recommended targeting a disproportionate amount of federal transfers towards poorer areas and areas with minority populations to stimulate growth, specifically using social institutions. Additionally, with extensive research, one of the major barriers to get the funding is the “Title issue”. Without the title of the occupant, governmental funding will not be available. Hence, the solution of this issue which is highly recommendable is pre-planned stimulation of the awareness among the society and community in the pre-disaster stage. This approach would give time to people living in the community to process their application and have the title to their homes after which different governmental agencies can help them in their recovery process to achieve on-time post disaster recovery. One of the important solutions to this problem is that local planner should know their communities’ economic base. Specifically, local planners and Community Based Organizations should monitor and address the unmet needs of different geographic areas, economic sectors, and demographic groups (Lindell and Prater 2003). Specifically, in the case of resource allocation, we have to try to make sure the resources and equipment are present as much as can to need address the disaster as per the jurisdiction in case of delay. Nevertheless, Song et al (2017) noted that many communities are now embracing the concept of sustainability but their planners may have only superficial understanding of how to translate it into the practice and their interest groups may be skeptical of this new idea. Another strategy to acquire skilled resources is that jurisdiction with greater access to resources can increase local capabilities and ensure access to new technology (Smit and Wandel 2006). Table 5.5 represents validation of pre-identified post-disaster resource and document barriers.

Table 5.5 Validation of Post Disaster Resources and Document (PRD) Barriers

ID	VALIDATED BARRIERS
PRD 7	In terms of the recovery, barriers are skilled labors were not present, con artist being present. Qualified contractors were not available. The workers were not reliable which caused delay in the recovery during Hurricane Katrina.

## 5.6 Finance and Economic

Local government is one of the pillars to make key decision making after the disaster. Olshansky et al. (2008) stated that in order to strengthen the funding in overall post disaster recovery process in general, equal amount of efforts from FEMA, Department of Housing and Urban Development (HUD) and local government are required to provide financial support for long-term recovery funding. Particularly, the financial stability should be at the extent to help to a resilient process which is well informed prior to the disaster recovery.

Moss and Shelhamer (2009) clearly stated with a detailed observation that the Stafford Act, the nation's disaster management law, is insufficient for a catastrophic disaster to provide the funds to support local government operations in their times of greatest need. Furthermore, it has extensively burdensome requirements for local government to obtain reimbursement for repair of their damaged facilities. Hence, in the context of strategy to make timely availability of the funding, Stafford act should be amended in such a way that federal reconstruction funds should come quickly the next time catastrophic disaster strikes.

In some part of the United States, there is a delay in the recovery specifically due to lack of economic sources. Yang et al. (2013) highlighted four resourcing categories and the areas which require development in post disaster recovery: legislation and policy, construction industry, construction market and Transportation sector. In the legislative area, efforts need to be made to put in place comprehensive and compatible legislation and policy incorporation which ultimately can provide a plan for post disaster long term recovery with sustainability.

Furthermore, to develop construction industry to build resilient structures, there is strong need to redesign programs to increase awareness of industry players to engage in the disaster management, planning and mitigation. Involvement of construction industry



stakeholders in local emergency management departments and other disaster mitigation programs could improve the overall awareness in the industry. Also, there is a requirement for resource availability to be integrated into a project management framework to ensure a strategic vision in the project resourcing process.

In the case of long-term recovery, funding programs vary from place to place. A common strategy represented by McManus et al. (2007) could be implemented which is to preplan the organizations in two categories which will define the long-term recovery funding program approach. One is to provide resilient communication strategy in which every stakeholder is involved in long term disaster recovery program and other is emergency communication strategy in which special attention is given to the emergency preparedness and management. It should be noted that communication is a two way flow of information and faulty transfer of information causes miscommunication leading to undesired outcomes (Kamalirad and Kermanshachi, 2018). These programs can be used to design the pre-disaster funding programs so that even if natural calamity will happen, this approach would behave strong and organization funding source.

On the other hand, NGOs will be greatly helped if they are planned and in the process of the recovery. Hence one of the solutions for this issue is to create strong state VOAD (Volunteer Organization Act in Disaster) where state and local organizations will participate. In some areas, there are policies which indirectly lead to income disparity and diversification of livelihoods. The intensity of this barrier can be reduced by a national disaster framework, which constitute barriers from local level and state level to yield full picture of vulnerability.

Particularly, this framework should consist of locally located “hotspots”, which will define the specific indicators for poor communities affecting post disaster recovery speed. With the incorporation of these hotspots, this national disaster framework will be a strong guide in the post disaster recovery process. Table 5.6 represents validation of pre-identified

post disaster finance and economic barriers.

Table 5. 6. Validation of Post Disaster Finance and Economic (PFE) Barriers.

ID	VALIDATED BARRIERS
<b>PFE 1</b>	In one case, a person applied for the recovery in coastal region received less than 30% by FEMA due to location, flood and wind. Not providing enough funding to support recovery is one of the barriers in the recovery.
<b>PFE 2</b>	Individual system and Public Assistance are two systems during the economic recovery. Specifically, in Public Assistance, Not knowing what rules are going to be implemented increase the time of the recovery.
<b>PFE 3</b>	In Texas and Louisiana, in poor communities, FEMA or FHWA will just do the repairs and they will do the emergency repair work, but the communities require assistance in the funding for the recovery process. Hence, they must wait for the funding. So, it takes long time to deliver the federal recovery.
<b>PFE 4</b>	For non-profits, their emergency funds reserves are shrinking each year
<b>PFE 5</b>	Funding distribution was done by damage of the property value. Higher the property value, easy to get the funding
<b>PFE 7</b>	Unavailability of the documents and flood insurance caused delay

#### 5.7 Approach and attitude

Different questions were asked to different officials regarding approach and attitude of different stakeholders during disaster recovery process. However, the strategies to improve the social and community participation barriers during post disaster recovery has been mentioned below which could be implemented with future in-depth research. Participants lack of skill, knowledge and competence is identified as a major issue in the disaster recovery program.

Corti et al. (2011) found that, the extent of effective collaboration and coordination between national authorities, local actors and international actors appear to be insufficient to achieve effective planning process in the disaster. In addition, Kermanshachi (2010) concluded that cooperation between entities, stakeholders, and parties increase the efficiency of the planning activities and construction processes tremendously. Hence one of the strategies is to involve global technical experts during the planning process through the warning system just after the declaration of the disaster which can help to involve more competence staff in the planning process finally making the disaster recovery on time.

Many post disaster recoveries cause excess time to recover due to unclear roles and responsibilities between different stakeholders. The main key to reduce this problem is timely coordination. One of the participants of interview provided the best strategy which is to command uniformly. A "United Command" system is the system in which all local participants such as NGOs, sheriffs, mayors, chief of police and other respective stakeholders will be present. Due to implementation of this approach, all stakeholders would be able to make collective organized decision to respond the disaster which would essentially help to process the disaster recovery. The conflicts between state and federal officials during hazard mitigation and funding happens due to the many reasons including unclear policies. One of the solutions for unclear policies is an amendment to them as per the location. The necessary policies should be amended in such a way that they should clearly state the responsibility of each stakeholder during the disaster recovery process. Waugh Jr. & Streib (2006) Mentioned that no stakeholder has complete control on the mitigation efforts. One of the useful technique to avoid conflicts is an integration of local authorities into one. Due to the incompatible policies, slow decision making and lack of active approach from key stakeholders in the recovery stage, it takes more time than estimated to recover from the disaster.

There are two strategies which can help to overcome these problems. To make an active involvement in the recovery process, local stakeholders should invite a variety of groups to take part in planning process. By inviting such local groups, the agendas of local citizens could be covered and citizens could be satisfied. These groups can provide problems and alternative solutions to citizens. The practical way to make this approach happen is to form advisory committees in planning process where all can share a thought and make the recovery timely. The second solution is to provide new solutions to make the decisions. One of the possible way to get funding is NFIP. But in reality, this insurance program is in huge debt causing less alternatives to the affected people. Hence, development of new initiatives with consent of all the stakeholders is required to make the

decision making process fast and in time ultimately making the disaster recovery on time. provide new solutions to make the decisions. One of the possible way to get funding is NFIP. But in reality, this insurance program is in huge debt causing less alternatives to the affected people. Hence, development of new initiatives with consent of all the stakeholders is required to make the decision making process fast and in time ultimately making the disaster recovery on time. Table 5.7 represents validation of pre-identified post disaster approach and attitude barriers.

Table 5. 7. Validation of Post Disaster Approach and Attitude (PAA) Barriers

ID	VALIDATED BARRIERS
PAA 1	During Hurricane Katrina, there was no predetermined planning as many things were planned as per the past recovery experience and the necessity rather than full scale disaster. There was conflict between FEMA policy and State policy. FEMA act, Stafford act had some problem particularly selecting the method for the recovery. Due to lack of planning, resources of the federal government were used tremendously which ultimately increases the time for the recovery. Lack of flood insurance and lack of qualified workman, contractors and materials also increased time for the recovery.
PAA 4	During front range flood in Colorado, emergency management system did not know anything about CDBG-DR which ultimately increased time of the recovery.
PAA 6	Federal and state government had poor cooperation during the Hurricane Katrina regarding hazard mitigation. FEMA's first response during Hurricane Katrina was not good, it was political patronization which caused conflicts between different stakeholders involved in the process of the disaster recovery.
PAA 8	During Hurricane Harvey, FEMA resources began to reach to the people 8 months after the disaster. 600 million dollars funding to develop the transportation and infrastructure from FEMA is still coming.

### 5.1 Summary

This chapter analyzes the pre identified barriers and collective responses in cross comparison. As per pre-identified categories, each validated barrier has been summarized at the end of each category in the tabulated format. The study, further the best practices recommended by different participant have been mentioned for all validated barriers.

## Chapter 6

### Conclusion and Future Recommendations

In last ten years, frequency of natural calamity in the United States has been increased. Yet some of the time, it takes more than required time to recover from disaster. Therefore, the main purpose of the study was to identify and validate barriers in post disaster recovery process. As a first step, a detailed research has been conducted on the literature of 200 scholarly papers in order to study the post disaster recovery process. With the help of which, fifty-seven different barriers to the post disaster recovery were found. These barriers were then categorized into five different categories such as Economic, Social, Infrastructure and Transportation, Environmental, Policy and Legal. Successively, a detailed questionnaire was built on the basis of the categories and indicators collected. These questions were asked to different professional practitioners to validate the barriers and to find new barriers affecting speed of the post disaster recovery. An in depth comparison of all the factors were considered then to find significant relationship between barriers found from the literature and from the interviews. As a part of the Economic barriers, Weakness of local governments in funding, Delay in disbursement of emergency funds in recovery process, Lack of economic resources for recovery are present. Additionally Lack of long-term recovery funding programs, Policies which lead to income disparity and diversification of livelihoods, Tough legislative criteria for low-income groups to obtain strong financial assistance were the barriers which were validated from the pre-identified barriers. In the Social barriers, biased recovery service allocation for high- income people due to possibility for them to negotiate with the system was the main factor which affected timely post disaster recovery. In the Transportation and Infrastructure category, factors such as Slow and unorganized mass relocation in recovery process, inappropriate infrastructure maintenance policies leading to more vulnerable infrastructures and malfunctioning in recovery process plays requires special attention to achieve on time post disaster recovery. However, in the environmental category, late debris removal was the

factor which truly can increase the time of the recovery, hence many disaster practitioners put it as their first priority. Finally, in the resource and legal category, Lack of qualified governmental personnel for damage inspections in post-disaster condition, Not counting technical expertise in planning process, Lack of clarity in roles and responsibilities for assistance, Conflicts between local and federal government authorities for hazard mitigation and funding decision making, Slow decision making and lack of proactive approach in recovery process are key barriers in post disaster recovery. It is recommended that; the researchers should conduct further research in the future to identify barriers in different areas which affect the timely completion of post disaster recovery. Particularly, academic scholars can find specific factors which affect the post disaster recovery and prioritize them.

#### 6.1 Limitations.

In this research, the author experienced different limitations. The number of practitioners, scholars and officials from questionnaire was limited to 10, hence it was not enough to draw a comprehensive conclusion for all types of disasters. Secondly, some of the respondents from different states could not answer some of the questions due to confidentiality requirements of their positions, hence, the analysis did not include the data from all the states. Finally, the policy recommendation provided in this study would require additional examination in order to be implemented as a solution to speed up the overall post disaster recovery.

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