PROJECT RISK MANAGEMENT FOR COMMUNITY-BASED POST-DISASTER HOUSING RECONSTRUCTION

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DEDICATION

This piece of research is dedicated to my dearest wife Inna, and my lovely children Afif and Hanny.

DECLARATION

This thesis submitted under the University of Salford requirements for the award of a PhD degree by research. Some research findings were published in refereed journal and as refereed conference papers prior to the submission of the thesis during the period of PhD studies (refer to Appendix A).

The researcher declares that no portion of the work referred to in the thesis has been submitted in support of an application for another degree of qualification to the University of Salford or any other institution.

Taufika Ophiyandri

ABBREVIATIONS

ACARP	Aceh Community Assistance Research Project
ACHR	Asian Coalition for Housing Rights
ADRC	Asian Disaster Reduction Centre
AIRMIC	The Association of Insurance and Risk Managers
ALARM	The National Forum for Risk Management in the Public Sector
ANSSP	Aceh Nias Settlements Support Programme
APBD	Provincial/Local Annual Budget
APBN	National Annual Budget
APBN-P	Revised National Annual Budget
BAKORNAS-PB	National Coordination Board for Disaster Management
BAPPENAS	National Development and Planning Agency
BPKD	Local Budget Management Board
BNPB	National Disaster Management Agency
BPBD	Local Disaster Management Agency
BRR	Aceh and Nias Rehabilitation and Reconstruction Agency
BS	British Standard
CAP	Community Action Plan
CDAS	Community Development Alliance Scotland
CPHRP	Community-based Post-disaster Housing Reconstruction Project
CRED	Centre for Research on the Epidemiology of Disasters
CSFs	Critical Success Factors
DIPA	Issuance of Spending Authority
DRM	Disaster Risk Management
EM-DAT	Emergency Events Database
FEMA	Federal Emergency Management Agency
GIS	Geographical Information System
GoI	Government of Indonesia
GoSL	Government of Sri Lanka
HFA	Hyogo Framework for Actions
IDNDR	International Decade for Natural Disaster Reduction
IRBI	Indonesia Disaster Risk Index

ISO	International Standard Organisation
IRM	The Institute of Risk Management
IRP	International Recovery Platform
KMK	District/city Management Consultant
KMP	Provincial Management Consultant
KMW	Regional Management Consultants
KPA	Budget Authority Officer
MDF	Multi Donor Fund
NGO	Non-governmental Organisation
PA	Budget User
PMI	Project Management Institute
POKMAS	Community Group
PPK	Programme Implementation Officer
SKPD	Working Units
TPM	Community Assistance Team
TPT	Technical Support Team
TTN	National Technical Team
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNISDR	United Nations International Strategy for Disaster Reduction
USGS	United States Geological Survey
BPS	Statistics Indonesia
UNDP	United Nations Development Programme
UNSYIAH	Syiah Kuala University
UPLINK	Urban Poor Linkage

ABSTRACT

Indonesia is a country that is highly susceptible to disasters, particularly earthquakes. In the last decade, Indonesia has been hit by three large earthquakes; Aceh in December 2004, Yogyakarta in May 2006, and West Sumatra in September 2009. These earthquakes have created considerable losses to Indonesian communities, leading to 130,000 fatalities, US$10.3 billions in economic losses, and 500,000 heavily damaged houses. The extensiveness of housing reconstruction is the most problematic issue in the housing reconstruction programme sector. Although a community-based post-disaster housing reconstruction project (CPHRP) has been implemented, nevertheless the outcome was overshadowed by delays in delivery, cost escalation, unexpected quality, and community dissatisfaction. The implementation of good practice in project risk management in the construction industry is expected to enhance the success of CPHRP. Accordingly, this study aims to develop a risk management model for community-based post-disaster housing reconstruction approach.

In order to achieve the aim and objective of the research, multiple case studies are selected as research strategies. This study implements the sequential mixed method application, starting with a semi-structured interview and followed by a questionnaire survey as the primary method. Content analysis was used to analyse qualitative data, whilst descriptive and inferential statistics were deployed to analyse quantitative data.

The novelty of the research is as follows: this study reveals the importance of the understanding of a community-based approach in post-disaster housing reconstruction. Four highly significant advantages of CPHRP have been discovered, the most significant advantage being that it ‘creates a sense of ownership’ to beneficiaries of the project. The psychological advantage of CPHRP was also found to be greater than the construction advantage. Furthermore, the risk assessment revealed some high-risk events during the pre-construction stage of CPHRP. The project objective most affected by them is project time completion. A risk response document has also been proposed. Moreover, this study found twelve critical success factors (CSFs) of CPHRP, with the highest of the CSFs being ‘transparency and accountability’. With careful attention paid to the above findings, it is expected that the success of the implementation of CPHRP can be increased.

Chapter 1 - INTRODUCTION

1.1 Introduction

This chapter intends to present the background and justification of the study. It also includes the aim and objectives, summary of research methodology, expected contribution to knowledge, and the structure of this thesis.

1.2 Research Background

The frequency of disaster occurrence has increased significantly during the last three decades. The international disaster database, Emergency Management Database (EM-DAT), which is maintained by the Centre for research on the Epidemiology of Disasters (CRED), shows that disaster occurrence for the period 1980-1989 to 2000-2009 rose from 2798 to 7694 occurrences, an increase of 175%. In line with disaster occurrence trends, the impact of disasters on human life and economics has also become more severe. Between 1980-1989 and 2000-2009, fatalities increased steeply from 852,232 to 1,544,859, while economic damages soared from US$194.95 billion to US$910.39 billion (EM-DAT, 2013). The above figures suggest that the world is becoming more vulnerable to disasters. However, it is developing countries that suffer the most (Twigg, 2004; Eshghi and Larson, 2008; Haigh and Amaratunga, 2011;), including Indonesia.

Indonesia is undeniably one of the countries most prone to disaster in the world. Guha-Sapir *et al.* (2012) reported that Indonesia together with China, the United

States, the Philippines and India, are the five countries most frequently hit by natural disasters in the past 10 years. The most common types of disaster in Indonesia during this period are floods and earthquakes. These respectively contribute to 42% and 26% of the total number of natural disasters. Although in the last ten years earthquakes only occupy 26% of the total number of natural disasters, the death toll and economic damages it caused compared to total impacts are almost 98% (175,341 fatalities) and 89% (US$10.76 billion) respectively (EM-DAT, 2013).

Located in the juncture of four tectonic plates, Indonesia is frequently hit by earthquakes. In recent years, the occurrence of large earthquakes has increased significantly. EM-DAT (2013) records that earthquake occurrence increases from 14 times during 1980-1989 to 39 times during 2000-2009. In addition, particularly following the giant earthquake in Aceh at the end of 2004 that measured 9.0 on the Richter Scale, USGS (2010) notes that 38 large earthquakes have taken place compared with only 12 earthquakes between 1992 and 2004. Examples of devastating earthquakes during this period are the 6.3 Richter Scale Yogyakarta earthquake in 2006 and the 7.6 Richter Scale West Sumatra earthquake in 2009.

These three devastating earthquakes have destroyed hundreds of thousands of houses. Aceh earthquake necessitated the construction of 120,000 new houses (BRR and International Partners, 2005). Yogyakarta earthquake destroyed 157,000 houses (BAPPENAS *et al.*, 2006) while West Sumatra suffered the loss of 114,000 houses (BAPPENAS, 2009). As a result, massive housing reconstruction programmes have been conducted in these three affected areas. Providing good quality housing that can withstand future disaster and achieving high levels of beneficiaries' satisfaction are the ultimate goals in post-disaster housing reconstruction. However, these apparently simple goals are not easy to achieve. Many problems have hampered the success of post-disaster housing reconstruction projects.

1.3 Research justification

Housing reconstruction is probably the most important activity in a typical post-disaster reconstruction project because of the high level of demand. As a result, delivering high quality housing that can satisfy beneficiaries' needs and expectations is a key factor of a successful reconstruction programme. However, experience has shown that post-disaster housing reconstruction projects are not an easy task to undertake and face many problems (Lloyd-Jones, 2006; BRR, 2007; Haigh and Amaratunga, 2010b). Delays in delivery, cost overrun, poor quality and low satisfaction have become common problems (ACARP, 2007; BRR, 2007; Lambert and de la Maisoneuve, 2007).

Inevitably, housing reconstruction can be classified as a construction project. The traditional basic criteria of project success in the construction industry are time, cost and quality (Chan and Chan, 2004). However, in post-disaster housing reconstruction this is not sufficient, as community satisfaction is also an important factor and has to be one of the main objectives. It is the community who will live in the houses, therefore fulfilling their needs and expectations is imperative. According to Siriwardena (2012), in post-disaster housing reconstruction, 'needs' refer to something that is compulsory, while 'expectations' refer to the hopes and beliefs of the community, which may be realistic or unrealistic. Therefore, she suggests that needs should be addressed and expectations should be managed. Failure to do so can lead to low occupancy rates or in the worst case can lead to the failure of the entire housing reconstruction project. It was found that in some post-disaster housing reconstruction projects beneficiaries were not satisfied with the housing provided for them although it was of good quality construction (Vebry *et al*., 2007; Ganapati and Ganapati, 2009). One procurement method option that can be adopted to overcome those problems is a community-based approach. In many disaster-affected areas, this approach has proved superior to the contractor-based approach (Barenstein, 2006; Dercon and Kusumawijaya, 2007). It implies that in post-disaster reconstruction there are some advantages that cannot be delivered through the contractor-based approach. Therefore, it is interesting to discover the specific advantages embedded in the community-based method.

Moreover, although this method can achieve high satisfaction rates among survivors (Arslan and Unlu, 2006; Fallahi, 2007; Barenstein, 2008; Lawther, 2009), many problems still exist (Davidson *et al*., 2007; Dercon and Kusmawijaya, 2007, Jha *et al.*, 2010; MacRae and Hodgkin, 2011). Based on their experience in Aceh reconstruction, Dercon and Kusumawijaya (2007) suggest that there is a need for a standard definition of the terms ‘participation’ and ‘community-based’ as this can cause confusion. The lack of understanding of community participation also occurred in a housing reconstruction project in Sirinkoy, Turkey, after an earthquake struck in 1999 (Ganapati and Ganapati, 2009). Consequently, establishing a clear definition of community-based reconstruction is required and can provide a better understanding of this method, as well as one of the key factors for the success of the community-based method. Establishing other factors that can contribute to the success of the community-based method is also immensely important.

A typical construction project carries more risks and uncertainties than other industries such as the manufacturing industry (Hlaing *et al.,* 2008). Because the post-disaster situation is more complex than a normal situation, the risk for post-disaster housing reconstruction projects is higher than the construction project in a normal environment. Some specific challenges in post-disaster reconstruction are that it involves multiple actors, lacks local capacity, has limited funding, high demand for accountability, and a need for rapid reconstruction (Kulatunga, 2011). Further, considering that every construction project is unique, the risks in involving a community in a disaster reconstruction are very specific and would be very different compared to normal environment and contractor-based methods. The variations in scale of disaster impact, the existence of local culture and wisdom, government capacity and funding availability increase its particularity. In dealing with risks, the construction industry has acknowledged that risk management is an important factor in achieving project objectives (Kangari, 1995), minimizing losses and enhancing profitability (Akintoye and MacLeod, 1997). However, the implementation of risk management has not yet become a common practice in post-disaster housing reconstruction projects (da Silva, 2010).

In addition, Uher and Toakley (1999) state that the conceptual phase of a new construction project is most important and has the highest degree of uncertainty. Although it is viewed as the most important stage, in contrast, Lyons and Skitmore (2004) found that risk management usage in the execution and planning stages of the project life cycle is higher than in the conceptual or termination phases. Many problems in the community-based method are believed to emerge at this stage. Moreover, risk management for the whole reconstruction process is a very broad area with very broad scope. Thus, this research focuses on the application of risk management principles during the pre-construction phase of community-based post-disaster housing reconstruction projects (CPHRP). Another reason to focus on the pre-construction phase of community-based post-disaster reconstruction projects is that this phase is identified as one of the most important contributions to the success of community-based post-disaster housing reconstruction projects.

Accordingly, with the increase in the occurrence of earthquakes and with the massive effects on people and housing, it becomes clear that the implementation of a risk management process in community-based post-disaster housing reconstruction projects is imperative. Therefore, this study aims to develop a risk management model for a community based post disaster housing reconstruction approach.

1.4 Aim and objectives

The aim of the research is to develop a risk management model for community-based post-disaster housing reconstruction approach with the emphasis focused upon the pre-construction phase of the planned project. To achieve the aim, the following objectives have been devised:

- to understand the context of community-based post-disaster housing reconstruction.
- to identify and analyse the limitations of community-based post-disaster housing reconstruction.
- to establish the critical success factors (CSFs) of community-based post-disaster housing reconstruction.
- to establish a model of risk management guidelines to ensure the success of community-based post-disaster housing reconstruction project.

1.5 Research methodology

The research methodological framework of this study adopts the 'research onion' model proposed by Saunders *et al.* (2009). The philosophical assumption of the research stands at the pragmatism paradigm and multiple case studies are selected as research strategies. In achieving its aim and objectives, this research implements the sequential mixed method application, starting with a qualitative approach and followed by a quantitative approach as the primary method. The main objective of the first data collection method (semi-structured interview) is to identify the key risks in the community-based approach. There follows a questionnaire survey assessing the probability and impacts of identified risks. Content analysis is conducted for the qualitative analysis, while descriptive and inferential statistics are deployed for the quantitative analysis.

1.6 Contribution to knowledge

This study contributes to theory by establishing the risk management model for a community-based post-disaster housing reconstruction project. In addition, this study establishes a definition of a community-based method in a post-disaster housing reconstruction project, including its advantages and limitations, and reveals the CSFs of CPHRP. The study contributes to practice by providing a useful tool for stakeholders, particularly for government or for the implementing agency, helping ensure the success of CPHRP by the establishment of a risk management model and the CSFs of CPHRP. The above contributions reflect the novelty of this research.

1.7 Thesis structure

The structure of the thesis is as follows:

- Chapter 1 – Introduction

  This chapter presents an introduction to the thesis including background, research justification, aim and objectives, brief introduction of research methodology, and contribution of the research to knowledge.

- Chapter 2 – Literature review

  A literature review pertaining to the study is provided, presenting the trends and impacts of disasters in Indonesia, post-disaster housing reconstruction, community, risk management method, and critical success factors.
- Chapter 3 – Research methodology

  Chapter 3 outlines the research methodological design of the study and discusses the philosophical assumption of the research. Also presented are the adopted approach, strategy, techniques, and how validity and reliability are addressed.
- Chapter 4 – Research framework

  This chapter presents the conceptual framework of the study, which shows the key concepts of the study, their linkage and its boundary.
- Chapter 5 – Data analysis

  Chapter 5 provides the analysis of the empirical evidence of the research, involving qualitative and quantitative methods.
- Chapter 6 – Research findings

  This chapter presents the findings from the empirical analysis, providing the risk management model for community-based post-disaster housing reconstruction project and CPHRP.
- Chapter 7 – Conclusions

  Chapter 7 draws the conclusions associated with the aim and objectives of the research. Limitation and recommendations for future research topic are also presented.

1.8 Summary and the link

This chapter presents an overview of the research area by introducing the background and justification of the particular study. Having presented the aim and objectives of this study, this chapter provides the summary of research methodology, contribution to knowledge, and the structured of the thesis. The next chapter presents the literature review of the study.

Chapter 2 - LITERATURE REVIEW

2.1 Introduction

This chapter begins with some basic terminology relating to disasters, factors that contribute to disasters, trends and impacts of disaster, and the life cycle of disaster management. Then, this thesis presents the propensity of Indonesia to disaster. Further, it analyses the frequency of disaster occurrence in Indonesia during the past thirty years, between 1982 and 2011, and the impact on people, economy and the housing sector. Section 2.4 presents the key considerations that have to be analysed in post-disaster reconstruction and presents the type of procurement that has been used in post-disaster housing reconstruction. In this section, post-disaster housing reconstruction problems are also discussed. Section 2.5 discusses the definition of community and the different types of community participation in projects, and at what level of community participation a programme could be called ‘community based’. It is followed by detail on how to implement the community based approach and its advantages and limitations. Section 2.6 discusses the importance of a risk management approach in the construction industry and presents the potential of the implementation of a risk management process into a community-based post-disaster housing reconstruction project. Further, the critical success factors are discusses in section 2.7 and the knowledge gap is presented in section 2.8. This report is finally concluded in section 2.9.

2.2 Disasters

2.2.1 Definitions

2.2.1.1 Disaster

There has been no exact definition of disaster (Shaluf *et al.,* 2003; Eshgi and Larson, 2008) because it is a multidisciplinary area (Benson and Twigg, 2004), and depends on the context in which it is interpreted (Shaluf *et al.,* 2003). It can be based on the geographic, economic or political situations of disaster-prone countries (Eshgi and Larson, 2008). In the field of disaster management, the definitions proposed by the CRED and the United Nations International Strategy for Disaster Reduction (UNISDR) are probably the most influential. CRED defines disaster as a situation or event that overwhelms local capacity, necessitating a request for a national or international level of external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering (Vos *et al.*, 2010). UNISDR (2009) states that disaster is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. Similarly, according to Benson and Twigg (2004), disaster is the occurrence of an abnormal or infrequent hazard that impacts on vulnerable communities or geographical areas, causing substantial damage, disruption and possible casualties, leaving the affected communities unable to function normally, and requiring outside assistance. In addition, Haigh and Amaratunga (2010a) state that disaster is exceptional event with overwhelming loss of life and property. Despite variations on the origins of the disaster and its causes, the impact on human society is similar. These include extensive loss of life, particularly among vulnerable members of a community, economic losses, hindrance of developmental goals, destruction of the built and natural environments, increasing vulnerability, widespread disruption to local institutions and livelihoods, and disempowerment of the local community (Haigh and Amaratunga, 2010b). Synthesizing the above definitions, it can be analysed that there are three characteristics of disaster. First, it is as an event with negative consequences; second, there is the element of disturbance and distress to community/people; and third, the affected community needs assistance to overcome it.

With no universal definition of disaster, scholars and institutions classify disasters with different terminology. The classification is mainly developed by the cause of the disaster, whether it is natural or man-made. Shaluf (2007) divides it into three categories, natural disasters resulting from natural hazards, man-made disasters resulting from human decisions and hybrid disasters that result from a combination of natural and man-made hazards. Moreover, Eshgi and Larson (2008) state that the cause of disasters includes natural causes, a failure of technology, or an act of human violence. EM-DAT (2011) distinguishes two generic categories for disasters, natural disasters and technological disasters. Referring to EM-DAT (2011), natural disasters divide into five categories, geophysical, meteorological, hydrological, climatological and biological. Table 2.1 shows natural disaster subgroups, their definitions and their main types. Earthquakes have a disaster subgroup, which is ground shaking and tsunami. Moreover, technological disasters in EM-DAT (2011) categorise into three subgroups: industrial accident, transport accident and miscellaneous accident.

Table 2.1 Disaster sub-group definition and classification

Disaster Subgroup	Definition	Disaster Main Type
Geophysical	Events originating from solid earth	Earthquake, Volcano, Mass Movement (dry)
Meteorological	Events caused by short-lived/small to meso scale atmospheric processes (in the spectrum from minutes to days)	Storm
Hydrological	Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up	Flood, Mass Movement (wet)
Climatological	Events caused by long-lived/meso to macro scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability)	Extreme Temperature, Drought, Wildfire
Biological	Disaster caused by the exposure of living organisms to germs and toxic substances	Epidemic, Insect Infestation, Animal Stampede

(Source: EM-DAT, 2011)

2.2.1.2 Hazard and vulnerability

The occurrence of natural disasters is based on the convergence of two factors, hazard and vulnerability (Blaikie *et al.,* 1994; Guha-Sapir *et al.*, 2004). Added to these two factors, UNISDR (2009) includes one more factor that contributes to natural disaster, the insufficient capacity or measures to reduce or cope with the potential negative consequences.

2.2.1.2.1 Hazard

Hazards can include a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR, 2009). Based on the origin, hazards can be classified into natural and technological hazards. Natural hazard is a natural process or phenomena occurring in the biosphere that may constitute a damaging event and it can be divided into three categories: geological, hydrometeorological and biological (UNISDR, 2004). Earthquake and tsunami are the two examples of geological hazards. A technological hazard is any danger associated with technological or industrial accidents, infrastructure failures or certain human activities, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation, sometimes referred to as anthropogenic hazards (UNISDR, 2004).

2.2.1.2.2 Vulnerability

Vulnerability constitutes the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard (UNISDR, 2009) and because it refers to the human dimension of disasters it is not classed as a natural hazard (Twigg, 2004). Moreover, McEntire (2001) states that vulnerability is a dependant component of disaster. In order to mitigate disaster, therefore, vulnerability should be managed (Kanchana *et al.*, 2009).

According to Blaikie *et al.* (1994) vulnerability has three levels of progression: root causes, dynamic pressure and unsafe conditions. Economic, demographic, and political process are the most important root causes. They affect resource allocation and distribution, and reflect the distribution of power in society. Dynamic pressures are processes and activities that translate the effects of root causes into the vulnerability of unsafe conditions. Unsafe conditions are the specific forms in which the vulnerability of a population is expressed in time and space in conjunction with hazard. Figure 2.1 shows the link of the progression of vulnerability, hazards and disaster.

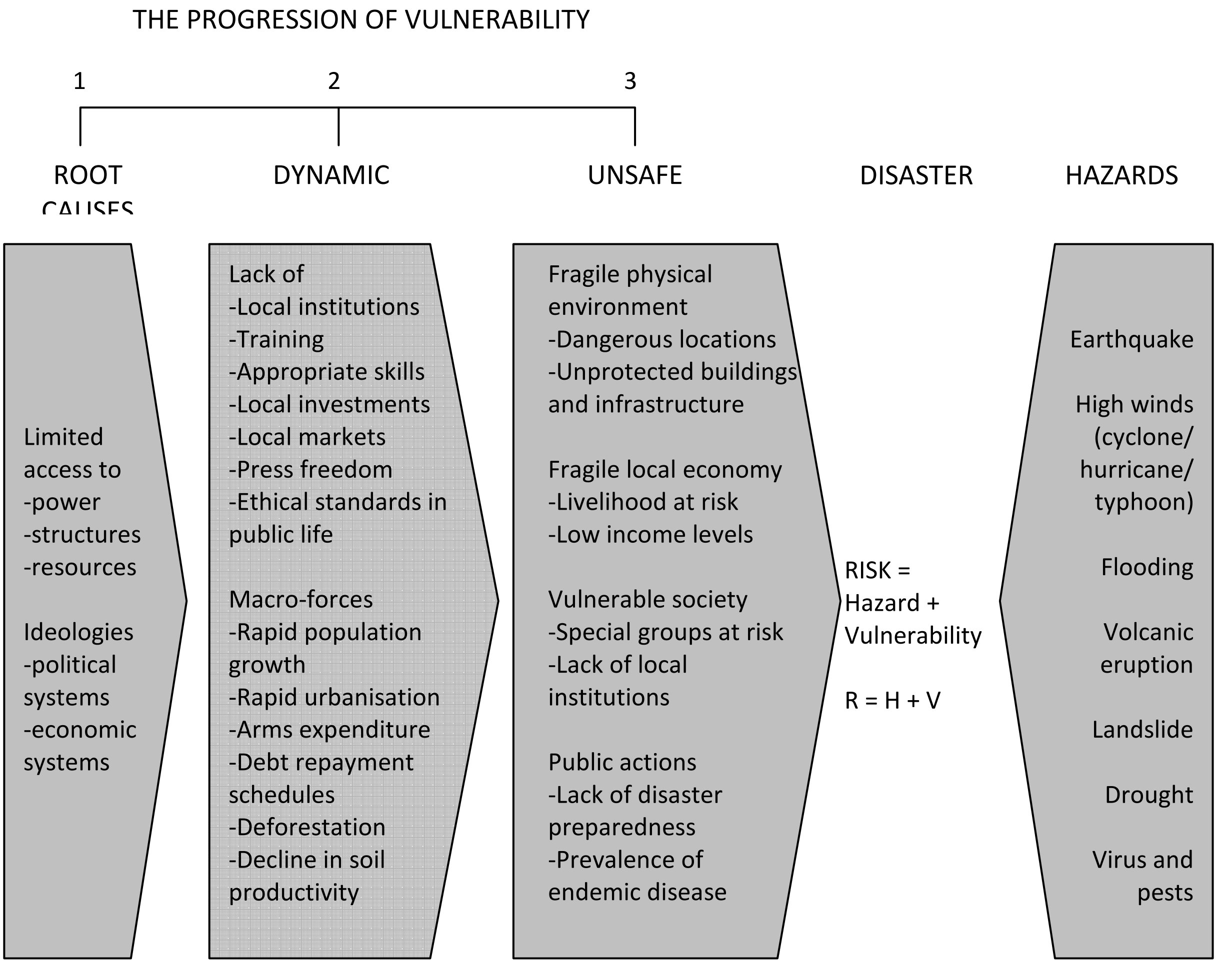

Figure 2.1 The progression of vulnerability
(source: Blaikie *et al.*, 1994)

In addition, McEntire (2001) categorises vulnerability into six types: physical, social, cultural, political, economic, and technological. The types and some factors that increase vulnerability can be seen in Table 2.2.

Table 2.2 Types of vulnerability and their factors

Type of vulnerability	Factors
Physical	- the proximity of people and property to triggering agents - improper construction of buildings - inadequate foresight relating to the infrastructure - degradation of the environment.
Social	- limited education (including insufficient knowledge about disasters) - inadequate routine and emergency health care - massive and unplanned migration to urban areas - marginalisation of specific groups and individuals
Cultural	- public apathy towards disaster - defiance of safety precautions and regulations - loss of traditional coping measures - dependency and an absence of personal responsibility
Political	- minimal support for disaster programmes amongst elected officials - inability to enforce or encourage steps for mitigation - over-centralisation of decision making - isolated or weak disaster related institutions
Economic	- growing divergence in the distribution of wealth - the pursuit of profit with little regard for consequences - failure to purchase insurance - sparse resources for disaster prevention, planning and management
Technological	- lack of structural mitigation devices - over-reliance upon or ineffective warning systems - carelessness in industrial production - lack of foresight regarding computer equipment/programmes

(source: McEntire, 2001)

Moreover, McEntire (2012) states that vulnerability can be reduced by reducing risk and susceptibility, and raising resistance and resilience. The built environment people can contribute by increasing resistance through construction practices (McEntire *et al.*, 2010). For example, in earthquake-hazardous areas, houses, buildings, bridges and other infrastructures should be built according to an earthquake resistant code.

The following section presents data of disaster occurrence and their impact on the world.

2.2.2 Trends and Impact

The different definitions of what a disaster is, have led to a variation in facts on disaster occurrence all over the world. According to Below *et al.* (2009), this has led to inconsistency, unreliability and poor interoperability of diverse disaster data compilation initiatives. The EM-DAT database managed by the Centre for Research on the Epidemiology of Disasters (CRED) is probably the most reliable source of data on disasters in the world. Thus, the figures of natural disaster occurrences and impacts in this sub-chapter will mainly refer to the EM-DAT database. EM-DAT (2011) requires that at least one of the following four criteria is fulfilled for an event to be recorded as a disaster and stored in its database:

- 10 or more people reported killed
- 100 or more people reported affected
- declaration of a state of emergency
- call for international assistance.

Guha-Sapir *et al.* (2004) state that over the past 30 years, between 1974 and 2003, the number of reported natural disasters has increased steadily, from slightly fewer than 100 in 1974 to a little more than 400 in 2003. The steep increase of natural disaster occurrence took place between 1996 and 2000. From 227 occurrences in 1996, the number soared to 444 events in 2000. However, the human impact shows very different trends over the same period. The number of people affected has followed, more or less steadily, the same pattern of increase as the number of disasters. Although the number of affected has increased over the last 30 years, the number of deaths has declined (Figure 2.2).

The recent publication on natural disasters statistical review by Vos *et al.* (2010) reveals that in 2009, 335 natural disasters were recorded, 10,655 people were killed, 119 million people were affected and economic costs exceeded US$ 41.3 billion. From Figure 2.3 it can be seen that over the last ten years 2009 experienced the lowest number of natural occurrences and had fewer victims. However, in 2010 these numbers have increased again with 373 natural occurrences (CRED, 2011) and 296,800 fatalities (Guha-Sapir, 2011). This figure has made 2010 the most perilous year of the last two decades.

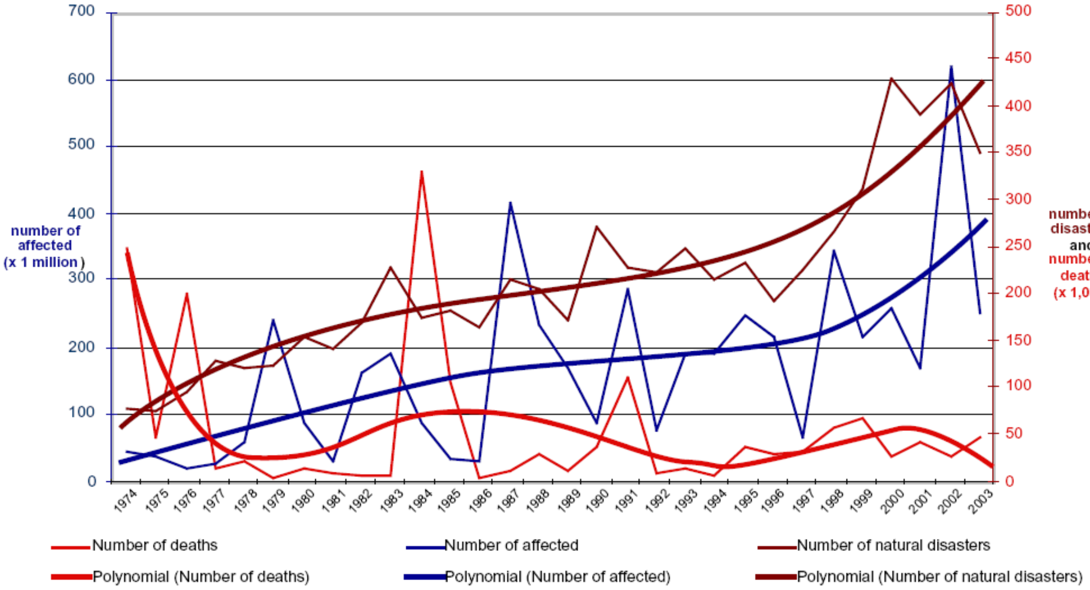

Figure 2.2 Polynomial trends in numbers of natural disasters, persons killed and persons affected: 1974 – 2003
(source: Guha-Sapir *et al.*, 2004)

Earthquakes, one of the main types of disaster in the geophysical subgroup, often tend to be the deadliest disaster in terms of the number of people killed. The worst disaster of 2004 was the huge earthquake, measuring 9.0 on the Richer Scale, which triggered the tsunami in Aceh, Indonesia and took 226,000 lives in 12 countries. In 2009, the worst disaster was the West Sumatran earthquake, which killed 1,117 people, and the worst disaster of 2010 was the Haiti earthquake where the death toll reached 222,570. Earlier this year, on 11 March 2011, a huge earthquake struck Japan, measuring 9.0 on the Richter Scale, which triggered a tsunami. Fatalities of this disaster reached 12,334 and 15,237 people were reported missing (ADRC and IRP, 2011). Tens of thousands of houses were swept away by the tsunami and the damage to Fukushima nuclear power plant has created a nuclear crisis in Japan. In terms of economic damage, the cost of this disaster is expected to be US$ 122-235 billions (World Bank, 2011). It is predicted to be the most expensive disaster in modern history.

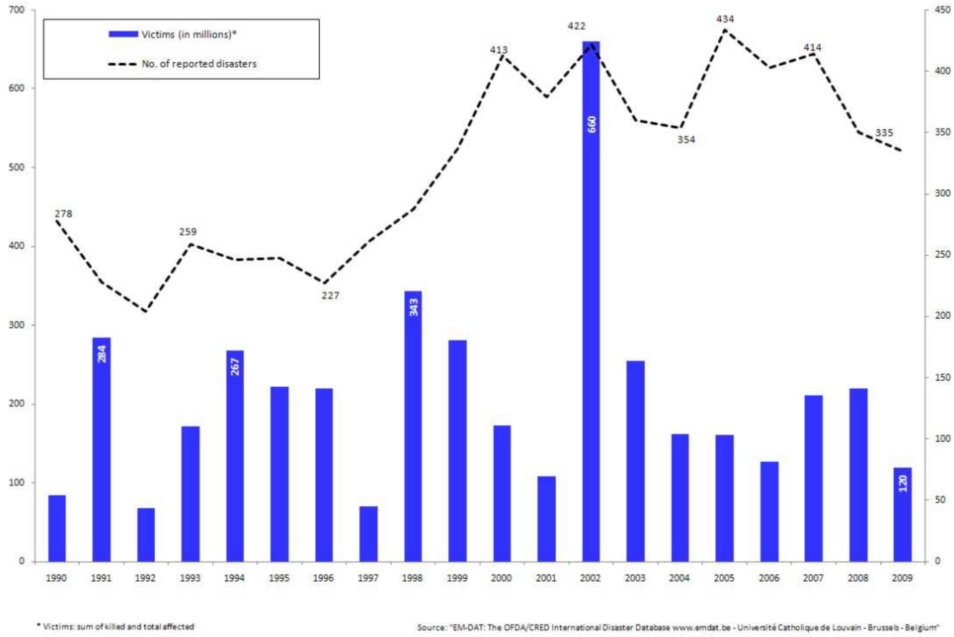

Figure 2.3 Occurrence of natural disaster trends and victims
(source: Vos *et al.*, 2010)

It is recognised that developing countries are hit hardest by natural disasters (Twigg, 2001) and more than 90% of the deaths occur in developing countries (UNISDR, 2004). The majority of victims in earthquakes are killed when their own houses collapse (Pandey and Okazaki, 2005) but the mortality rates and levels of destruction of housing by earthquakes varies from country to country, especially when comparing developed and developing countries (Guha-Sapir *et al.*, 2004). This is strengthened by the fact that between 1970-2010 the ten worst earthquakes occurred in non-developed countries (Table 2.3). This is primarily because of the differences in building codes, styles and density of settlements. Guha-Sapir *et al.* (2004) illustrates that the strong tremors of the Bam earthquake in Iran in 2003 destroyed nearly 90% of the city's buildings and killed 26,796 people. Four days earlier, an earthquake of the same intensity, 6.6 on the Richter Scale, struck the city of San Simeon in California. This earthquake left only two people dead and 40 buildings damaged.

Table 2.3 The ten deadliest earthquakes between 1970-2010

No	Date	Country	Richter	Killed (× 1,000)
1	27 Jul 1976	China	7.8	242
2	26 Dec 2004	Indian Ocean tsunami (12 countries)	9.0	226
3	12 Jan 2010	Haiti	7.0	223
4	12 May 2008	China	7.9	88
5	08 Oct 2005	Pakistan, India, Afghanistan	7.6	75
6	31 May 1970	Peru	7.8	67
7	21 Jun 1990	Iran	7.3	40
8	26 Dec 2003	Iran	6.6	27
9	07 Dec 1988	Armenia	6.9	25
10	16 Sep 1978	Iran	7.7	25

(source: Guha-Sapir and Vos, 2011 and CRED 2011)

Moreover, based on EM-DAT criteria, Guha-Sapir and Vos (2011) report that in the last 39 years (1970-2008), there have been 21 earthquakes per year, but over the last 9 years, this average has increased to 30 earthquakes per year. Indonesia, which is one of the countries most susceptible to earthquake disaster, also suffered from this phenomenon. Details of earthquake data and the impact in Indonesia are discussed in section 2.3. Table 2.4 shows the ten countries with the highest number of earthquakes between 1970-2008. It is not as surprising that Indonesia is ranked in second place because it lies in the ring of fire.

Table 2.4 The ten countries with highest number of earthquakes between 1970-2008

No.	Country	Earthquake occurrences
1	China	99
2	Indonesia	80
3	Iran	74
4	Turkey	42
5	Japan	34
6	Peru	27
7	Afghanistan	25
8	United States	24
9	Italy	23
10	Greece, Mexico	22

(source: Guha-Sapir and Vos, 2011)

2.2.3 Disaster management cycle

According to Haigh and Amaratunga (2010a), disaster management is related to resource mobilisation, emergency response, and long-term strategies to prevent disasters and reduce the risks of vulnerable groups. Various scholars (ADRC, 2005; Alexander, 2002; Amin *et al.*, 2008; Shaluf, 2008; Lettieri *et al.*, 2009) have developed different models and stages of a disaster management cycle. Generally it consists of four main stages: mitigation, preparedness, response and recovery or reconstruction. According to Lettieri *et al.* (2009), there are three different temporal (and logical) stages of disaster management, pre-crisis is the period preceding a disaster, crisis is the aftermath of the disaster and post-crisis is the period between the fading of crisis and the return to normal conditions. Based on this, a disaster management cycle can be developed as seen in Figure 2.4.

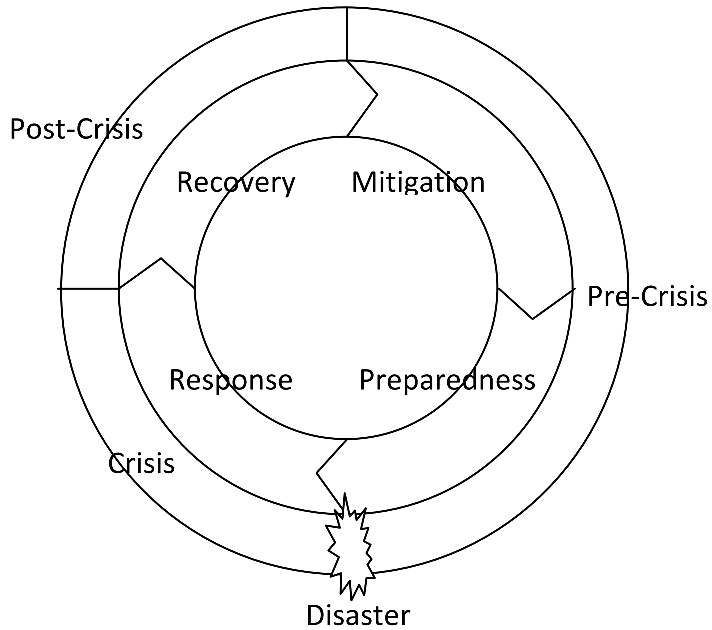

Figure 2.4 Disaster management cycle
(source: after Alexander, 2002)

According to UNISDR (2009) the definition of these four stages is as follows:

- Mitigation is the lessening or limitation of the adverse impacts of hazards and related disasters. Activities in this stage include application of engineering techniques, hazard-resistant construction and improved environmental policies and public awareness.
- Preparedness is the knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to

anticipate effectively, respond to, and recover from, the impacts of likely, imminent or current hazardous events or conditions. This stage relates to the readiness to respond to disaster. Activities include installation of early warning systems, provision of training and exercises, and provision of information.

- Response is the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. It focuses on immediate and short-term needs after disaster. Response actions include evacuation and provision of temporary shelter.
- Recovery is the restoration and improvement, where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. This requires long term planning and activities at this stage include provision of permanent housing for survival, trauma healing and livelihood programmes.

Although disaster management can be grouped into four main stages, it is not a step-by-step approach; there could be an overlap among stages. FEMA (2006) cited in Shaluf (2008) states that the disaster management cycle is an open-ended process that can operate simultaneously as the stages are interrelated and need not wait until one stage is completed before undertaking the next stage. This implies that long term planning does not have to wait until a disaster takes place or until after the crisis has ended. Moreover, Lloyd-Jones (2006) states that the planning for medium and long-term recovery can occur before and after a natural disaster. De Ville de Goyet (2008) also confirms the overlap between stages.

Disaster brings much negative impact to a community, although it can also be an opportunity to introduce better conditions than in the past. Recovery and reconstruction efforts should mitigate possible future disasters by reducing vulnerability (Shaw, 2006; Labadie, 2008). According to Jha *et al.* (2010), consultation with a community before deciding on any reconstruction approach is critical. However, it does not necessarily mean communities have complete control over the reconstruction process (Kennedy *et al.,* 2008).

Generally, activity at the recovery stage can be divided into two categories, namely physical and non-physical reconstruction. In the reconstruction in Aceh, the Government of Indonesia classified it into four groups (GoI, 2005):

- Community reconstruction: restoring aspects of religious and social-cultural lives, and community resilience, including education, health, science, religious and legal sectors, as well as traditional institutions.
- Economic reconstruction: creating employment opportunities, providing financial aid and loans for the development of small and medium sized businesses, rebuilding productive sectors (fishery, agriculture, industry, trade, and services) along with the reconstruction of economic facilities (markets, fish auction markets, warehouses).
- Infrastructure and housing reconstruction: giving priority to the restoration of basic infrastructure functions such as roads, airports and seaports, telecommunications and facilities, the restoration of electricity, water supply and housing.
- Governance reconstruction: re-creating the systems and services of local governments and by redesigning cities and new activity centres.

The above section has presented the definition of some of the basic terms in disaster management and the upward trends of disaster occurrence in the world. Indonesia, as one of the most vulnerable countries, has been badly affected by the significant rise in the occurrence of natural disasters, especially earthquakes, and due to this, the country has suffered many negative consequences. Thus, it is important to look in detail at the trends and impact of disasters in Indonesia and this subject is presented in the next section.

2.3 Disasters in Indonesia

2.3.1 Disaster Prone Country

The Republic of Indonesia is a country in Southeast Asia. It is the world's largest archipelagic country, consisting of 17,508 islands, of which 6,000 are inhabited. The total population of Indonesia given in the last population census in 2010 was

237,556,363 (BPS, 2010), the fourth largest in the world after China, India, and the United States of America.

Lying along the equator, Indonesia has a tropical climate, with two distinct monsoonal wet and dry seasons. Average annual rainfall in the lowlands varies from 1780-3175 millimetres, and up to 6,100 millimetres in mountainous regions. Humidity is generally high, averaging around 80%. Average temperatures are classified as follows: coastal plains, 28°C; inland and mountain areas, 26°C; higher mountain areas, 23°C (National Information Agency, 2004).

Indonesia is a beautiful country, but also prone to both natural and man-made disasters. Disasters can be related to geography, geology, climate or other factors associated with social, cultural or political diversity. The types of disaster that occur in Indonesia are (BAPPENAS and BAKORNAS PB, 2006): earthquakes and tsunamis, volcanic eruptions, floods, landslides, droughts, forest and land fires, epidemics, disease outbreaks and extraordinary events, technological disasters, and social unrest.

2.3.2 Trends

The total number of disasters in Indonesia in the last 30 years is 491 events. Figure 2.5 shows an upward trend in the last three decades. Comparing the number of disaster occurrences three decades ago to the last decade, the number has almost doubled, from 113 occurrences in 1982-1991 to 216 occurrences in 2002-2011. As can be seen from Table 2.5, Indonesia has suffered from many types of disaster sub-group, be they natural or technological disasters. Among the disaster subgroups in the natural disaster category, geophysical disaster and hydrological disaster occur more often than any other type of disaster. In the last 30 years, the most common disaster in these two subgroups is earthquake (ground shaking and tsunami) and flood where they contribute to 23.6% (73 events) and 36.9% (114 events) of natural disaster occurrences respectively. Analysing geophysical disaster more closely, the number of earthquake occurrences in Indonesia has risen steeply from 16 occurrences in the period of 1982-1991 to 34 occurrences in the period of 2002-2011.

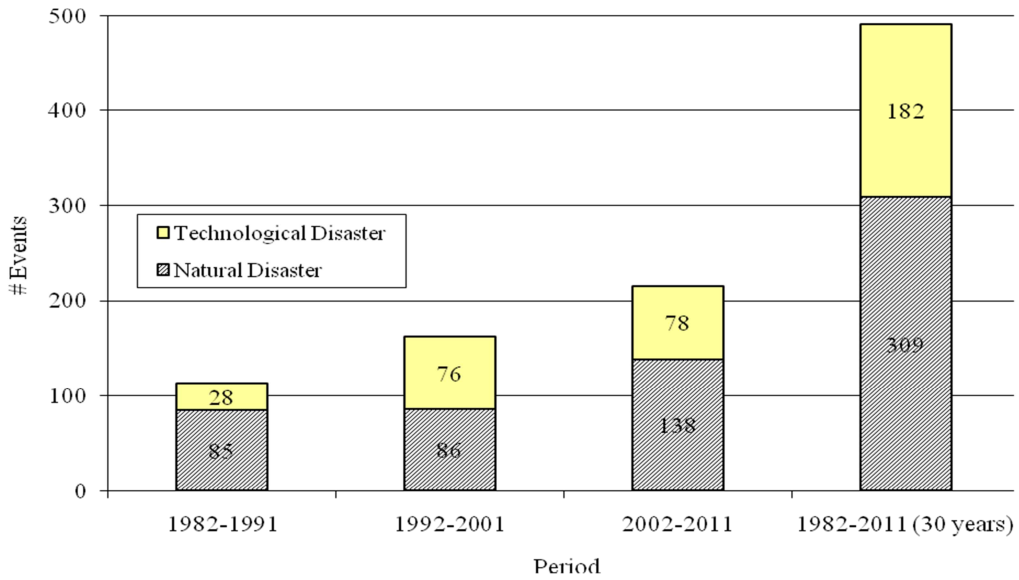

Figure 2.5 Disaster occurrence in Indonesia during 30 years (1982-2011)
(Source: EM-DAT, 2011)

Table 2.5 Type and frequency of disasters in Indonesia during 30 years

Disaster Category	Disaster Subgroup	Disaster Type	1982-1991		1992-2001		2002-2011	
			No. Events	No. People Killed	No. Events	No. People Killed	No. Events	No. People Killed
Natural Disaster	Geophysical	Earthquake (seismic activity)	16	306	23	3436	34	175319
		Volcano	15	70	7	100	12	325
		Mass movement dry	1	131	0	0	0	0
	Meteorological	Storm	2	2	0	0	2	4
	Hydrological	Flood	29	967	28	1156	57	2467
		Mass movement wet (Landslide)	6	378	12	498	21	813
	Climatological	Drought	4	594	1	672	1	0
		Wildfire	1	57	5	243	3	0
	Biological	Epidemic	11	667	10	1844	8	1165
	Sub Total		85	3172	86	7949	138	180093
Technolo-gical Disaster	Industrial Accident	Industrial Accident	2	55	5	56	8	111
	Miscellaneous Accident	Miscellaneous Accident	2	50	6	237	12	232
	Transport Accident	Transport Accident	24	1639	65	3792	58	2766
	Sub Total		28	1744	76	4085	78	3109
Total			113	4916	162	12034	216	183202

(Source: EM-DAT, 2011)

2.3.3 Impact

The impact of disasters in Indonesia is very significant. In 30 years (1982-2011), disasters have killed 200,152 people, affected 21,270,898 people and caused economic losses of US$ 23.65 billion. The huge earthquake, measuring 9.0 on the Richter Scale in 2004, which triggered the tsunami, was the worst incident, where 165,708 people were killed and economic losses of approximately US$ 4.45 billion were incurred. The tsunami from this huge earthquake also affected eleven other countries in the world.

Statistically, earthquakes are the most dangerous hazard in Indonesia. If we look at the top 10 causes of fatalities from natural disasters in Indonesia in the last 30 years, earthquakes are the major threats. The top six causes of fatalities come from earthquakes and five of them happened in or after 2004 (Table 2.6). In more detail, Table 2.7 presents the significant earthquakes in Indonesia during the last 30 years.

Table 2.6 Top 10 natural disasters in Indonesia sorted by the number of deaths from 1982-2011

No.	Disaster Type	Date	People Killed
1	Earthquake (seismic activity)	26-Dec-04	165,708
2	Earthquake (seismic activity)	27-May-06	5,778
3	Earthquake (seismic activity)	12-Dec-92	2,500
4	Earthquake (seismic activity)	30-Sep-09	1,117
5	Earthquake (seismic activity)	28-Mar-05	915
6	Earthquake (seismic activity)	17-Jul-06	802
7	Epidemic	13-May-98	777
8	Drought	Sep-97	672
9	Epidemic	Jan-98	672
10	Epidemic	01-Jan-04	658

(source EMDAT, 2011)

The severity of an earthquake is not just measured in terms of fatalities and economic losses, but is also significant for damage to dwellings. Due to the Aceh earthquake in 2004 and the Nias earthquake in 2005, 120,000 new houses are required (BRR and International Partners, 2005). The Yogyakarta (Central Java) earthquake of 27 May 2006 measured 6.3 Richter Scale and destroyed 157,000 houses (BAPPENAS *et al.*, 2006). The Tasikmalaya (West Java) earthquake measured 7.0 on the Richter Scale of 2 September 2009 and damaged 65,700 houses. The Padang (West Sumatra) earthquake (7.6 on the Richter Scale) of 30 September 2009 left 114.483 houses heavily damaged

(BAPPENAS, 2009). The most recent earthquake (7.7 on the Richter scale) of 25 October 2010 in a remote area of Kepulauan Mentawai triggered a 3 metre tsunami that took 509 lives and heavily damaged 879 houses. The above numbers suggest that the housing sector in Indonesia has been very badly hit by earthquakes. The reason for the collapse of housing is that the design and construction process does not follow the housing earthquake resistant code (Building Sesimic Safety Council, 2006).

Table 2.7 Significant earthquakes in Indonesia during 30 years

Date	Location	Sub Type	Killed	Tot. Affected	Est. Damage (US$ Million)
26/12/2004	Aceh (Sumatra)	Tsunami	165708	532898	4451.6
27/05/2006	Yogyakarta (Central Java)	Earthquake (ground shaking)	5778	3177923	3100
12/12/1992	East Flores	Earthquake (ground shaking)	2500	92103	100
30/09/2009	Padang (West Sumatra)	Earthquake (ground shaking)	1117	2501798	2200
28/03/2005	Simeule and Nias (Sumatra)	Earthquake (ground shaking)	915	105313	na
17/07/2006	Tasikmalaya (West Java)	Tsunami	802	35543	55
24/10/2010	Mentawai (West Sumatra)	Tsunami	530	11864	na
02/06/1994	Purwoharjo (Central Java)	Earthquake (ground shaking)	239	8720	2.2
16/02/1994	Liwa (Sumatra)	Earthquake (ground shaking)	207	49399	170.476
17/02/1996	Biak (Iran Jaya)	Earthquake (ground shaking)	166	25638	4.2

(Source: EM-DAT, 2011)

Moreover, the increase in earthquake occurrences in Indonesia, especially after the tsunami 2004, suggests that a good strategy in housing reconstruction has to be developed. Housing reconstruction should provide survivors with a good quality house that can mitigate possible future disaster and, most importantly, it has to meet the user’s needs.

2.3.4 Shifting disaster paradigm

In the General Assembly of United Nations (UN) in December 1999, the UN established the International Strategy for Disaster Reduction (ISDR) as a successor arrangement of the International Decade for Natural Disaster Reduction (IDNDR) under the resolution 54/219. The objective of ISDR is (Preventionweb, 2013):

- to enable communities to become resilient to the effects of natural, technological and environmental hazards, thus reducing the compound risk posed to social and economic vulnerabilities within modern societies; and
- to proceed from protection against hazards to the management of risk by integrating risk prevention strategies into sustainable development activities.

The second objective of ISDR's establishment marks the shifting paradigm on how international communities should deal with disaster, from post disaster response towards disaster risk management (DRM).

The concept DRM in ISDR comprises of four stages (Bosher *et al.*, 2007): hazard identification, mitigative adaptations, preparedness planning, and recovery and reconstruction planning. The latter reflects that post-disaster reconstruction effort should also contribute to disaster risk reduction programmes. In addition, the Hyogo Framework for Action 2005-2015 which was established at the second World Conference on Disaster Reduction in Japan in 2005 identifies five priority areas for action in order to reduce disaster losses (UN, 2005):

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors.
5. Strengthen disaster preparedness for effective response at all levels.

Priorities 3 and 4 urge built environment professionals to address disaster risk reduction in their projects. Thus, in the context of post-disaster reconstruction project, it is importance to produce houses or other infrastructures that can withstand future possible disaster. The disaster can be seen as an opportunity to built back better. For example, houses to be built in earthquake disaster affected areas have to comply with an earthquake resistant building code.

In Indonesia, the tsunami in Aceh in 2004 and the establishment of HFA in early 2005 have become the accelerator for Indonesia to pay more attention to disaster risk management. Since then, there has been much discussion about how Indonesia should deal with disasters. The new paradigm on disaster management officially starts from the approval of Disaster Management Law No. 24 Year 2007 by the House of Representatives. Although it was proposed on the beginning of 2004, before the Aceh tsunami, the Law was enacted in Jakarta on 26 April 2007.

Disaster Management Law No. 24/2007 brings a shifted paradigm in disaster management to Indonesia. First, in respect of disaster management, there is a change from an emergency response to focusing on risk management. Second, protection is a basic human right of the people. Third, disaster management is the responsibility of all stakeholders, not only government. Finally, disasters should be handled as daily activities not as an extraordinary issue. Table 2.8 contrasts the old and new paradigm on disaster management in Indonesia after the establishment of Law No. 24/2007.

Table 2.8 Shifted paradigm on disaster management in Indonesia

Old Paradigm	New Paradigm
Emergency response	Risk management
Protection as a blessing given by the government	Protection as the people's human right
Government responsibility	All stakeholders responsibility
Handling disasters as an extraordinary issue	Handling disasters as the daily task of administration and development

(source: after Hadi, 2007)

Moreover, under Law No. 24/2007, the government is encouraged to a establish National Disaster Management Agency (BNPB) which is a non-departmental body on a ministerial level. On 26 January 2008, BNPB was established by the enactment of Presidential Regulation no 8 year 2008.

The above section has presented the trends and impacts of disaster in Indonesia and it can be concluded that earthquakes are a major threat in Indonesia. It has cost thousands of lives and destroyed thousands of homes. A shifted paradigm in disaster management has also been discussed, highlighting the importance of integrating disaster risk principles to post-disaster reconstruction projects. Particularly for housing reconstruction projects, the new houses provided for survivors should be better than before, and able to withstand future possible disasters. It is not just the quality of the house that matters but also making beneficiaries aware of risk reduction principles. The next section discusses key considerations on post-disaster housing reconstruction, problems, and procurement methods that can adopted.

2.4 Post-disaster Housing Reconstruction

2.4.1 Key considerations

Housing reconstruction is one activity in the physical reconstruction project following a disaster. In this research, it is defined as the process of reconstruction of a house that has been damaged by disaster. It is probably the most important activity in the reconstruction project due to the levels of homeless people after the relief period. As described by Maslow (1943), there are five levels in the hierarchy of needs: physiological needs, safety needs, love/belonging needs, esteem needs and self-actualization needs. Physiological needs are the most basic needs without which human beings cannot survive, such as food, water, and shelter. If the physiological needs are relatively well satisfied, then new needs emerge which are known as safety needs. These are the needs for personal protection, such as employment, health, and property. Above these are the needs for love and belonging, such as friendship, relationships, and family. After the first three needs have been satisfied, the next level comprises esteem and self-actualisation needs. In these categories, humans have a need to feel confident, be respected, and be concerned about their own achievements, personal growth and the fulfilment of their own potential. Homes can be categorised into the second level, the safety needs. With the availability of home, the human being can feel safe and can commence normal life. As a result, delivering a high quality house that can satisfy beneficiaries' needs and expectations is a key factor in a successful reconstruction programme. However, experiences have shown that housing reconstruction projects are not an easy task and face many problems.

Amin *et al.* (2008) acknowledged that the recovery and reconstruction phase is a slow process of redevelopment with a long-term vision. In his research in 2006, Lloyd-Jones raises the question of why reconstruction following major disasters takes so long. He discovered that there is a gap in funding, management and delivery, between short-term, effective humanitarian relief, and long-term reconstruction. Because of the different types of organisations and interest groups involved, the link between immediate humanitarian relief and the longer-term reconstruction is often poorly managed. Moreover, Lloyd-Jones (2006) suggests that planning for long term recovery does not have to wait until the relief phase is at an end, it can occur before and after a natural disaster (Figure 2.6).

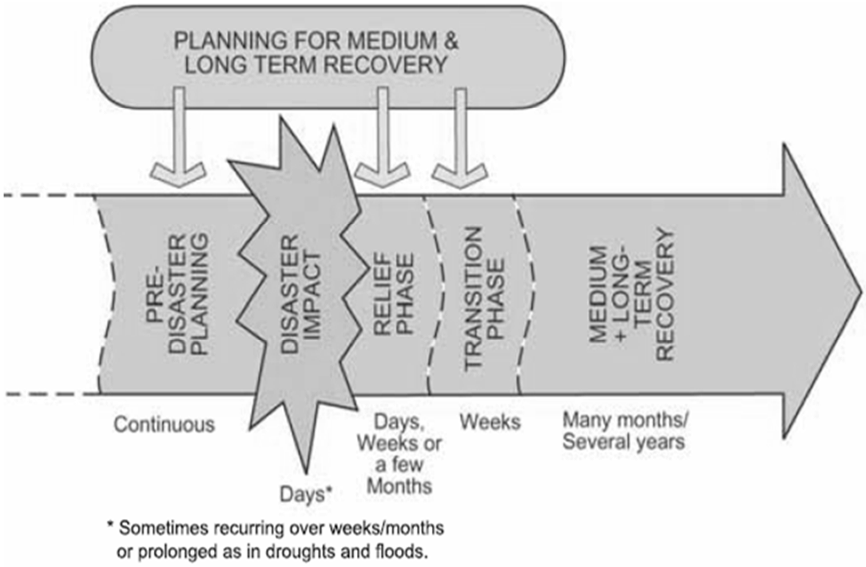

Figure 2.6 Where planning for medium and long-term recovery can occur before and after a natural disaster
(source: Lloyd-Jones, 2006)

Da Silva (2010) proposes some key considerations for post-disaster reconstruction based on its stages (planning, design and construction) (Figure 2.7). In addition, for a community-based reconstruction programme Jha *et al.* (2010) suggest some factors that have to be considered: reconstruction costs, improvement in housing and community safety, restoration of livelihoods, political milieu, cultural context, and people's own goals for well-being, empowerment, and capacity.

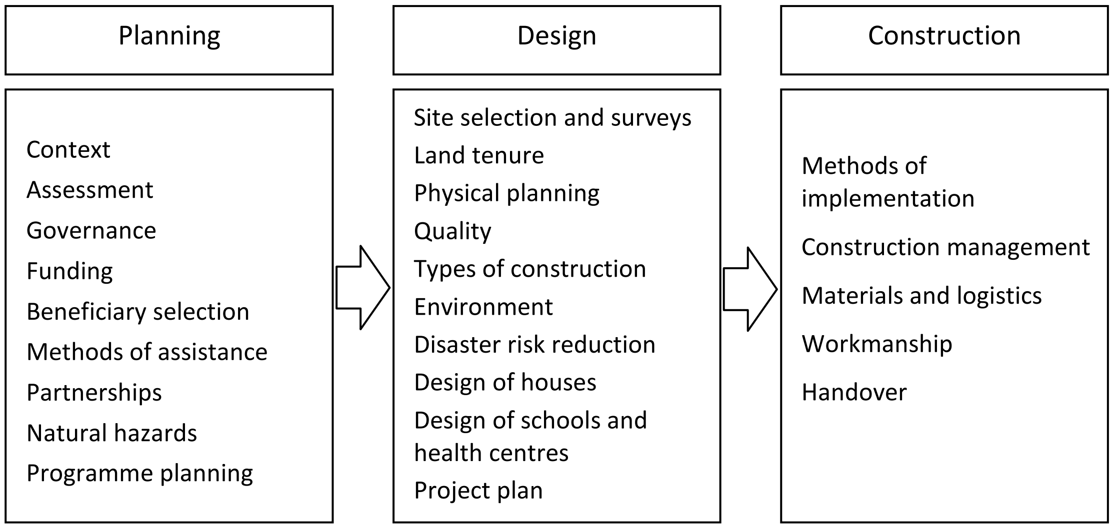

Figure 2.7 Key considerations in post-disaster reconstruction
(source: da Silva, 2010)

Different models of housing reconstruction strategies after earthquake disasters have been implemented around the world. Hayles (2010) suggests that it must find a balance between affordability, technical feasibility and quality of life. According to da Silva (2010) the most appropriate method will be depend on the skills and capacity of the beneficiaries, the availability of local material, the complexity of the housing design and type of construction, the timescale for reconstruction and the availability of funding. However, its implementation is not easy as it requires interdisciplinary strategies, tools and approaches (Haigh and Amaratunga, 2010b).

Based on the above, it then becomes clear that governments in disaster prone areas have to prepare a pre-reconstruction strategy. They have to analyse carefully the key considerations in post-disaster reconstruction, for example beginning by identifying all the resources that they have, and carrying out risk assessment process. In this process, governments have to analyse carefully the hazard and the vulnerability of their area. Then they can calculate the possibility of disaster occurrence and its possible impact. The possibility of impact can translate into several options, for example, high, medium or low. In the housing sector, the scenario can be based on the number of damaged houses and funding availability. Within the preliminary organisation structure, with a detailed coordination line, roles and responsibilities also can be structured. If a real disaster happens, only minor adjustments to the pre-reconstruction strategy will be needed in order to suit a real situation. In Indonesia for example, the scenario has been implemented in Yogyakarta and West Sumatra reconstruction in terms of funding availability (BAPPENAS *et al.*, 2006; BAPPENAS, 2009). Inevitably, the availability of pre-planning will save much time in constructing the policy for post-disaster reconstruction. The government does not need to start its plan from the beginning, and consequently the housing reconstruction project does not have to be delayed whilst waiting for the strategy to be developed.

Lack of pre-construction planning in post-disaster reconstruction added to other factors may lead to reconstruction problems. The next sub-section analyses the specific problems that emerged in the post-disaster housing reconstruction in Aceh, Indonesia.

2.4.2 Reconstruction problems

Following the earthquake and tsunami in 2005, the Government of Indonesia established the Reconstruction and Rehabilitation Agency of Aceh and Nias (BRR). This agency, established by Presidential decree, was given the task of restoring livelihoods and infrastructure and of strengthening communities in Aceh and Nias by directing a coordinated, community-driven reconstruction and development programme (BRR and Partners, 2006). BRR's target is to construct 48,000 houses and it is responsible for coordinating the construction of 72,000 units built by NGOs and international agencies (BRR, 2007). Two procurement methods have adopted for the Aceh and Nias reconstruction, a contractor-based approach and a community-based approach. However, even though the Government of Indonesia has appointed BRR to speed up the reconstruction phase, housing reconstruction there still faces many problems.

The massive housing reconstruction programme in Aceh and Nias is not an easy task for the government, donors, international agencies and NGOs who are involved in the reconstruction phase. ACARP (2007) states that permanent housing has been found to be the most problematic task of the entire tsunami recovery effort, and the most challenging sector for international NGOs working in Indonesia (World Vision, 2008). However, many lessons can be learned from this experience, especially in the housing reconstruction sector.

2.4.2.1 Delays

Lambert and de la Maisoneuve (2007) reported that the permanent shelter programme in Aceh experienced many problems, and delivery of the programme has not met the original target. BRR (2007) admits that the target to construct 120,000 houses has not been achieved. Only 41,730 houses had been constructed by 31 March 2006; this figure rose to 57,000 units by the end 2006 and by April 2007 the number had reached almost 65,000 units. In addition, ACARP (2007) found that delays in housing delivery are the most common complaint on the Aceh reconstruction programme.

All parties involved in the reconstruction process, BRR, the central and local government, and international organisations negatively contributed to the delay on the Aceh reconstruction programme. Greenomics Indonesia, which quantitatively assessed the constraints of stakeholders, revealed that the level of constraints originating from BRR was the highest at 31.43%, followed by central government at 28.57%, international organisations at 22.86% and Aceh local government at 17.14%. The delay to the delivery of new housing in Aceh was also caused by other factors: shortage of human resources, logistical problems, bureaucratic and institutional problems, and difficulties in coordinating the multitudes of organisations (Vebry *et al.*, 2007). Also land acquisition problems, particularly for the relocation villages (ACARP, 2007), and lack of road access (OXFAM, 2006).

The West Sumatra housing reconstruction programme that started in 2010 and dealt with the reconstruction of 114,000 houses also reported that it was struggling to meet the project timeline (Tempo Interaktif, 2010). The major sources of the delay came from problems of coordination and unclear sources of funding. Moreover, Koria (2009) states that delays can caused cost overruns and in reverse, cost overruns have caused delays. It also can lead to total failure where the funds have not been sufficient.

2.4.2.2 Cost overruns

The initial estimation by BRR for a 36 metre square standard house to be provided for beneficiaries in Aceh was around US$3000 and set to be the maximum budget permitted in early 2005. However, by the end of 2005 BRR revised this figure to

US$5-6000. The huge cost escalation was mainly due to sharp price increases in construction materials and labour (BRR and International Partners, 2005). The increase of construction material was because of the increase of construction activity, the need to import common construction materials, and the increase in energy prices (Steinberg, 2007). As a result, the price of construction materials in Aceh soared by 200-50%. Shortage of skilled labour has also contributed to cost escalation (Lyons, 2009 and Steinberg, 2007).

Another factor was transportation problems, as many roads and bridges were destroyed by the tsunami making access difficult. As a result, the transportation costs became high (Chang *et al*., 2010). Moreover, poor workmanship also contributed to the cost overrun and was exacerbated by low supervision during the construction process.

2.4.2.3 Poor quality

ACARP (2007) found that along with delays in delivery of housing in the reconstruction project in Aceh, other complaints regarding quality and design issues, poor coordination and poor communication between the housing providers and intended beneficiaries were evident. BRR (2007) understood the difficulty in keeping all housing beneficiaries fully and equally satisfied. The different housing construction agencies have individual construction standards which lead to a coordination problem. Due to a lack of uniform standards, the housing construction programme is unbalanced either in rate of completion or in level of quality. According to BRR and Partners (2006), in general, low contractor capacity and poor supervision has led to poor quality construction.

The reconstruction of Aceh and Nias involved more than 100 organisations. Vebry *et al.* (2007) state that many NGOs active in Aceh were originally humanitarian organisations without any relevant experience in housing reconstruction. Lured by huge donations, hundreds of NGOs entered the reconstruction process without any supporting background, knowledge or experience in post-disaster housing reconstruction and rehabilitation, with many of them attempting the process for the first time (Dercon and Kusumawijaya, 2007 and Vebry *et al.*, 2007). Dercon and

Kusumawijaya (2007) add that many organisations, especially the smaller ones, started building without a clear overall concept. In the best of cases, some organisations began the reconstruction but then dropped out, halted or stopped their programmes. Other organisations endlessly postponed their start-up dates, and in the worst cases, many poor houses were constructed and organisations had to acknowledge costly defeats.

2.4.2.4 Poor satisfaction

In 2005, BRR encouraged Universitas Syiah Kuala (UNSYIAH), the Banda Aceh-based State University, to provide third party monitoring and evaluation on housing reconstruction. The survey, conducted from 2005 to 2006, monitored settlement recovery of 805 homes of 61 organisations in 161 locations. It used three key indicators to benchmark the success of each project: a construction quality index (0 to 4), a satisfaction index (-9 to 9), and an accountability index (0 to 10). The accountability index and satisfaction index are based on the beneficiaries' opinion of the organisation, whereas construction quality is measured through direct on-site observation by building inspectors, architects and civil engineers, who monitor the construction process against the Aceh Building Code standard. All results were made public. In terms of average result, the construction quality index was 2.58, the satisfaction index was 1.2 and the accountability index was 6.0 (UNSYIAH and UN-HABITAT, 2006).

It becomes clear that the Aceh reconstruction faced serious problems in construction quality, satisfaction and accountability. The most significant was the satisfaction index. From a scale of -9 to +9, the satisfaction index was only 1.2. This result implies that the majority of beneficiaries were not satisfied with the housing provided for them. It is clear that delays and poor quality construction contributed to this result. However, there were cases in which high quality housing did not achieve high satisfaction from beneficiaries (Vebry *et al.*, 2007). Thus, what other factors contributed to this level of dissatisfaction?

The satisfaction index is closely related to the feelings of beneficiaries. Good quality housing sometimes does not fulfil their expectation and needs. A simple example is that one beneficiary might expect his or her house to be painted pink, whereas, the house has been painted a cream colour. Because the expectation does not meet the needs of the beneficiary then there will be a significant degree of dissatisfaction. It means that providing houses for beneficiaries has to be managed carefully and understanding how to meet their expectations and needs is essential. Thus, without communication with the recipient, expectations are impossible to identify. This situation often occurs within the top down approach. To avoid this problem, the community has to be actively involved in the reconstruction process. Therefore, community participation is important, and by involving the community affected by the disaster in the reconstruction process, a level of satisfaction is more likely to be met.

By examining the satisfaction index of the Aceh reconstruction programme, it can be suggested that the programme has failed to meet the beneficiaries' needs, which also indicates little community participation took place.

The above discussion has shown the importance of determining the most appropriate type of procurement method to be adopted in post-disaster housing reconstruction. The next section discusses the type of procurement method in post-disaster housing reconstruction.

2.4.3 Type of procurement

There are many types of procurement method that have been implemented in post-disaster housing reconstruction, with many terms and models defined by scholars and organisations. Da Silva (2010) classifies self- or community-built, and contractor-built or direct implementation. In Sri Lanka, following the introduction of a buffer zone after the 2004 tsunami, two types emerged in post-disaster housing reconstruction (GoSL 2005). These were donor-built reconstruction programmes, where affected families were relocated away from the buffer zone and the donors undertook the reconstruction, and home owner-driven housing reconstruction programmes where partly or fully damaged houses were rebuilt outside the buffer zone by the homeowner.

In addition, Barenstein (2008) states that housing reconstruction in Gujarat after an earthquake in 2001 measuring 7.7. Richter scale adopted five different approaches:

- Owner driven approach (ODA): the house owner was given financial compensation ranging from a minimum of 40,000 Rs to a maximum of 90,000 Rs for a fully damaged house, depending on the size and value of the original house.
- Subsidiary housing approach (SHA): the housing assistance approach pursued by several Gujarati NGOs that were actively involved with various livelihood programmes, targeted at socio-economically disadvantaged communities in remote areas of Gujarat, before the earthquake struck.
- Participatory housing approach (PHA): several NGOs in Gujarat actively involved their target groups in the reconstruction process.
- Contractor-driven reconstruction in situ (CODIS): mainly pursued by large national and international NGOs. The NGO employed a large contractor who brought in skilled and unskilled labour from outside, but reconstructed most houses in situ.
- Contractor-driven reconstruction ex-nihilo (CODEN): adopted by large national and international NGOs and some private companies. Besides adopting a contractor-driven approach, it was among the few agencies that in spite of massive public resistance to relocation constructed completely new villages *ex nihilo*.

Similarly to Barenstein (2008), Jha *et al.* (2010) proposes five types of housing reconstruction approaches:

- Cash Approach: unconditional financial assistance is given without technical support.
- Owner-Driven Reconstruction: conditional financial assistance is given, accompanied by regulations and technical support aimed at ensuring that house reconstruction is improved.
- Community-Driven Reconstruction: financial and/or material assistance is channelled through community organisations that are actively involved in decision making and in managing reconstruction.

- Agency-Driven Reconstruction in-Situ: refers to an approach in which a governmental or nongovernmental agency hires a construction company to replace damaged houses in their pre-disaster location.
- Agency-Driven Reconstruction in Relocated Site: refers to an approach in which a governmental or nongovernmental agency hires a construction company to build new houses on a new site.

Table 2.9 presents the degree of household control, form of assistance and stakeholders' role for the above approaches, and shows that the degree of control of beneficiaries varies from low to high where the degree of control in community-driven approach is from medium to high. The amount of control will depend upon what extent the community can participate in the reconstruction project.

Table 2.9 Reconstruction approaches and degree of household control

Reconstruction approach	Degree of household control	Form of assistance		Role of actors			Location	
		Financial	Technical	Community	Agency	Contractor	In-situ	New site
Cash Approach	Very high	Cash only	None	None	None	Household may hire	Yes	No
Owner-Driven Reconstruction	High	Conditional cash transfer to household	TA/Training of household	None	Project oversight and training	Household may hire	Yes	No
Community-Driven Reconstruction	Medium to high	Transfer to household or community	TA/Training of community and household	Project organisatio n and oversight	Project oversight and training	Community may hire	Yes	No
Agency-Driven Reconstruction *in-Situ*	Low to medium	Funds handled by agency	Limited or none	Limited	Manageme nt of project	Agency hires	Yes	No
Agency-Driven Reconstruction in Relocated Site	Low	Funds handled by agency	Limited or none	Limited	Manageme nt of project	Agency hires	No	Yes

(source: Jha *et al.*, 2010)

Moreover, a study by Davidson *et al.* (2007) of four case studies for post-disaster housing reconstruction in Colombia, El Salvador, and Turkey (two cases) also revealed different models of post-disaster housing reconstruction with different roles for stakeholders. Table 2.10 shows the responsibilities of stakeholders throughout the reconstruction stages. It can be seen from this table that the level of community participation is higher in Colombia compared to other locations. The community was engaged from the earliest stages of reconstruction. They found that this had a positive impact on community and on the project itself. The community satisfaction was very high in this case. Conversely, the case study in Cankiri, Turkey, ended with beneficiaries' dissatisfaction, many survivors refusing to move to their new houses due to lack of participation taking place. This study highlights the importance of engaging the community at the earliest stage of the housing reconstruction programme.

Table 2.10 Responsibilities of project participants

Activity	Case study 1 Colombia	Case study 2 El Salvador	Case study 3 Turkey - Marmara	Case study 4 Turkey- Cankiri
Programme initiation (leading role in procuring the master programme of reconstruction)	Government	Government	Government	Government
Project initiation (leading role in starting the project)	NGO-Beneficiaries	NGO	Government -NGO	Government
Project financing	Government -NGO-Beneficiaries	NGO	Government-NGO	Government-Beneficiaries
Design	Beneficiaries	NGO	Government-Private firm	PFIRM
Construction	Beneficiaries	Hired contractors + Beneficiaries	CON + Private firm	Beneficiaries + Hired contractors
Post-project modifications-additions	N/A	N/A	Beneficiaries	Beneficiaries
Position of the project in the ladder of community participation proposed in Fig. 4.2	empower	inform/ manipulate	consult	inform

(Source Davidson *et al.*, 2007)

It can be seen that many choices can be adopted for housing reconstruction projects. Moreover, Jha *et al.* (2010) state that the approach need not be rigidly adhered to, but can be combined because it is context-specific and should consider many factors. Whatever strategy is to be implemented the key considerations that have been discussed in the previous subsection (section 2.4.1) need to be addressed.

The above discussion also suggested that a community-based method can provide the community with a high degree of control in disaster reconstruction which can lead to the success of post disaster housing reconstruction. What exactly is community participation and to what extent should the community participate in the reconstruction process? The following section answers these questions.

2.5 Community Participation

2.5.1 Definition of community

The word ‘community’ has different meanings and definitions. Hillery (1955) cited in Kumar (2005) enumerates ninety-four different definitions of community in scientific literature. All definitions used some combination of space, people and social interactions. According to Wright-House (2009), McMillan & Chavis's definition is probably the most influential among theories of, and is the starting point for most of the recent research on, the psychological sense of community. McMillan and Chavis (1986) define community as a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together. Moreover, they state that there are four elements to a sense of community:

- Membership
  Membership includes five attributes: boundaries, emotional safety, a sense of belonging and identification, personal investment and a common symbol system. These attributes work together and contribute to a sense of who is part of the community and who is not.

- Influence
  Influence is a bidirectional concept. Members need to feel that they have some influence in the group, and some influence by the group on its members is needed for group cohesion.

- Integration and fulfilment of needs
  This is the feeling that the resources received through their membership in the groups will meet members’ needs. Members feel rewarded in some way for their participation in the community.

- Shared emotional connection
  The "definitive element for true community", it includes shared history and shared participation (or at least identification with the history).

The definition of community proposed by Abarquez and Murshed (2004) states that it can be used to refer to groupings that are both affected by and can assist in the mitigation of hazards and reduction of vulnerabilities. Hence, in the context of disaster risk management, Abarquez and Murshed (2004) define community as a group that may share one or more things in common such as living in the same environment, experiencing similar disaster risk exposure, or having been affected by a disaster. Common problems, concerns and hopes regarding disaster risks may also be shared. A similar definition, but one more closely allied to the built environment is proposed by Ginige and Amaratunga (2011). They define community as 'individuals and groups sharing a natural and built environment that is vulnerable to hazards. In other words, community is the general public; the users and occupants of the built environment and the beneficiaries of post-disaster reconstruction'. Drawing from these definitions, and for the purpose of this context, the researcher defines community as groups of beneficiaries for housing reconstruction in which their houses were affected by disaster.

Communities change and grow, they are not static (CDAS, 2008). Economic and social pressures and indeed disaster can break links between people, but people also create communities in new ways. In the modern world, one person can belong to many different communities, based on where they live, their interests or culture, or the people that share common difficulties. Abarquez and Murshed (2004) add that advancements in information and communications technology have given birth to new forms of communication and arguably to a new form of community. Computer-mediated communication leads to the formation of virtual communities. A common concept of community is that it consists of a harmony of interests and aspirations, and is bound by common values and objectives. This definition implies that a community is homogeneous. However, in reality, a community can be socially differentiated and diverse; it need not be homogenous (Abarquez and Murshed, 2004).

2.5.2 Types of participation in housing reconstruction

Kumar (2005) cited in Chambers (1983) states that it was primarily in the 1980s with the emergence of participatory methods that the focus on community began to gain in importance. The popularity of community participation is evident from the proliferation of participatory projects from the 1980s onwards. However, it was ironic, as Midgley *et al.* (1986) in Kumar (2005) pointed out, that even though it was central to the issue of participatory development, the concept of community was poorly defined. Kumar (2005) adds that community participation projects are also often vague as to whether the community is meant to be a means or an end to a development programme. Davidson *et al.* (2007) also noted that the concept of community was easier said rather than done.

Arnstein (1969) created eight levels of citizen participation that he called 'A Ladder of Citizen Participation' (Figure 2.8). The bottom rungs of the eight-rung ladder are rung 1 (Manipulation) and 2 (Therapy), which describe the levels of non-participation where power holders have the power to educate or cure the participants. Rungs 3 (Informing), 4 (Consultation) and 5 (Placation), progress to levels of tokenism, where citizens may indeed hear, be heard or give advice. Further up the ladder are levels of citizen power, rung 6 (Partnership) enables them to negotiate and (7) Delegated Power and (8) Citizen Control equate to situations where citizens obtain the majority of decision-making seats, or full managerial power.

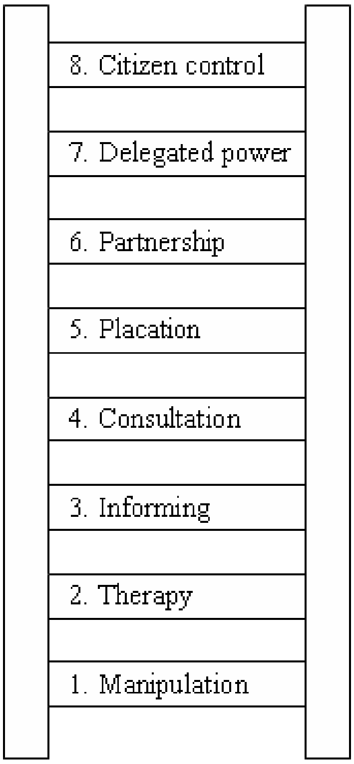

Figure 2.8 Eight rungs on the ladder of citizen participation
(source Arnstein, 1969).

Arnstein's model was later modified by Choguill (1996) to fit with underdeveloped countries. Choguill (1996) classifies the ladder of community participation into neglect, rejection, manipulation and support. Later on, Davidson *et al.* (2007) combine these two theories to suit community participation in housing reconstruction projects (Figure 2.9). The level of control of the community reduces from the top to the bottom of the ladder. If the level of participation is at the bottom rung of the ladder, the community has little or no power to control or manage the reconstruction. In this case, there may be consultation regarding their needs and expectations but with no assurance that these concerns will be taken into account, or they may be merely informed about the shape, the housing project will take or even manipulated into taking part in the project. At the top ladder, empowerment and collaboration can offer communities control of the housing reconstruction project (Davidson *et al.*, 2007).

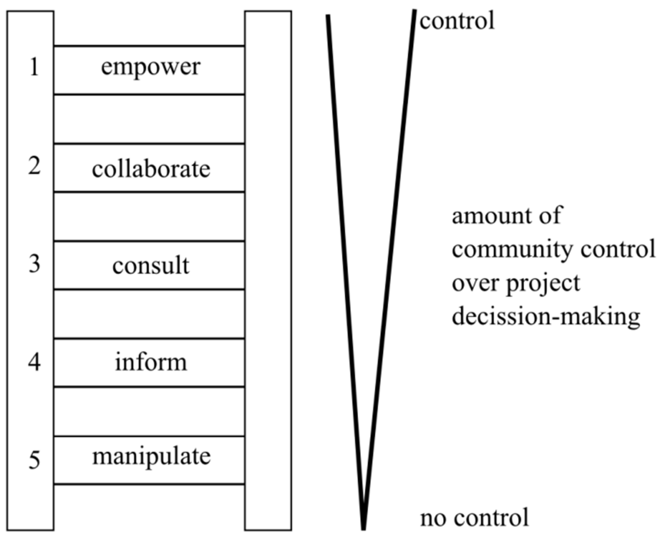

Figure 2.9 Ladder of community participation on housing reconstruction project
(source Davidson et. al., 2007)

Following a disaster, communities sometimes become passive to development programmes brought in by external organisations. Thus, they have to be engaged to actively contribute and participate. According to Johnston (1982), four basic strategies are required in order to increase the level of participation of a community:

- Build mutual trust between members of the community, between the community and its leaders, and with external organisations cooperating within the community.
- Give the community an opportunity to participate.
- Encourage communities to welcome the project since it provides something of value to them.
- Promote a strong sense of ownership and responsibility for the programme within the community.

The next section discusses the implementation of community post-disaster housing reconstruction in post-disaster housing reconstruction together with it advantages and limitations.

2.5.3 Community-based housing reconstruction

Section 2.4.2 states that the post-disaster housing reconstruction project in Aceh has faced many problems, a delay in project delivery, poor quality, poor levels of satisfaction, low accountability, and low community participation. However, some good practices emerge. The community-based housing reconstruction has proven to be a better way of reconstruction compared to a contractor based approach. Dercon and Kusumawijaya (2007) divided the findings from a monitoring survey undertaken by UNSYIAH (UNSYIAH and UN-HABITAT, 2006) on the Aceh housing reconstruction project into a community organisation programme and a contractor-built programme and found that the quality, satisfaction and accountability index of the community participation programme was superior to that of the contractor-based approach (Table 2.11).

Table 2.11 Housing reconstruction index in Aceh

Organisations	Construction Quality (0 to 4)	Satisfaction Score (-9 to 9)	Accountability Score (0 to 10)
All organisations in 2006	2.58	1.2	6.0
All community organisations programme	2.67	2.1	6.7
All contractor-built programme	2.55	0.8	5.9

(source: Dercon and Kusumawijaya, 2007)

In addition to the high construction quality, satisfaction and accountability scores, delivery of housing reconstruction using a community-based approach is also faster than the contractor-based approach. ACARP (2007) reveals that a few housing projects that involved homeowners in the construction process have been completed more quickly, with far fewer problems, than the majority of projects that took a turnkey approach. Moreover, Dercon and Kusumawijaya (2007) also state that in the Aceh reconstruction the community based approach has proven to be faster and to deliver higher quality and satisfaction results than other reconstruction methods. MDF (2008) states that the community-driven approach has proved an efficient means not only of rebuilding houses but also of creating a sense of ownership, and restoring pride among beneficiaries (Barakat, 2003). The spirit in which the community-based approach was applied has resulted in a high level of beneficiary satisfaction.

Two leading organisations that implemented a community-based approach in the Aceh and Nias reconstructions were UN-HABITAT and JUB/UPLINK. The UN-HABITAT programme is called The Aceh Nias Settlements Support Programme (ANSSP). This programme was assigned to provide 3600 houses in six districts: Banda Aceh, Aceh Besar, Pidie, Simeuleu and Nias, starting in 2005. ANSSP focused on placing people at the centre of the decision-making process for housing rehabilitation and reconstruction, meaning the process was primarily community-driven. This did not mean that the community implemented everything, but it was more of a reference to the needs felt by and defined by the community concerned. The design of ANSSP consists of six steps (Figure 2.10) (UN-HABITAT, 2007):

- Step 1: The purpose of this step is to establish contact with the community; to recruit and train the field team of facilitators; to engage in household and small group meetings in which local problems, capacities and opportunities are discussed. The baseline information is collected at this stage, including the identification of beneficiaries.
- Step 2: Cluster groups of eight to 12 households and a representative committee are established. The latter is entrusted with management of the activities on behalf of the clusters. Prior to the formation of the clusters, a list of beneficiaries is prepared and verified through community consultation. It is then publicly

announced. Moreover, the cluster groups prepare, in consultation with the communities, a Community Action Plan (CAP). Land maps are drawn in a community adjudication process.

- Steps 3 and 4: Focus on the preparation and approval of the project proposal; on the disbursement of the block grant; on procurement of materials and services; and on the actual reconstruction of the houses. Witnessed by formal and informal village leaders, a community contract is signed between each cluster and UN-HABITAT. Bank accounts are opened in the name of the cluster by three signatories.
- Step 5: Focuses on monitoring, evaluation and project completion, stressing quality assurance.
- Step 6: Stresses the need to link this process with the formal governance structure throughout the implementation process.

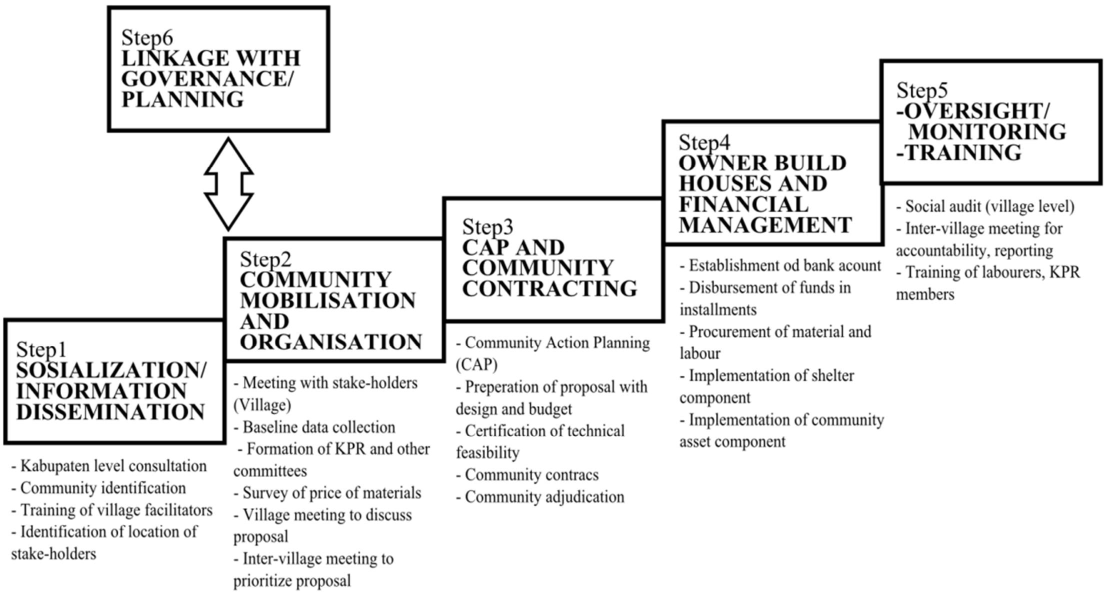

Figure 2.10 The design of ANSSP
(source: UN-Habitat, 2007)

With beneficiaries deeply involved in the reconstruction work, many communities gained knowledge of the standard features that every house should have, such as proper foundations and strong roof beams. Many beneficiaries were industrious and saved money by working on the construction of their own homes instead of hiring labourers. They used the savings to buy extra materials or ornamentation for their houses (UNDP, 2008).

Jaringan Udeep Beusare (JUB)/Urban Poor Linkage (UPLINK) also implemented the community-based approach in their housing reconstruction programme in Aceh. The Udeep Beusaree ('living together') network is a links 25 coastal villages in Aceh and the Aceh Besar district which was worst hit by the 2004 tsunami. In these neighbouring villages, only 47% of the original population survived (ACHR, 2005) and 3500 new houses were needed. In managing the housing reconstruction project, this network was facilitated by UPLINK. The strategy adopted by UPLINK was to empower the communities by organising, giving advocacy and creating networking. The basic principles of housing reconstruction were hard work, integrity, accountability, transparency, and gender equity and social justice (UPLINK, 2008). Some important roles of the beneficiaries in housing JUB/UPLINK programme are (UPLINK, 2008):

- House owners are implementers. They are builders and inspectors. Construction does not involve contractors.
- Beneficiaries are invited to choose one design from among the five house designs offered by UPLINK.
- Beneficiaries are responsible for the supervision of the house construction assisted by UPLINK building inspectors to maintain the construction quality as required for earthquake safe construction.
- Beneficiaries are invited to procure some material items, while UPLINK provides timber, steel, cement, sand, and rock through the JUB Material Bank.
- UPLINK applies a card system for material allocation and distribution.

Third party monitoring on housing reconstruction for both UN-Habitat and JUB/UPLINK's villages have confirmed that their facilitated houses have achieved high satisfaction, good quality and high accountability scores by the community (UNSYIAH and UN-Habitat, 2006). Through their programmes, both organisations have empowered the community to undertake the reconstruction. The basic principles they adopted are the same, which are integrity, solidarity, transparency, accountability and equality.

In Aceh many of the community-based programmes were implemented by NGOs whereas, in Yogyakarta and West Sumatra, housing reconstruction after the 2006 and 2009 earthquakes respectively were implemented by the government. The policy adopted by the government for housing reconstruction was to implement a community participation approach in accordance with the local culture; and to improve the community's understanding of disaster risk reduction (BAPPENAS, 2009). Another significant difference in the Aceh reconstruction is the funding scheme. The government was unable to provide a full house reconstruction for survivors, and, therefore, provided a stimulus funding of Rp 15 million (US$ 1,650) for heavily damaged homes, Rp. 10 million (US$ 1,100) for moderately damaged homes and Rp. 5 million (US$ 550) for minimally damaged homes. Under this policy, the government also provided facilitators for the community. The reconstruction process at community level begins by establishing a community organisation. One community organisation consists of 20-25 beneficiaries. Each community defines its needs and decides the best way to undertake the housing reconstruction. Member communities have the ability to design, select construction materials, and decide who should construct their homes; facilitators assist with all these activities.

The rebuilding of houses for beneficiaries should not just attempt to rebuild the house physically. Another important objective is to rebuild the social capital of the people. Involving the community in the reconstruction process can help survivors to cope with the trauma, stress, depression and feelings of hopelessness that they have suffered. Based on the experience of Aceh, Dercon and Kusumawijaya (2007) state that community-based housing reconstruction attains a high success rate because it responds quickly to urgent needs and thus can achieve relief at an early stage. Community-based housing reconstruction can mobilize solidarity among the members of a community and therefore create social capital. It allows women to be a part of the reconstruction work, strengthens local institutions and achieves good planning which leads to high quality results, limits disaster vulnerability, and can be well monitored and thus achieve transparent accountability.

In addition, the community-based approach ensures the funds are allocated to the people who really need it. This approach can reduce marginalisation among beneficiaries because every member of the community can participate in the reconstruction process. People also know what is best for them, their needs, their problems and how to solve them. In many countries, there are cultural considerations that have to be assessed when building a house. It varies from one country to another or even from one area to its adjacent area. Only the community understands such variations. By working and planning together in a community-based reconstruction programme a community can be strengthened. It can increase the sense of belonging, togetherness, and make the beneficiaries more united so they can face any problems that might arise together.

Moreover, by referring to the theory of needs (Maslow, 1943) the implementation of CPHRP is also one way to fulfil the basic needs of human beings. It provides home for beneficiaries so they will feel safe. It also can provide employment for a community so they can generate income. This condition satisfies their safety needs. By working together, networking and friendships can be established. So their need for love/belongings is also satisfied.

Following the Bam earthquake of 2003 in Iran, in which 30,000 people died, the housing reconstruction programme adopted a community participation approach. Fallahi (2007) states that the key strategy was to encourage strongly active community participation in the process of designing, planning and constructing units. Householders were given the ability to choose their own plans and layouts and act as the supervisors of their own projects, thus establishing a line of cooperation between designers and contractors. This approach also ensured that government loans resulted in the desired houses being built for the people (Fallahi, 2007). Moreover, Fallahi (2007) states there were two important factors contributing to the success of the Bam reconstruction programme, the financial and construction material aid from the Housing Foundation, and the survivors' participation in the process of rebuilding. Active survivor participation in housing reconstruction leads to operational cost and time reduction, and can reduce the negative psychological impact of earthquakes. Lawther (2009) also states that community participation in housing reconstruction following the tsunami of 2004 in the Maldives was crucial to the success of the reconstruction programme.

In Gujarat, India, following the earthquake of 2001, Barenstein (2008) found that owner-driven housing reconstruction was the fastest, most cost-effective, and the most satisfactory approach according to the beneficiaries. The same studies also found that the contractor-based approach was notorious, as only 22.8 percent of the beneficiaries were satisfied. A small-scale community participation project in Duzne, Turkey after an earthquake in 1999 also showed the advantages of this type of approach when compared to the majority of non-community-based approaches (Arslan and Unlu, 2006).

From the above case studies of post-disaster housing reconstruction projects, it can be seen that the community-based approach can achieve excellent levels of satisfaction among beneficiaries. Other benefits of this approach are that it is faster, of better quality and can reduce construction costs when compared to a contractor-based approach. Different models of community participation with different roles can be adopted and the community can act as owner, consultant or even contractor for their own projects.

Although the community-based approach has achieved significant results, its implementation has not always been smooth and unproblematic. UNSYIAH third party monitoring (UNSYIAH and UN-HABITAT, 2006) results show that a small numbers of housing reconstruction programmes based on a community approach did not achieved high marks on quality, satisfaction and accountability. According to Dercon and Kusumawijaya (2007), there are three important lessons to be learned from the Aceh programme when implementing a community-based reconstruction: a need for a standard definition for the terms ‘participation’ and ‘community-based’ as this can cause confusion. The implementer should provide enough time for the participatory process as shortage of lead in time could result in failure, and in a shortage of facilitators. The lack of understanding about community participation also happened in a housing reconstruction in Sirinkoy, Turkey, after the earthquake in 1999 (Ganapati and Ganapati, 2009). There is also doubt about the success of community based post-disaster reconstruction methods when applied to a large-scale project (Dercon and Kusumawijaya, 2007). Thus, a strategy to minimise these problems has to be developed.

One option is by implementing a risk management process in community based post-disaster housing reconstruction projects. The risk management process is already well established in the construction industry. By identifying possible problems that might arise in the future and creating solutions to deal with them, risk management can increase the likelihood of meeting the project objective. The following section discusses the concept of risk management and its implementation within the construction industry.

2.6 Project Risk Management

2.6.1 Project management

PMI (2008) defines project as a temporary endeavour undertaken to create a unique product, service, or result. Temporary means that project has a beginning and an end. Every project is unique, in that none of them is precisely the same. Inevitably, a post-disaster housing reconstruction project can be categorised as a construction project. The post-disaster situation that creates many different circumstances makes it unique. Post-disaster reconstruction is also complex and has several dimensions (Moe and Pathranarakul, 2006).

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (PMI, 2008). There are five processes in project management: initiating, planning, executing, monitoring and controlling, and closing. Smith *et al* (2008) register different numbers of stages of a project life cycle, ranging from two to twelve, and also different names. However, PMI (2008) states that no matter how large or small, simple or complex, the life cycle of the project comprises: starting the project, organising and preparing, carrying out the project work, and closing the project. As project management and disaster management both have a life cycle, it can therefore be combined (Moe and Pathranarakul, 2006) (Figure 2.11).

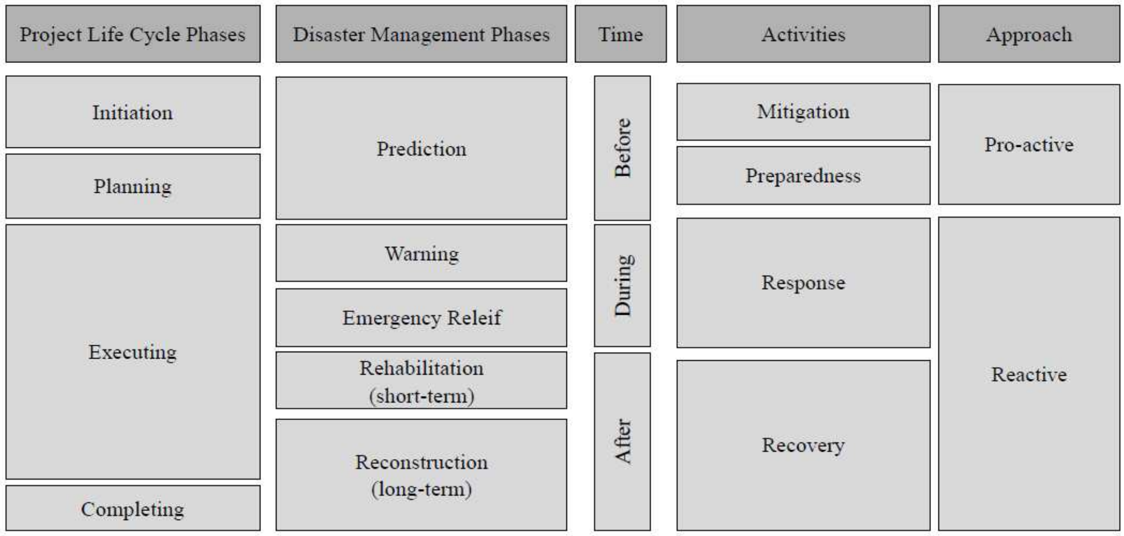

Figure 2.11 A comparison of project life cycle and disaster management
(source: Moe and Pathranarakul, 2006)

Every project has its own objective. The traditional basic criteria of project success in the construction industry are time, cost and quality (Chan and Chan, 2004), called the 'iron triangle' by Atkinson (1999). The criteria for time and cost are very straight-forward; ideally, there are no delays and no cost overrun until the project is completed. For quality, it can be variously interpreted. Winch et al. (2010) define quality criteria in four ways: the conception, the specification, the realisation, and the conformance. Conception relates to the aesthetic term; specification to the technical standards set and level of finishes; realisation to client review and total quality management; and conformance to quality assurance. In terms of this definition it is clear that satisfaction is part of the quality. However, quality mainly relates to specification, such as, the criteria used by UNSYIAH and UN-HABITAT in conducting housing monitoring and evaluation in Aceh reconstruction (UNSYIAH and UN-HABITAT, 2006). They differentiate the indicator for quality and beneficiaries' satisfaction (details in section 2.4.2.4). Thus, if quality solely refers to specification, then the beneficiaries' satisfaction has to be added to the project success criteria. This is because, in post-disaster housing reconstruction, to fulfil time, cost, and quality objectives only is not enough, as community satisfaction is also an important factor. In certain post-disaster housing reconstruction projects, beneficiaries were not satisfied with the houses provided for them although they were of good quality. This has led to a low occupancy rate. To overcome this problem, a community-based method may be the solution.

Moreover, Davidson *et al*. (2007) states that the challenges of post-disaster housing reconstruction projects are similar to those challenges met in low-cost housing projects in developing countries. However, the post-disaster environment raises some new challenges: the situation is very chaotic and limited resource availability prevails, projects require rapid completion times, although it does offer the opportunity to construct sustainable, good quality homes.

2.6.2 Risk management

Risk is a combination of the probability of an event and its consequence (ISO, 2002) and is generally used only when there is at least the possibility of negative consequences. Hlaing *et al*. (2008) state that the construction industry carries more risk and uncertainty compared to many other industries, and because of this has adapted significantly to manage any uncertainty and threats that might occur. The success or failure of any project will depend on how risk is treated and whether the construction industry has managed it badly (Thompson and Perry, 1992). Although risk is often associated with negative impact, Hillson (2002) states that risk can also bring positive consequences on project objectives. As a result, Olsson (2007) suggests that the risk management process should be capable of managing both risk and uncertainty. Risk can delay the project delivery, escalate cost and produce a poor quality product (Thompson and Perry, 1992) because it affects the productivity, performance, quality, and budget of a construction project (Kangari, 1995). Hence, the main purpose of the risk management process is to ensure the construction project meets its objectives. However, the implementation of risk management is not easy (Thompson and Perry, 1992). According to Tang *et al*. (2007), there are three barriers in implementing the risk management process: lack of joint risk management mechanisms by parties, shortage of knowledge/techniques on risk management and differing recognition of risk control strategies. The focus of good risk management is the identification and treatment of the risk (AIRMIC *et al*., 2002). BS (2001) draws an example of risk factors affecting a project (Figure 2.12).

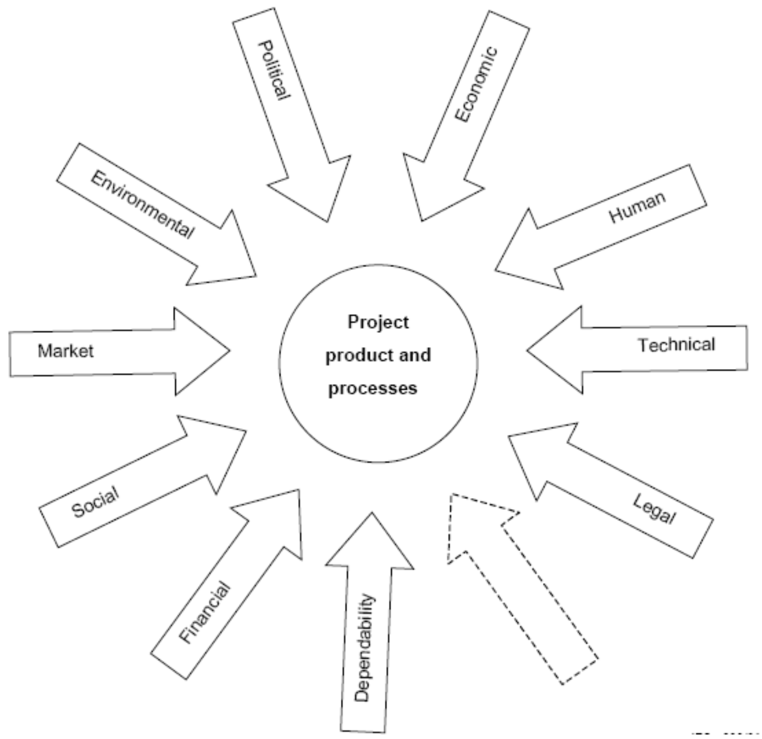

Figure 2.12 Examples of risk issues affecting a project
(source: BS, 2001)

Scholars classify the risk management process in a variety of ways. Thompson and Perry (1992) divide it into risk analysis and risk management, while Boothroyd and Emmett (1996) classify it as risk assessment and risk management. In more detail, Baker *et al.* (1999) states that risk management consists of five stages, risk identification, risk analysis, risk evaluation, risk response and risk monitoring , while Winch (2009) classifies it as risk identification and classification, risk analysis, risk respond, and risk monitoring. However, it is generally the process of identification, evaluation or assessment, respond or treatment and risk communication. Figure 2.13 shows the concept of risk management process.

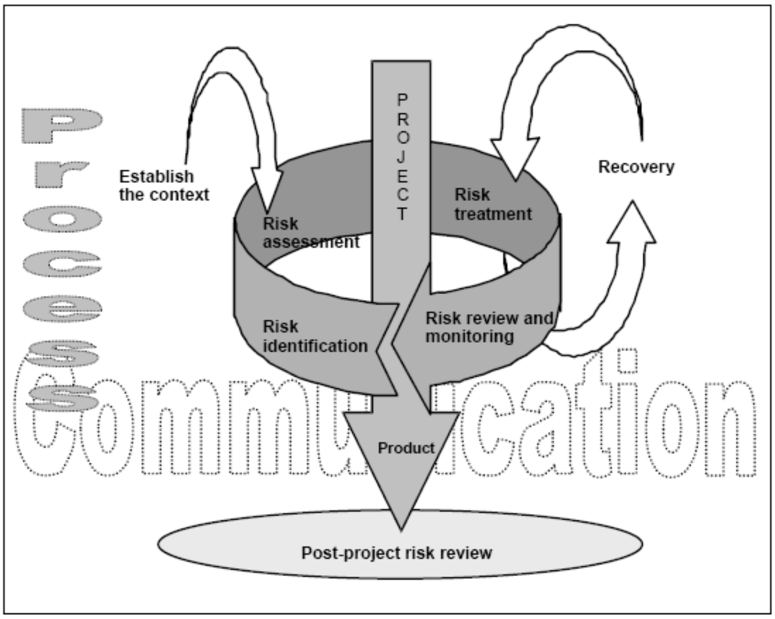

Figure 2.13 Project risk management concept
(source: BS, 2001)

Risk management should be carried out through all stages of a construction project, from the pre-construction stage, construction stage, and operating and maintenance stage. Thompson and Perry (1992) state that risk management is most valuable when implemented in the early stages as there is more flexibility in the design and planning stage and it should be a continuous process until the project completion. This implies that risk management during pre-construction is more important compared to other stages. Figure 2.14 shows the risk and cost curve over the project phase. It can be seen that if the risk management process is carried out at the beginning of the project then the impact of risk on the project cost will be minimised and vice versa. The degree of stakeholder influence, risk, and uncertainty is high at the earlier stage of project time, decreasing over time. On the other hand, this figure also indicates that the cost of changes on project decisions is low at the earlier stage, but will increase over time.

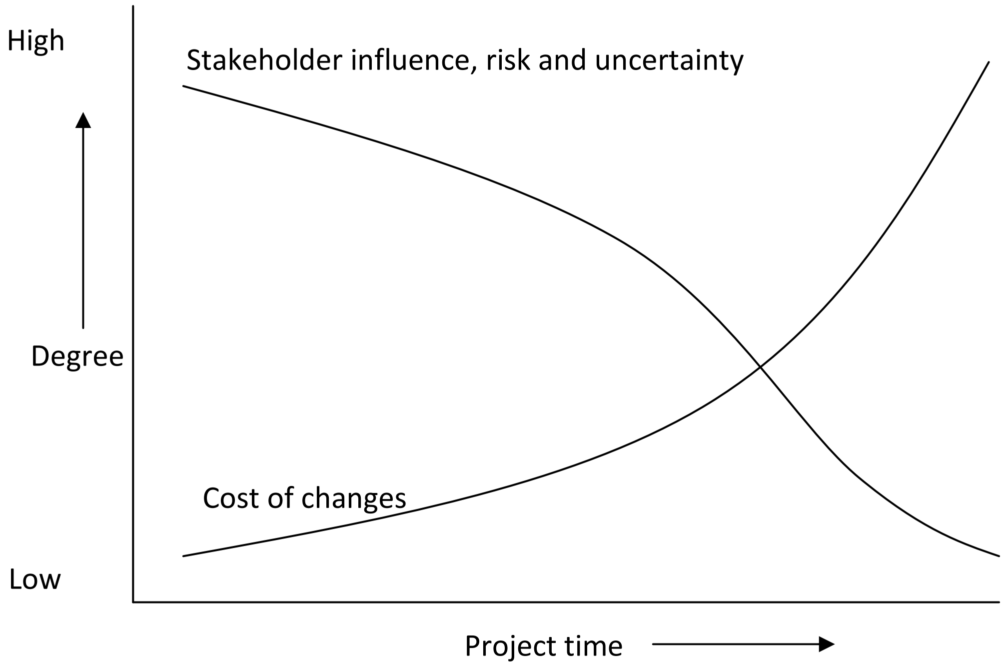

Figure 2.14 Risk and cost curve over project phase
(PMI, 2008)

Risk identification is the first stage of the risk management process (Forbes *et al*, 2008) and is the most important as no action can be taken on a risk if it has not yet been identified (Boothroyd and Emmett, 1996; Chapman and Ward, 1997 and Forbes at al., 2008). The purpose of risk identification is to find, list and characterize risks that may affect the achievement of the agreed project or project phase objectives. This process may also reveal opportunities (BS, 2001). There are a number of methods of risk identification (BS, 2001): brainstorming, expert opinion, structured interviews, questionnaires, checklists, historical data, previous experience, testing and modelling, and evaluation of other projects. PMI (2008) states that there are five tools and techniques in identifying risk:

- Documentation reviews: by performing a structured review on project documentation that includes plans, assumptions, previous project files, contract and other information.
- Information gathering techniques: by conducting brainstorming, Delphi technique, interviewing and root cause analysis.

- Checklist analysis: by developing checklists based on historical information and knowledge from previous similar project and other sources of information.
- Assumption analysis: by developing a set of hypotheses, scenarios, or assumptions.
- Diagramming techniques: by conducting cause and effect diagrams, system or process flow charts, and influence diagrams.

In addition, according to Thompson and Perry (1992) the most common techniques implemented are checklists, interviews and brainstorming.

According to BS (2001), the purpose of risk assessment is to analyse and evaluate identified risks to determine whether treatment is required. Risk analysis can be carried out using qualitative or quantitative techniques. Egbu (2009) lists some techniques that can be used on risk management:

- Qualitative techniques: brainstorming, checklists, Delphi technique, probability-impact (P-I) score tables, interviews and risk register
- Quantitative techniques: decision trees, earned monetary value (EMV), sensitivity analysis, and Monte Carlo simulation

PMI (2008) develops a table on how to rate the risk impact on the project objectives (Table 2.12) and by combining this with probability then a Probability-Impact Matrix can be built up (Table 2.13).

Table 2.12 Risk impact on project objectives

Project objectives	Relative or numerical scales				
	Very low 0.05	Low 0.10	Moderate 0.20	High 0.40	Very high 0.80
Cost	Insignificant cost increase	<10% cost increase	10-20% cost increase	20-40% cost increase	>40% cost increase
Time	Insignificant time increase	<5% time increase	5-10% time increase	10-20% time increase	>20% time increase
Quality	Quality degradation barely noticeable	Only very demanding applications are affected	Quality reduction requires sponsor approval	Quality reduction unacceptable to sponsor	Project end item is effectively useless

(after PMI, 2008)

Table 2.13 Probability-Impact matrix

Probability	Threat					Opportunity				
0.90	0.05	0.09	0.18	0.36	0.72	0.72	0.36	0.18	0.09	0.05
0.70	0.04	0.07	0.14	0.28	0.56	0.56	0.28	0.14	0.07	0.04
0.50	0.03	0.05	0.10	0.20	0.40	0.40	0.20	0.10	0.05	0.03
0.30	0.02	0.03	0.06	0.12	0.24	0.24	0.12	0.06	0.03	0.02
0.10	0.01	0.01	0.02	0.04	0.08	0.08	0.04	0.02	0.01	0.01
	0.05	0.01	0.20	0.40	0.80	0.80	0.40	0.20	0.10	0.05

(source: PMI, 2008)

The purpose of risk treatment is to identify and implement cost-effective actions that will make risks tolerable (BS, 2001). It is the process of deciding on and implementing options for dealing with identified risks. It may include actions to (BS, 2001):

- avoid the risk altogether;
- reduce the probability of occurrence of the risk;
- reduce the resulting consequences should the event occur;
- transfer or share the risk;
- Retain the risk and make plans to recover from the outcome.

The final procedure of the risk management process is the risk review and monitoring. The purpose of this process is to identify any new risks that arise, and ensure that risk handling remains effective (BS, 2001). The effectiveness of the risk management process should also be reviewed through the life cycle of the project. With the availability of new information, the risk should be updated and past risks can be removed. Moreover, Winch (2009) suggests a risk owner should be appointed to undertake the monitoring process.

The above discussion has highlighted the purpose, advantages and challenges of the application of the risk management process in the construction industry. The construction industry has benefited greatly from this process (Kangari, 1995; Akintoye and MacLeod, 1997). It can increase the probability of the project objectives being met. In considering that post-disaster housing reconstruction can be categorized as a construction activity that is often poorly managed, then the implementation of the construction industry's good practice of risk management process into a post-disaster housing reconstruction project is thought to be one solution. As a result, there is a need to establish the model for a risk management approach in CPHRP. The application of this model will help stakeholders, particularly governments and agencies, to become aware about the potential problem and their impact on reconstruction objectives. Further, the development of risk response will help above stakeholders to deal with the potential risk and as a result, common mistakes and problems in CPHRP can be eliminated or reduced.

The next section analyses the potential of the implementation of a risk management process in community based post-disaster housing reconstruction.

2.6.3 Risks associated with post-disaster housing reconstruction projects

Considering that every construction project is unique, risks in it also vary. As a result, risk in a community based post-disaster housing reconstruction will be unique too. This will be compounded by the circumstances of each disaster; the variation in scale of the impact of the disaster, the existence of local culture and wisdom, government capacity and funding availability. Moreover, risk in involving a community in a construction project in post-disaster circumstances must be very specific and the risks would be very different compared to the risk on contractor-based reconstruction activities.

Although community-based housing reconstruction has been proven a better way of carrying out reconstruction activities, it is obvious that without having any experience and knowledge of construction, community involvement carries greater risks than the contractor-based method. The employment of unskilled labour on construction projects can lead to poor quality construction, and cost overruns (Tabassi and Bakar, 2009), affect the level of productivity and may also lead to injuries (Nasir *et al.*, 2003). Moreover, research by Thevendram and Mawdesley (2004) reveals that the level of importance of the human risk factors in a construction project compared to the other factors (financial risk, environmental risk, political risk, construction related risk and physical risk) was significant (56%).

Many problems for community based post-disaster housing reconstruction project exist at this early stage. Dercon and Kusumawijaya (2007) highlight that failures in community-based approaches are caused by the delay in the start-up process where there is little time for the participatory process. In addition, Uher and Toakley (1999) state that the conceptual phase of a new construction project is most important and has the highest degree of uncertainty. Although it is viewed as the most important stage, in contrast, Lyons and Skitmore (2004) found that risk management usage in the execution and planning stages of the project life cycle is higher than in the conceptual or termination phases. Ophiyandri *et al.* (2011) also found the same condition in post-disaster housing reconstruction projects.

Moreover, research by Manelele and Muya (2008) on community-based construction projects reveals that many of the critical risks occur in the pre-construction stage. Some risks identified are: unconfirmed sources of funds, lack of technical advice, lack of consensus, lack of cooperation, non-conformity to standard specification, incompetency when recruiting skilled labour, unavailability of skilled labour, incompetent labour, lengthy tender processes, and lack of work schedules (Manelele and Muya, 2008).

According to Jha *et al.* (2010), risks that might arise in implementing community-based housing reconstruction projects are high overheads because of agency involvement, agency involvement leaving little room for individual preferences by imposing standard design and materials, and local contractors taking over the community committee and limiting real participation by the community. Kusumasari (2010) highlights the lack of skills and expertise of local government. Limited government capacity can lead to unclear reconstruction methods, uncertainty of roles and responsibility of stakeholders and can create coordination and communication problems.

Earlier in section 2.4.2 and section 2.5.3, some problems in the post-disaster housing reconstruction context have also already been discussed. Added to the discussion in this section, it can be observed that risk on a community-based post-disaster housing reconstruction project mostly arises at the pre-construction stage. It suggests that this stage is very important and needs to be managed properly in order to achieve high satisfaction levels among beneficiaries. Key stakeholders in this process are government, external agencies, facilitators and the community itself. There is a gap in their capacity and knowledge in carried the CPHRP. Risks associated with them are introduced below:

- Government

Government capacity (especially local government) in reconstruction projects and a good of understanding of the community-based approach is an important factor for the success of a post-disaster housing reconstruction project. Without proper planning for reconstruction projects, it will be hard to achieve the project objectives. Unclear policy, re-planning, coordination problems, unconfirmed sources of funding and long bureaucratic processes are common problems that emerge in the reconstruction effort. This can lead to time-wasting, high costs and dissatisfaction from community. As a result, increasing government capacity is imperative.

- External agencies

In an external agency lead programme, the risks associated with external agencies are almost the same as the risks associated with government. Many agencies still have limited knowledge of post-disaster reconstruction. Moreover, agencies normally come from outside the affected community. Their level of understanding of the affected area and its local culture is often very limited. As a result, recruiting local staff is important. External agencies may already have specific objectives and a programme before entering the disaster area. Sometimes these ideas are shaped by insufficient information about the real situation in the disaster area. Thus, in order to synchronise their programme with the real situation the agency has to have flexibility in implementing its programme.

- Facilitators

Facilitators are the heart of a community-based programme. Success or failure of a community-based programme is in their hands. Facilitators work directly with beneficiaries in assisting the achievement of the reconstruction goals. They implement the programme designed by the government or external agency. However, in many cases, recruiting effective facilitators is not an easy task. There are two issues associated with this problem, first, availability of good facilitators and second, their having good levels of knowledge and expertise. Experience has proved that it is hard to find a large number of good facilitators. Even if they are available, most of them are recent graduates with limited knowledge and experience of reconstruction programmes and of how to work with a community.

- Community

The community in a disaster-affected area is not homogenous. They have different backgrounds, knowledge and ethnicity. They have many expectations about the level of assistance they wish to receive. Sometimes they may also have some degree of resistance to external players. Therefore, working with the community requires special handling and winning their trust is imperative.

Based on the above discussion, this research focuses on the pre-construction stage as the most important stage of CPHRP. The study for the whole housing reconstruction process, from pre-construction to maintenance and operation, will also be a very broad area in terms of PhD research. The other reason for focusing on pre-construction is that to do the data collection and analysis for whole reconstruction stage will require a lot of time. Thus, this study focuses on analysing the risks of activities of CPHRP that take place before the construction stage begins.

As noted in section 2.6.2, the implementation of project risk management aim to ensure that the success of CPHRP can be achieved. In addition to this method, to increase the level of success of CPHRP, the identification of critical success factors (CSFs) will also be important. The next section discusses the CSFs in CPHRP.

2.7 Critical success factors

Rockart (1979), in his seminal paper, defines CSFs as 'the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation. They are the few key areas where "things must go right" for the business to flourish'. Similarly, according to Boynton and Zmud (1984), CSFs are 'those few things that must go well to ensure success for a manager or an organisation, and, therefore, they represent those managerial or enterprise areas that must be given special and continual attention to bring about high performance'. Synthesizing from these two definitions, both mention the 'few factors' and the words 'satisfactory/well'. In this context, the meaning of CSFs adopted in this thesis is the few factors that must go well in order to ensure the successful implementation of CPHRP.

Many scholars have investigated CSF models or frameworks. For instance, the CSFs for a general project were developed by Belassi and Tukel (1996), Chua *et al.* (1999), and Pinto and Slevin (1988), and for general construction projects such as Chan *et al.* (2004). Specific CSF models in construction projects have also been researched by scholars, such as in construction research and development (Kulatunga *et al.*, 2009), competitiveness of contractors (Lu *et al.*, 2008), performance of safety programs (Aksorn and Hadikusumo, 2008), labour-intensive construction sub-contractors (Ng and Tang, 2010), and construction project briefing (Yu *et al.*, 2006). However, those models already developed cannot be implemented or adopted directly by the CPHRP, since the circumstances of post-disaster housing reconstruction projects are different compared to construction projects in normal situations. Their uniqueness is further increased through their being community-based, which contrasts greatly to the traditional procurement method in construction projects.

The success factors are indicated by identifying a specific factor that creates a problem or an area having a risk that affects the success of the project. Some scholars, such as Manelele and Muya (2008), Dercon and Kusumawijaya (2007), Davidson *et al.* (2007) and Ganapati and Ganapati, (2009) have already mentioned the problem of the community-based method (section 2.5.3. and 2.6.3). Thus, it is will be interesting to find out the CSFs of CPHRP. In line with the application of project risk management on pre-construction of CPHRP, the analysis abut CSFs will also be focused on the pre-construction stage of CPHRP.

The next section discusses the gap of post-disaster housing reconstruction in the existing body of knowledge.

2.8 Knowledge gap

Detailed literature reviews carried out on community-based housing reconstruction projects have revealed that most of the research emphasis is on the stages of housing reconstruction, the type of procurement method and its achievements (see sections 2.4 and 2.5). There is still limited research that relates to post-disaster housing reconstruction projects using community-based approaches, taking into consideration the risks involved in terms of construction project management. Even in practice, the application of the project risk management process in post-disaster reconstruction is limited (da Silva, 2010)

Accordingly, the premise of this research is the need to develop a project risk management approach for community-based post-disaster housing reconstruction. Risk management for community-based post-disaster housing reconstruction is important to ensure the success of the reconstruction project. In the construction industry, risk management has been acknowledged to be an essential activity in minimizing losses and enhancing profitability (Akintoye and MacLeod, 1997). However, applications of these concepts in practice are less common in post-disaster reconstruction, and housing reconstruction projects in particular. As a result, there is a need to carry out the risk management process during the entire life cycle of the project, from the conceptual phase to the operation and maintenance phase (Ophiyandri *et al.*, 2010b).

However, considering that risk management for the whole reconstruction process is a broad area with a broad scope, this research focuses on the application of project risk management principles during the pre-construction phase of community based post-disaster housing reconstruction projects. The reason to focus upon the pre-construction phase of a community based post-disaster re-construction project is that this phase is identified as the phase which contributes immensely towards the success of community based post-disaster housing reconstruction projects (section 2.6.3). In addition, this study also investigates the CSFs for CPHRP. It is functioning as an addition to risk management model to secure the CPHRP's objectives can be met. In this context, this study is expected to fill this gap by producing a risk management model and CSFs for community based post-disaster housing reconstruction.

Thus, this study aims to develop the risk management model for a community-based post-disaster housing reconstruction approach with the emphasis on the pre-construction phase of the planned project. In order to achieve the aim, the following objectives have been devised:

- to understand the context of community-based post-disaster housing reconstruction.
- to identify and analyse the limitations of community-based post-disaster housing reconstruction.
- to establish the critical success factors of community-based post-disaster housing reconstruction.
- to establish a model of risk management guidelines to ensure the success of a community-based post-disaster housing reconstruction project.

2.9 Summary and the link

This chapter has reviewed and analysed the existing literature in order to capture the knowledge and understanding of the issues associated with disaster, community participation, post-disaster housing reconstruction, and project risk management. It reveals a knowledge gap in the implementation of the risk management process in post-disaster housing reconstruction. The establishment of this model is expected to improve the performance of community-based approaches in post-disaster housing reconstruction projects. It is expected that outcome will be the delivery of high quality housing, which meets beneficiaries' expectations and needs, and can be delivered on time and within budget. Having established the literature review of the study, the next chapter describes the process in achieving the aim and objectives this study: the research methodology.

Chapter 3 - RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology adopted in achieving the aim and objectives of the research. It begins with an introduction to the motivation behind this research, a brief presentation of research problem, the aim and objectives, and the research question. Researcher then details the philosophical stand of the research, followed by the research strategy and techniques. Finally, it discusses the ways in which validity and reliability are addressed.

3.2 Derivation of aim, objectives and research questions

Finding a topic is the starting point of PhD research. Gill and Johnson (2010) suggested that it should consider capabilities and interest, access, time constraint, financial support, potential outcomes, and value of the research. As a result, the research topic is something that can inspire the researcher, that can be manageable within available resources, that can tackle the constraints that will emerge, and as regards PhD level, the outcome of the research should make an original contribution to the existing body of knowledge.

The search for an original research topic begins with a review of existing literature (see section 2.8). This combines with the self-motivation of the researcher. The process leads to the problem identification, and subsequently produces research questions, and the aim and objectives of the research.

3.2.1 Initial stimulus for the research

The researcher's enthusiasm to research risk management for community-based post-disaster housing reconstruction derives from two strong motivations. First, there is the policy from the Ministry of Education and Culture, Republic of Indonesia, advising that lecturers who pursue their doctoral degree should focus their research on the area originated by the Department they are working for, particularly on the specialisation of the Department. In Indonesia, the researcher is working at the Department of Civil Engineering in the Faculty of Engineering. This Department has five specialisation programmes: structural engineering, geotechnical engineering, transportation engineering, water resources, and construction management. The researcher is working on the specialisation on construction management. Consequently, the researcher intends to investigate an area that has a strong linkage with construction management.

Second, the researcher desires the potential outcome of the research to make a significant contribution to the Indonesian community, as expressed in the discussion in section 2.3. The most dangerous disaster in Indonesia is the earthquake, where hundreds of thousands of casualties and massive economic loss have resulted. Earthquakes have also wreaked massive destruction on houses, while Indonesia's reconstruction programme has been found to be the most problematic of the entire reconstruction effort (see section 2.4.2). The housing reconstruction after the Aceh earthquake and tsunami in 2004, the Yogyakarta earthquake in 2006, and the West Sumatra earthquake in 2009 were very problematic. Delays in delivery, cost escalation, quality degradation, and beneficiaries' dissatisfaction are the common problems that arise during reconstruction. Hence, there is an opportunity for construction management knowledge to contribute to post-disaster housing reconstruction. It also means that the researcher has an opportunity to create a linkage between the two motivations stated above.

Introducing a risk management approach in the reconstruction programme is one solution that can be proposed to increase the possibility of fulfilling the project objective. As a result, this research aims to create a risk management model for post-disaster housing reconstruction. By establishing this model, it is expected that objective of post-disaster housing reconstruction can be enhanced.

3.2.2 Literature review

Literature review is 'a description of the literature relevant to a particular field or topic' (Emerald, 2012). As suggests by Hart (1999), the literature review can provide the researcher with the key theories and concepts, key writers, major issues and debates, the main questions and problems previously discussed, and research methodologies adopted. Further, the findings are analysed to establish a research gap.

Initial interest in disaster management and the construction management area (see section 3.2.1) has led the researcher to identify the current problems of disaster management in Indonesia that can be linked with the construction management area. This initial literature review produced some potential research topic. Problems are identified in every single aspect of the disaster management cycle, from the mitigation stage to the reconstruction stage. This broader area is narrowed down through a more extensive literature review using a variety of other sources, mainly journals, project reports, books, and supported by material from websites. The researcher found that many problems in disaster management that have a strong link with construction management exist in the reconstruction stage, for example, the failure to provide good quality houses that can withstand future possible disasters (see section 2.4.2). Thus, in terms of disaster risk management, the post-disaster reconstruction stage was chosen by the researcher as the topic area.

The next question is which area of reconstruction should the research focus on? Again, literature review is carried out (see section 2.4.2) and finds that the housing reconstruction project is the most problematic sector, and more attention has been paid to it compared to other sectors. However, the housing reconstruction project is still a broad area and further literature review on housing sector is needed. The researcher found that there are two basic procurement methods that can be adopted in order to provide houses for beneficiaries, the contractor-based method and the community-based method. The latter method has been acknowledged to be one of the good methods that can offer many advantages to the beneficiaries. However, many problems still exist for this method (see section 2.6.3) which can prevent the implementer from achieving the project objectives. Thus, it is important to overcome the problems in the community-based approach in order to enhance the success of CPHRP. At this point, the researcher has come up with the research area of 'community-based post-disaster housing reconstruction'.

Moreover, as the researcher comes from a construction management background, there is an interest in what contributions construction management practices can generate in order to overcome the problems in CPHRP and to increase the success of CPHRP. It has to be something that is specific, has an originality value, and something of which the process and outcomes can be classified as doctoral research. A further, specific literature review is carried out to find out the answer. At this stage, the main source of material reviewed by the researcher is journals and project reports (particularly the lesson learned documents) that discuss post-disaster housing reconstruction, the community-based method, and the construction management project in disaster circumstances. The researcher found that the application of the project risk management approach, which has been greatly acknowledged in the construction industry as a means of achieving project objectives (see section 2.6.2), is very limited in the post-disaster reconstruction project and there is currently no topic linking the community-based post-disaster housing reconstruction project with the project risk management approach. Consequently, the researcher is committed to research the application of the project risk management approach in CPHRP.

Finally, after discussing with the supervisors, considering all the constraints, and reviewing the literature again, we agreed to carry out research with the aim of developing a project risk management model in the pre-construction stage for community-based post-disaster housing reconstruction project.

The extensive literature review has identified the gap in existing body of knowledge and furthermore, the researcher can establish the research problem and the aim and objectives of the study that then can inform the execution of the research methodology. The process described above is illustrated in Figure 3.1.

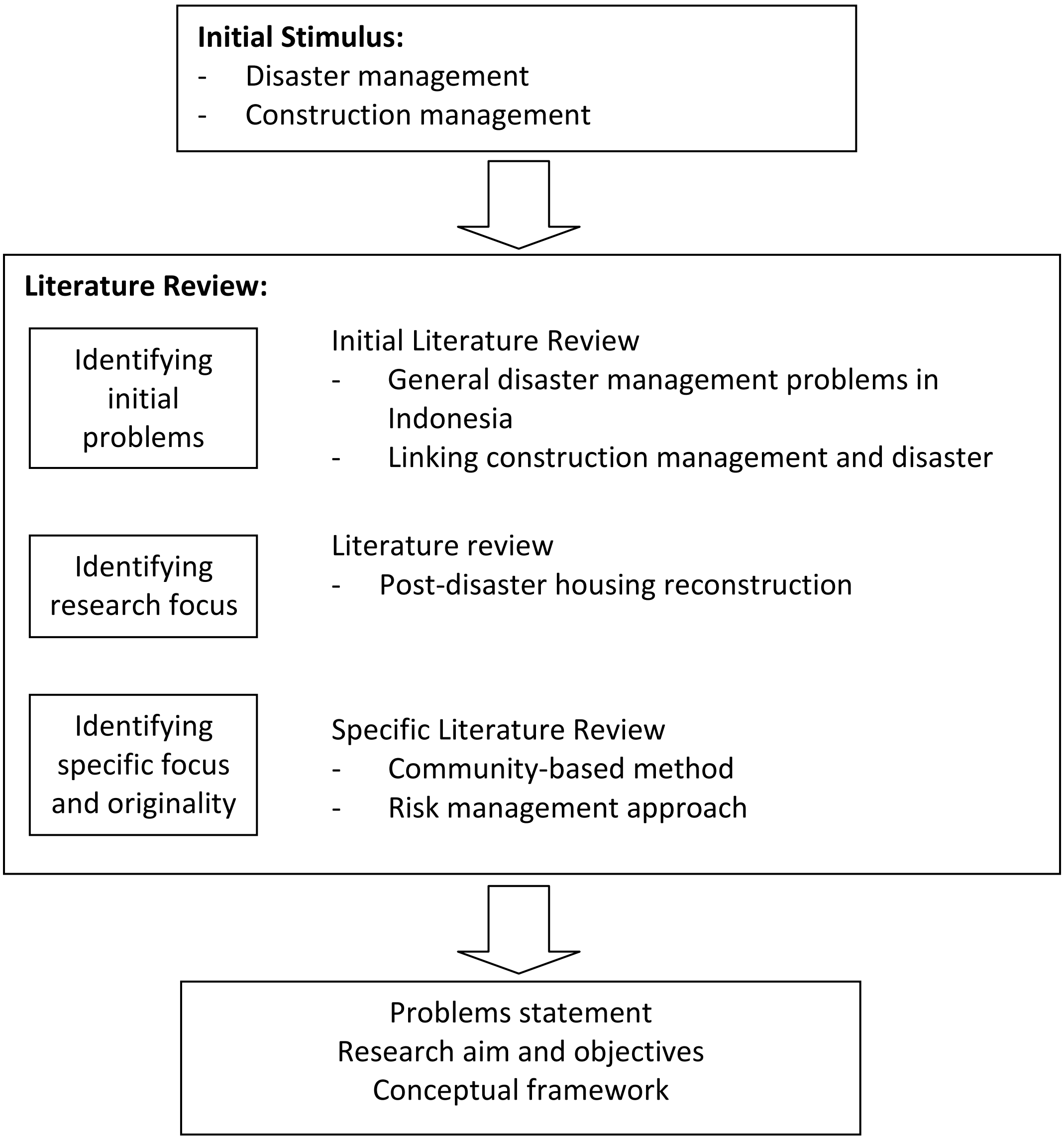

Figure 3.1 Process of finding the research topic

3.2.3 Research problem

The extensive literature review on the implementation of the community-based approach in post-disaster housing reconstruction projects has indicated that this method is not well understood by implementer (Davidson *et al.*, 2007; Ganapati and Ganapati, 2009). Many organisations/governments in post-disaster housing reconstruction labelled their programme as a 'community-based' because this method can evoke a positive perception and is well accepted. Compared to the contractor-based method, this programme has shown its superiority (see section 2.5.3). Thus, to overcome this problem, the researcher has to arrive at a simple definition of the community-based method in a post-disaster housing reconstruction context, and to what extent community participation in housing reconstruction can be acknowledged as a community-based approach. In addition, this research also examines the advantages of CPHRP, such as why its implementation can achieve high satisfaction levels among beneficiaries.

The implementation of the community-based approach will not automatically guarantee the success of the programme. There are some challenges in its implementation and, along with its CSFs, it is important to establish what these are. The CSFs can contribute to increase the level of success of CPHRP (see section 2.7).

The application of the risk management method is one way of fulfilling the project objectives. However, there exists a limited amount of literature discussing the application of risk management approach in CPHRP (see section 2.8). In order to carry out the risk management method, understanding on this concept and linking it with the post-disaster environment is immensely important. The risk management method begins by identifying what sort of risks exists in CPHRP. Its challenges and limitations will contribute to the process of risk identification. Furthermore, the extent to which the risks can affect the project objectives will contribute to the risk assessment process. In this process, the probability of risk happening and its impact is assessed. Having identified the risk and its impact on project objectives, the next process is to find the way to reduce the identified risk. Particular attention is given to high-risk events. To complete the project risk management approach, all stakeholders of the reconstruction programme should be informed of the risk, its impacts, and its treatment, particularly governments and implementers of CPHRP. The establishment of a project of risk management model in CPHRP is expected to make stakeholders aware about what sort of risk might emerge in the implementation of CPHRP so they are well prepared to overcome it. The level of success of CPHRP would then be expected to increase.

Having described the problem statement of the research, the next section presents the aim and objectives of the research, and the research questions.

3.2.3.1 Aim of the research

The aim of the research is to develop the risk management model for a community-based post-disaster housing reconstruction approach.

3.2.3.2 Objectives of the research

To achieve the aim, the following objectives have been devised:

- to understand the context of community-based post-disaster housing reconstruction.
- to identify and analyse the limitations of community-based post-disaster housing reconstruction.
- to establish the critical success factors of community-based post-disaster housing reconstruction.
- to establish a model of risk management guidelines to ensure the success of a community-based post-disaster housing reconstruction project.

3.2.3.3 Research questions

In order to achieve the above objectives, the following research questions were identified:

- What is a community-based approach in post-disaster housing reconstruction?
- What are the advantages of a community-based approach in post-disaster housing reconstruction?
- What are the limitations in implementing this method?
- What are the critical success factors of this method?
- How can a risk management model for community-based post-disaster housing reconstruction project be developed? What are the risks and their impacts?

The above section outlines the aim, objectives, and research questions of this study. The following sections present the way they will be fulfilled.

3.3 Research methodological framework

Research methodology is 'an approach to the process of the research, encompassing a body of the methods', and the method is a 'technique for collecting and/or analysing data' (Collis and Hussey, 2009: p.67). Scholars have established different forms of methodological framework. Accordingly, this research adopts the terminology proposed by Saunders *et al*. (2009), the 'Research Onion'. The reason for this is the 'research onion' can give clear guidelines for the research methodology, from the research philosophical stand to the methods for data collection and analysis. The research onion consists of six layers, namely (from the outer layer to the inner layer): research philosophies, research approach, research strategies, research choices, time horizons, and techniques and procedures (Figure 3.2.).

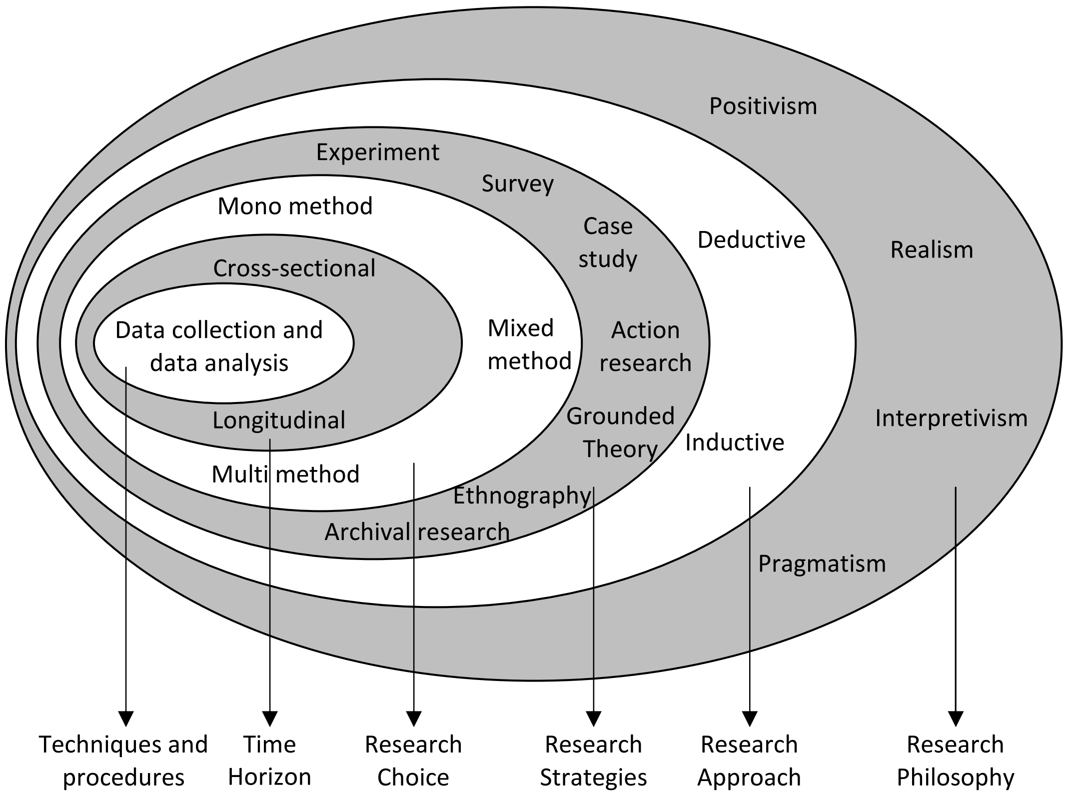

Figure 3.2 The research onion

3.4 Research philosophy

According to Saunders *et al*. (2009), research philosophy relates to the development of knowledge and the nature of that knowledge, and the one to be adopted contains important assumptions about the way we see the world. Understanding the research philosophy is important; Easterby-Smith *et al*. (2012) describe how it can help researchers in three ways. First it is useful in clarifying the research designs, second it informs which designs will work and which will not, and third it helps researchers to identify, and even create, research designs that may be outside their previous experience.

The research philosophy has been seen as a central debate between the natural scientist and social scientist and it mostly concerns about the ontological and epistemological approach (Easterby-Smith *et al*., 2012). The other term to express the terminology of research philosophy is research paradigm (such as Lincoln and Guba, 1985; Collis and Hussey, 2009).

Moreover, Miles and Huberman (1994) propose three underlying assumptions relevant to the research philosophy: epistemological assumptions, ontological assumptions, and axiological assumptions. The explanation of each assumptions and the philosophical stance of the research is described in the following subsections.

3.4.1 Ontology

Ontology is the philosophical assumption about the nature of reality (Saunders *et al.*, 2009; and Easterby-Smith *et al*., 2012). The ontology continuum is objectivism and subjectivism (Saunders *et al.*, 2009). According to Saunders *et al*. (2009) objectivism assumes that social entities exist in reality external to social actors while subjectivism believes that social phenomena are created from the perceptions and consequent actions of social actors (Saunders *et al.*, 2009). Moreover, Collis and Hussey (2009) state that objectivism sees the reality as objective and singular, apart from the researcher, while subjectivism defines where reality is subjective and multiple, as seen by participants.

Using different terminology, Easterby-Smith *et al*. (2012) divide the ontological assumption into four different categories, namely: realism, internal realism, relativism and nominalism. The implication of how the ontology assumption describes the truths and facts is presented in Table 3.1.

Table 3.1 Four different ontologies

Ontology	Realism	Internal Realism	Relativism	Nominalism
Truths	Single truth	Truth exists, but is obscure	There are many 'truths'	There is no truth
Facts	Facts exist and can be revealed	Facts are concrete, but cannot be accessed directly	Facts depend on view point of observer	Facts are all human creations

(source: Easterby-Smith *et al*., 2012)

The debates about ontological assumptions in social science are primarily between the positions of internal realism, relativism, and nominalism, and the answer will depend on the topic and the preferences of the researcher (Easterby-Smith *et al*., 2012).

3.4.2 Epistemology

Epistemology is concerned with what we accept as valid knowledge (Collis and Hussey, 2009) or in other definitions proposed by Teddlie and Tashakkori (2009) and Creswell (2007), it concerns the relationship between the researcher and the participant or that being researched. Scholars name the spectrum of epistemology differently, but the meanings are the same. Saunders *et al*. (2009) and Collis and Hussey (2009) define the extremes of the spectrum of epistemology as positivism at one end and interpretivism at the other; while Easterby-Smith *et al*. (2012) use the terms positivism and social constructivism.

Positivism is the epistemological position where the social world exists externally, and holds that its properties should be measured through objective methods rather than being inferred subjectively through sensation, reflection or intuition (Easterby-Smith *et al*., 2012). As a result, the positivist believes that only phenomena that are observable and measurable can be validly regarded as knowledge and in this position the researcher is independent from that being researched (Collis and Hussey, 2009). In the view of the social scientist, the positivism assumption is related to the application of methods in natural sciences to the social sciences (Denscombe, 2010; Bryman and Bell, 2011). On the other hand, interpretivism or socio-constructivism attempts to minimize the distance between the researcher and what is being researched (Collis and Hussey, 2009). Thus, phenomena is determined by people rather than by objective factors

(Easterby-Smith *et al.*, 2012). Further, Easterby-Smith *et al.* (2012) summarise the difference between positivism and the interpretivism/socio-constructionism in Table 3.2.

Table 3.2 Contrasting implications of positivism and social constructionism

	Positivism	**Social Constructionism**
The observer	must be independent	is part of what is being observed
Human interests	should be irrelevant	are the main driver of the science
Explanations	must demonstrate causality	aim to increase the general understanding of the situation
Research progress through	hypotheses and deduction	gathering rich data from which ideas are induced
Concepts	need to be defined so that they can be measured	should incorporate stakeholder perspectives
Units of analysis	should be reduced to the simplest terms	may include the complexity of the 'whole' situation
Generalisation through	statistical probability	theoretical abstraction
Sampling requires	large numbers selected randomly	small numbers of cases chosen for specific reasons

(source: Easterby-Smith *et al.*,2012)

3.4.3 Axiology

The last research philosophical assumption is axiology. It is a philosophical assumption that concerns value (Saunders *et al*, 2009). In this continuum, an assumption has to be made whether it is value-free or value-laden (Collis and Hussey, 2009). The value-free assumptions are attached to the positivism. In these assumptions, the objects of the research are not affected by the research activities. On the other hand, the value-free assumptions are closely connected to interpretivism. Moreover, for Collis and Hussey (2009) the value-free assumptions are commonly found in natural science studies, but hardy found in the social sciences because these concern the activities and behaviour of people.

3.4.4 Philosophical positioning of the research

This research aims to develop a risk management model for community-based post-disaster housing reconstruction. With the set of objectives and research questions established, the research philosophy is unlikely to be placed at one end of the extreme continuum of ontology, epistemology and axiology. There are several reasons that led the researcher to this conclusion.

First, the process of understanding the context of a community-based post-disaster housing reconstruction project, the advantages, the limitations and risks, and the success factors will involve the perceptions of people. Gauging the reality of their opinions will depend on their expertise and experience. People's subjective analysis and subjective conclusions mean that it is socially constructed. At this stage, reality is subjective and multiple, as seen by the participant. Furthermore, in order to gain the reality of the perspective, the researcher needs to be part of the research and needs to give his value to the knowledge.

Together with input from the literature review, the output from the above process is summarised and structured in order to generalise the reality. It is essential to discover the main advantage of community-based post-disaster housing reconstruction. Critical factors that contribute to the success of a community-based project will be difficult to establish if we rely solely on multiple realities. The advantages and the critical success factors have to be quantified in order to rank them. In a risk management approach study, the process of assessing the impact of risks will begin by setting out the potentiality of their occurrence and the severity of their impact on project objectives. By combining these two factors, high-risk events can be discovered. The process described above involves the collection of quantitative data and the deployment of statistical analysis. At this point, the researcher becomes independent and does not interfere with what is being researched.

Having described the philosophical assumptions, the research can be positioned in the middle of the research philosophical continuum (Figure 3.3). Moreover, Saunders *et al*. (2009) classified the philosophical continuum into four different categories: positivism, realism, pragmatism and interpretism. The characteristics of each category based on its philosophical assumptions are presented in Table 3.3. In terms of classifications method, this research can be classified as tending towards the pragmatism approach.

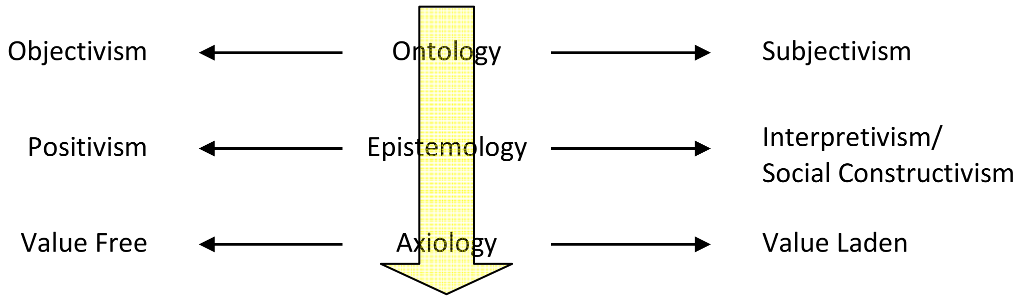

Figure 3.3 Philosophical positioning of the research

Table 3.3 Comparison of four research philosophies in management research

	Positivism	Realism	Interpretivism	**Pragmatism**
Ontology: *the researcher's view of the nature of reality or being*	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: *the researcher's view regarding what constitutes acceptable knowledge*	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, Reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: *the researcher's view of the role of values in research*	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

(source: Saunders *et al*., 2009)

These sections have described the philosophical positioning of the research that tends towards pragmatism. In this context, the next section describes the next layer of the research onion, research approach.

3.5 Research approach

The meaning of 'research approach' as defined by Saunders *et al*. (2009) concerns the way in which theory is developed, which can be classified as the deductive approach or the inductive approach. The deductive approach is where a theory and hypothesis (or hypotheses) are developed and then a research strategy is designed to test the hypothesis, while the inductive approach is one in which data is collected and a theory developed as a result of data analysis (Saunders *et al*., 2009). In addition, Collis and Hussey (2009) state that the deductive approach is associated with moving from the general to the particular, while the inductive is the reverse. Although it is potentially misleading, Saunders *et al.* (2009) state that deduction owes more to positivism and induction more to interpretivism.

The philosophical assumptions of the research lead this study to implement both these approaches, in order to fulfil the aim and objectives of the research. At the first stage, theory concerning the community-based method, advantages, success factors and risks will be generated through the first stage of data collection method and its analysis, together with the findings from the literature review. At the subsequent stage, the produced theory is tested by empirical observations. As a result, this study employs the inductive approach at the beginning followed by the deductive approach.

3.6 Research strategy

3.6.1 Types of research strategy

The meaning of research strategy in this study is the general plan on how the research questions will be addressed (Saunders *et al*., 2009) or on how the research is being conducted. Saunders *et al*. (2009) argue that no research strategy is inherently superior or inferior to any other. They are also not mutually exclusive (Saunders *et al*., 2009 and Yin, 2009). Hence, the research could be a combination of different strategies.

There are numbers of research strategies available and various scholars classify them in different ways. For example, Saunders *et al*. (2009) classify research strategy as experiment, survey, case study, action research, grounded theory, ethnography and archival research; Yin (2009) as experiment, survey, archival analysis, history and case study.

One method in justifying the research strategy is by analysing its research philosophical assumptions (Sexton, 2007). Figure 3.4 shows different types of research strategy connected to their philosophical assumptions. Referring back to the research philosophical assumptions of this study, in this method, the research strategy is mostly suitable for case studies or the survey method. However, it still needs to be justified by other factors.

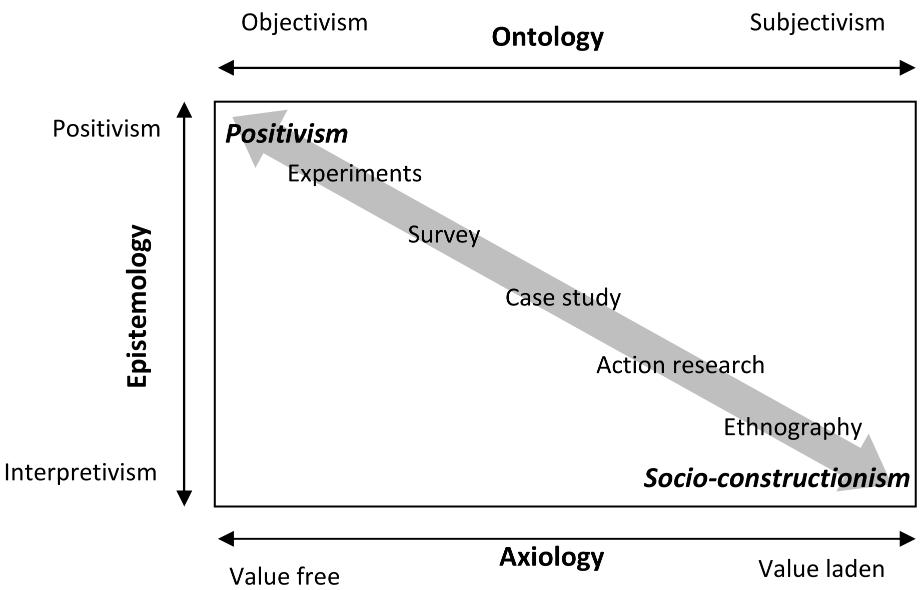

Figure 3.4 Research strategy continuum within research philosophical assumptions (Sexton, 2007)

Another method proposed by Yin (2009) states that there are three conditions to be considered in choosing a research strategy: the type of research question, the extent of control an investigator has over actual behavioural events and the degree of focus on contemporary as opposed to historical events. Table 3.4 displays this condition and its relation to research strategy. Moreover, Yin emphasizes that the first and most important condition for differentiating among the various research methods is to classify the type of question being asked. A basic categorization scheme for the types of question is the familiar series ‘who’, ‘what’, ‘where’, ‘how’ and ‘why’ questions.

Table 3.4 Relevant situation for different research methods

Method	Form of Research Question	Requires Control of Behavioural Events?	Focuses on Contemporary Events?
Experiment	How, Why?	Yes	Yes
Survey	Who, What, Where, How Many, How Much	No	Yes
Archival Analysis	Who, What, Where, How Many, How Much	No	Yes/No
History	How, Why?	No	No
Case Study	How, Why?	No	Yes

Source: Yin (2009)

'What' questions may raise two possibilities, 'what' as exploratory in which each method can be applied, or 'what' as a form of 'how many' or 'how much' which favours a survey or archival method. 'Who' and 'where' questions are likely to favour survey methods or the analysis of archival method. 'How' and 'why' question are more explanatory and likely to the use of case studies, histories and experiments as the preferred research methods (Yin, 2009). Accordingly, this research mainly involves the 'what' type of question and mixes both types of 'what' question, 'exploratory' and 'how many'. As a result, to answer the first type of 'what' question, any methods of research strategy can be adopted, and for the second type, the survey method is favoured.

Although the survey method is more appropriate in answering the 'how many' type of question, this research also requires in-depth analysis of the context of community-based method. Depending solely on the survey method will mean that the objective of the research cannot be met. As noted by Yin (2009), the ability of the survey method to investigate the context is extremely restricted. Hence, the most suitable strategy is the case study method. Many scholars (such as Eisenhardt, 1989; Robson, 2002; Yin, 2009) have expressed their opinion that the case study method is the most suitable approach to study contemporary events that require in-depth understanding. Yin (2009) defines case study as 'an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident'.

Based on the above analysis, it is essential that this research combines the case study method and the survey method. The research philosophy also suggests that a combination of research strategy is needed to answer the research questions. As highlighted earlier by Saunders *et al*. (2009) and Yin (2009), the research strategy does not have to be mutually exclusive. Yin (2009) also stresses that the case study strategy can be a combination of methods, including the survey method. As a result, this study implements a combination of case study and survey as a strategy to answer the research questions and to achieve the research objectives.

The next question is to determine which method is the primary one. Indeed, the case study requires multiple sources of evidence, such as documents, archival records, interviews, and direct observations (Yin, 2009). Moreover, Eisenhardt (1989) explains that the case study method typically combines data collection methods such as interviews and questionnaires, and the evidence may be qualitative, quantitative, or both. In addition, Saunders *et al*. (2009) state that in case studies data collection techniques employed may be various and are likely to be used in combination with other techniques, which may include interviews, observations, documentary analysis and questionnaires. Further Yin (2009) states that other research methods can be embedded in the case study. Based on the argument that the case study can be combined with other methods, the researcher adopts the case study strategy, which involves the survey method, or 'a survey within a case study'.

For further justification, it is worth exploring the reason for the elimination of other strategies. By considering the research philosophical continuum and factors proposed by Yin (2009), the experiment, archival analysis and history are clearly not suitable for this research. Experiment is strongly favoured for the positivism continuum and it requires a control group. The purpose of the experimental method is to study causal links, whether a change in one dependent variable produces a change in another dependent variable. This study does not intend to investigate the causal links and does not have any control group. Archival analysis method uses administrative records and documents as the principal source of data and the research questions focus upon the past and changes over a period of time. This research does not intend to analyse differences in phenomena over time. Moreover, historical research focuses on past events, not contemporary events such as post-disaster housing reconstruction. Thus, the combination between case study and survey method is strongly recommended.

This section has justified the rationale behind the researcher's choice of case study as the most appropriate strategy. The next section describes the detailed design of the case study method.

3.6.2 Case study design

According to Yin (2009), there are four types of basic design of case study research as can be seen in the 2x2 matrix in Figure 3.5. The selection is based on whether the research is single or multiple-case studies and whether it is holistic (single unit of analysis) or embedded (multiple units of analysis). The selection will be single-case holistic, single-case embedded, multiple-case holistic, or multiple-case embedded.

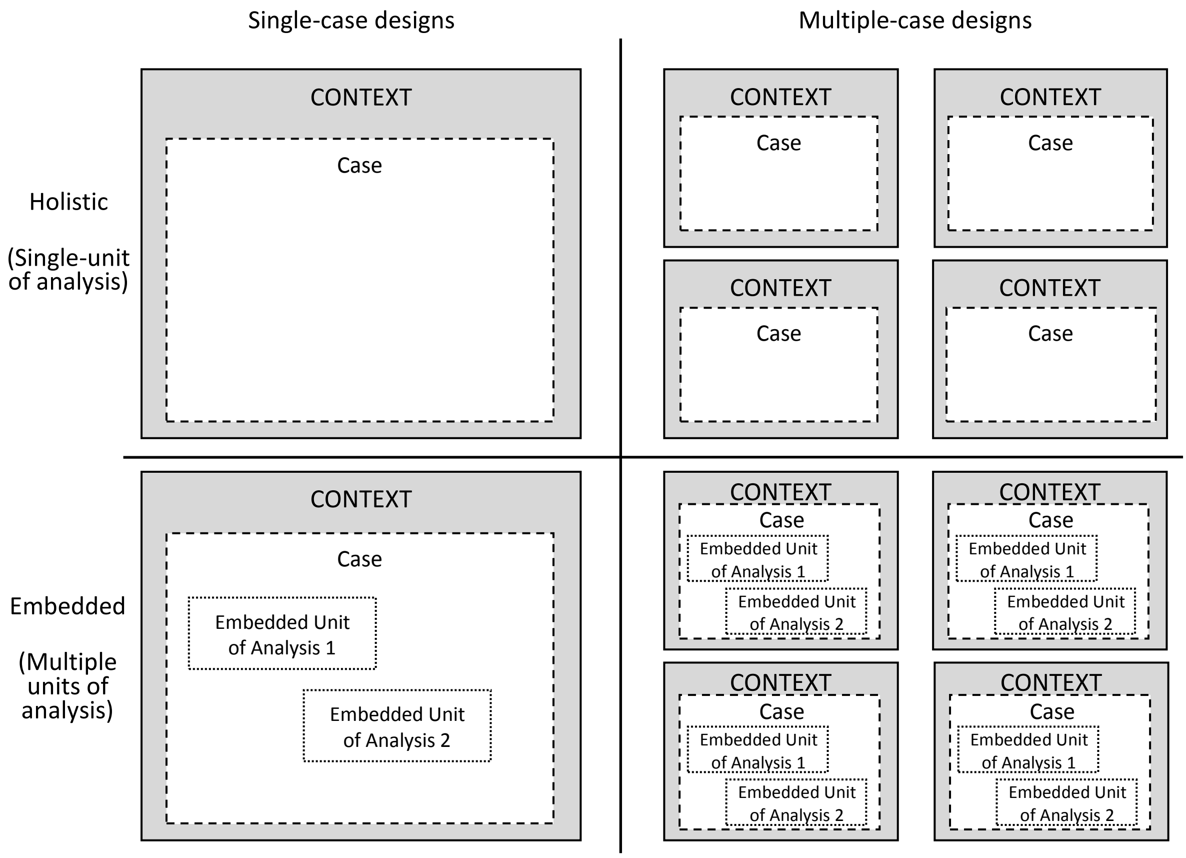

Figure 3.5 Basic types of designs for case studies
(source: Yin, 2009)

In designing case studies, the primary distinction is between single-case and multiple-case design. A single case study is justifiable when the study represents a critical case, extreme or unique circumstances, a representative or typical case, a revelatory case, or a longitudinal case (Yin, 2009). The research about community-based post-disaster housing reconstruction does not meet the above criteria, so this study implements the multiple-case design. Multiple-case studies have distinct advantages and disadvantages compared to single-case design. It is more compelling and therefore is more robust (Herriott and Firestone, 1983), and also allows replication logic and increases the breadth of the study (Yin, 2009). The disadvantage of the case study method is that it requires more resources and is more time consuming.

According to Saunders *et al*. (2009) there are three types of research principles: exploratory, descriptive, and explanatory. Exploratory research is a valuable means of finding out 'what is happening, to seek new insights, to ask questions and to assess phenomena in a new light' (Robson, 2002). Descriptive research aims to portray an accurate profile of persons, events or situations, while explanatory study aims to establish causal relationship between variables (Saunders *et al*., 2009). Similarly, Yin (2009) also states that there are three types of purpose behind case studies research: exploratory case studies, descriptive case studies, and explanatory case studies. The choices will depend on the research question. In this context, this research involves the exploratory 'what' questions. Thus, this research moves towards the exploratory case studies.

3.6.2.1 Unit of analysis

The unit of analysis is the phenomenon under study, about which data is collected and analysed (Collis and Hussey, 2009). Yin (2009) states that it relates to the fundamental problems of defining what the 'case' is (Yin, 2009) and the case can be individuals, groups, organisations, movements, events, or geographic units (Neuman, 2011). In this context, the unit analysis of the study is 'community-based post-disaster housing reconstruction project' and the boundary of the case is 'post-disaster housing reconstruction in Indonesia'. It is particularly restricted to Indonesia in order to be more focused on the research problem and also because post-disaster housing reconstruction has become the main subject of attention during the whole post-disaster reconstruction programme.

In the last decade, there were three affected areas in Indonesia that hit very worst by disaster (earthquake) and required massive housing reconstruction, Aceh in 2004, Yogyakarta in 2006 and West Sumatra in 2009 (details in section 2.3.3). These three locations have very specific problems and distinct conditions, such as funding availability and prevailing policy. Aceh reconstruction is where the implementation of the community-based approach attracted attention. Because of the success of this method in Aceh, Yogyakarta reconstruction implemented this approach and it is replicated in Padang reconstruction. Thus, these three areas become the case studies of this research.

3.6.2.2 Theory building from case studies

According to Eisenhardt (1989) case studies can be used to provide description, test theory, or generate theory. She adds that theory can be generated by combining observations from previous literature, common sense, and experience. The process of theory building in this research (as explained in section 3.5) involves both an inductive and a deductive approach, and is represented in Figure 3.6.

As can be seen from Figure 3.6, literature review and semi-structure interviews aim to develop an initial theory. In this inductive approach, theory regarding the community-based method, advantages, limitations, risks, and success factors of CPHRP will be generated through critical review of literature and findings from qualitative analysis.

After that, the generated theory is tested by deploying a questionnaire survey. In the survey, three case studies of CPHRP are selected: Aceh, Yogyakarta, and West Sumatra reconstruction programme. In the questionnaire, respondents were invited to express their opinion on the level of advantages, risk probability and impact, and CSFs of CPHRP. Data was analysed using quantitative method, and findings from each case study is presented. Furthermore, cross-case analysis is also conducted. This deductive process allows researcher to refine the theory being tested into a new theory.

The next section discusses the research choices of the study.

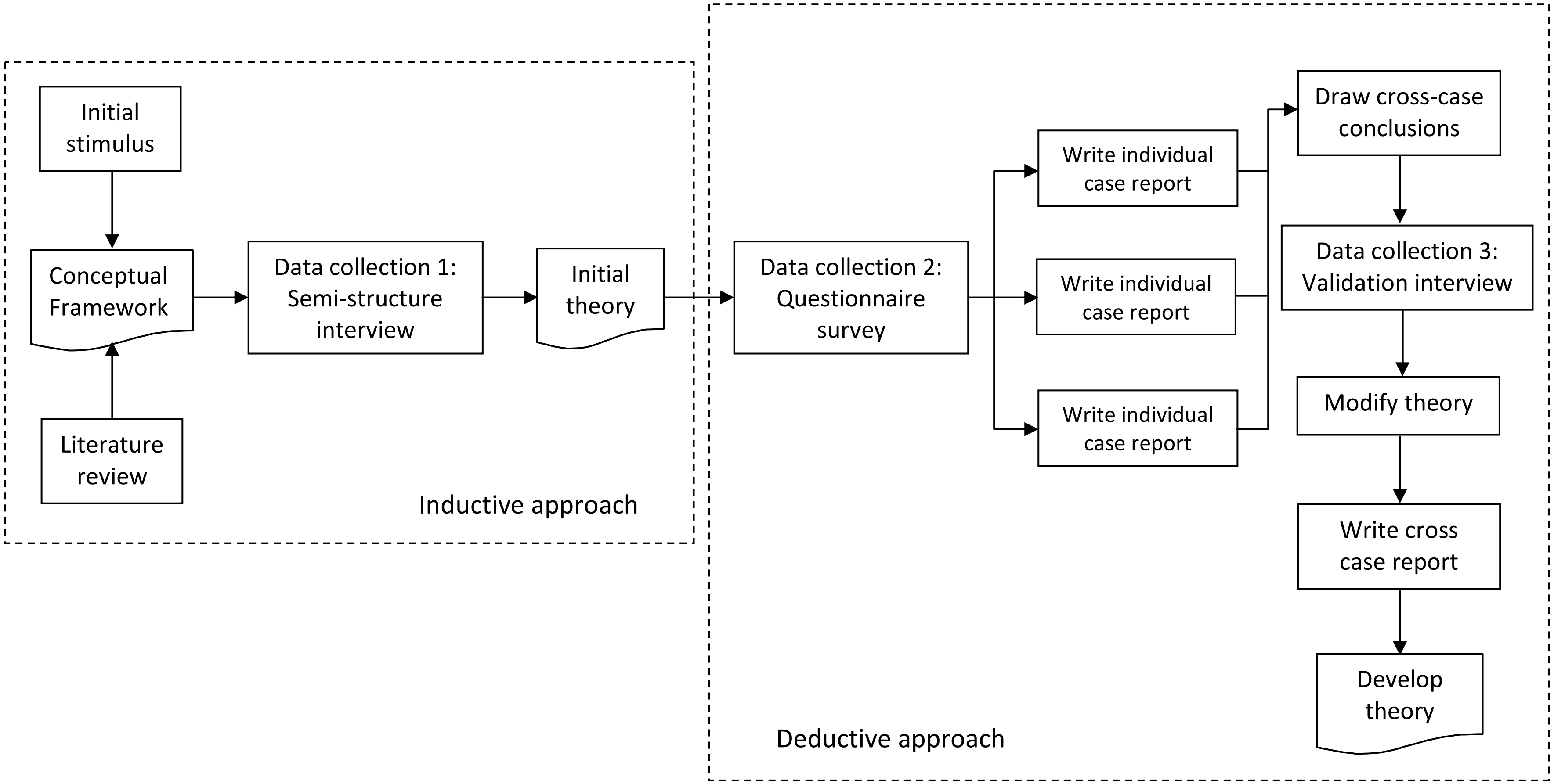

Figure 3.6 Process of theory building

3.7 Research choices

Saunders *et al*. (2009) use the terminology of 'research choice' to distinguish the options available for a researcher in data collection and in the data analysis method. In general, the options are whether to use the qualitative method, quantitative method, or a combination of the two.

According to Amaratunga *et al*. (2002), at the extreme continuum of the research paradigm, research may be grouped into two types, qualitative and quantitative. They state that qualitative research concentrates on words and observations to analyse the real world and attempts to describe people in natural terms, whereas quantitative research believes that numbers are the most suitable way to represent opinion or concepts. In more simple terminology, Collis and Hussey (2009) refer qualitative data as data in nominal form, and quantitative data as data in numerical form. Research that combines both the qualitative and quantitative methods is called the mixed method (Teddlie and Tashakkori, 2009). Table 3.5 presents the difference between these three research choices.

Accordingly, in line with its research paradigm and in order to achieve the research objectives, this research adopts the mixed methods approach. Further, Amaratunga *et al*. (2002) stress that the important factor in justifying the mixed methods in construction management research is that both qualitative and quantitative have strengths and weaknesses, and mixed methods focuses in combining their relevant strengths. In addition, Abowitz and Toole (2010) confirm that an effective body of research should include more than one research approach. The other benefit of using the mixed methods research design is that it can increase the reliability and credibility of the research (Abowitz and Toole, 2010). Details about reliability and validity are explained in section 3.11. The mixed method was also selected because the researcher can implement appropriate data collection and data analysis methods through the research process in order to achieve the objectives.

Table 3.5 Dimension of contrast among the three research choices

Dimension of contrast	Qualitative Position	**Mixed Method Position**	Quantitative Position
Methods	Qualitative methods	Mixed methods	Quantitative methods
Researchers	QUALs	Mixed methodologists	QUANs
Paradigms	Constructivism (and variants)	Pragmatism; transformative perspective	Postpositivism Positivism
Research questions	QUAL research questions	MM research questions (QUAN plus QUAL)	QUAN research questions; research hypothesis
Form of data	Typically narrative	Narrative plus numeric	Typically numeric
Purpose of research	(Often) explanatory plus confirmatory	Confirmatory plus exploratory	(Often) confirmatory plus exploratory
Role of theory; logic	Grounded theory; inductive logic	Both inductive and deductive logic; inductive-deductive research style	Rooted in conceptual framework or theory; hypothetico-deductive model
Typical studies or designs	Ethnographic research designs and others (case study)	MM designs, such as parallel and sequential	Correlational; survey; experimental; quasi-experimental
Sampling	Mostly purposive	Probability, purposive, and mixed	Mostly probability
Data analysis	Thematic strategies: categorical and contextualizing	Integration of thematic and statistical; data conversion	Statistical analyses; descriptive and inferential
Validity/trust worthiness issues	Trustworthiness; credibility; transferability	Inference quality; inference transferability	Internal validity; external validity

(source: Teddlie and Tashakkori, 2009)

3.8 Time Horizons

The ‘time horizons’ is terminology employed in order to analyse whether the research investigation focuses on one particular time or stretches over a period of time. Saunders *et al*. (2009) state the first as cross-sectional studies and the latter as longitudinal studies. In cross-sectional studies, the researcher studies one particular phenomena at a particular time, where in longitudinal study, the researcher studies the changes of phenomena over a period of time.

This study does not intend to investigate the changes of risks over a period of time, or compare how risk changes from one particular time to another. Indeed, it investigates the risks of the implementation of community-based approach in post-disaster housing reconstruction in three different locations, with three different times of occurrences. The housing reconstruction was first carried out in Aceh reconstruction after the 2004 earthquake, then in Yogyakarta after the 2006 earthquake, and finally West Sumatra reconstruction after the 2009 earthquake. This study did not compare, for example, how the risks changed from Aceh reconstruction to Yogyakatra reconstruction, and to West Sumatra reconstruction. Thus, the time horizon of the research is cross-sectional. Moreover Saunders *et al*. (2009) claim that most research for academic courses does not allow sufficient time for a longitudinal study.

3.9 Research techniques

This section discusses the techniques that have been used for data collection and data analysis. As discussed earlier, the mixed methods require both qualitative and quantitative data and these are present in this study in the form of interview and questionnaire surveys.

3.9.1 Data collection

According to Yin (2009) there are three principles of data collection. The first principle is that of using multiple sources of evidence. This study about community-based post-disaster housing reconstruction will use primary evidence mainly from documents, interviews and questionnaires surveys.

There are number of documents available detailing Aceh and Nias reconstruction after the earthquakes and tsunami. Although not as numerous as documents for Aceh reconstruction, documents relating to Yogyakarta and Padang reconstruction are also available. Progress and evaluation reports produced by the Indonesian government, international bodies, donors and NGOs are the main source of documents. News and articles in the mass media could also be included in this type of data. Further, interview and questionnaires that are the primary data of this study are explained in the next section.

The second principle of data collection is by creating a case study database. This principle is addressed by categorising the data under different themes and storing on a computer. The final step is maintaining a chain of evidence, where the data can be crosschecked. The methods above actually aim to increase the validity of the research (expanded in section 3.11).

3.9.1.1 Sampling

Sampling is required for this research as collecting data for the entire population is not feasible. Some constraints include budget, time and practicability; the study was conducted in Indonesia with three different locations of housing reconstruction projects.

There are two types of sampling techniques, probability sampling and non-probability sampling (Saunders *et al*, 2009; Denscombe, 2010; Easterby-Smith *et al.*, 2012). Probability sampling is where the probability of every member of the population to be included in the sampling is known, whereas it is not known in non-probability sampling (Easterby-Smith *et al.*, 2012). The decision on which technique should be implemented depends on the nature of the research.

This research particularly looks at risks involved on community-based post-disaster housing reconstruction projects. It requires research participants that have knowledge and experience in this type of project. As a result, non-probability sampling is the most appropriate way to achieve the research objective. Moreover, Abowitz and Toole (2010) highlight that in construction research, non-probability sampling methods are very common because approaching individuals can enhance the response rates.

According to Saunders *et al*. (2009), non-probability sampling can be categorised into five types: quota sampling, purposive sampling, snowball sampling, self-selection sampling, and convenience sampling. Sampling methods for non-probability sampling can also be combined (Teddlie and Tashakkori, 2009). Among types of non-probability sampling, the most suitable sampling method is purposive sampling. According to Denscombe (2010), the sample in purposive sampling is chosen based on its relevance and knowledge. Relevance is associated with the issue or theory being investigated and the knowledge is related to knowledge or experience about the topic. However, because the limitation of the researcher whereby he does not have sufficient connection with practitioners or experts related to community-based programme, snowball sampling is also adopted. In the snowballing sampling technique, the respondent emerges through a process of reference from one participant to the next.

Accordingly, this research adopted a combination of purposive and snowball sampling techniques, both for semi-structured interviews and for questionnaire surveys (see sections 3.9.1.2 and 3.9.1.3). As the first step, the researcher created a list of potential respondents who were already acquainted with the researcher and had experience of post-disaster housing reconstruction in the case study area. Then, the list was added to by information gathered via reports and internet searching. Potential respondents were then contacted by email and/or phone, asking for their availability to be part of the research. If the respondent agreed to take part, the researcher urged them to introduce other potential respondents with similar experience of post-disaster housing reconstruction. The process continued with the next potential respondents, and so on.

In selecting the sample, two criteria have to be fulfilled by the potential respondents. First they have an experience of a post-disaster housing reconstruction project which implemented the community-based method, and second, they have worked in at least one location of the case study project. These criteria determined the validity of the respondents.

3.9.1.2 Semi-structured interviews

Interview is the most common method of data collection technique in the case study method as it can give in-depth understanding on the phenomenon being investigated. Interviews are categorized into three types: structured interview, semi-structured interview, and unstructured interview. The selection among these types of interviews depends on the research objectives and research strategy.

A structured interview is conducted by asking the research participants an identical set of questions and often in sequence order. This method is also called ‘quantitative research interview’ because it aims to collect quantifiable data (Saunders *et al*., 2009). On the other hand, unstructured interviews have no predetermined questions. During the interview, the aspects that they want to explore (Saunders *et al*., 2009) guide the interviewers, so the interviewer can ask the interviewee freely about the topic area. This method is most suitable to the exploratory stage. Further, in semi-structured interviews, researchers have a list of predetermined questions under the research theme and during the interview, it can be expanded or reduced, depending on the flow of the conversation. In this study, the researcher adopted the semi-structured interview as the interview method.

The selection of semi-structured interviews is based on the purpose of this research or the interview itself. The objective of the interview in this study is to acquire a better understanding of the context of community-based post-disaster housing reconstruction. Most importantly, it is a method deployed in order to identify the risk factor in community-based projects. It does not intend to quantify the chance (probability) of certain risks taking place. As a result, the structured interview is not suitable for this research. The unstructured-interview is not suitable either, because relying on a broader topic during the interview can be misleading and can create difficulties.

Accordingly, the interviews were conducted in Indonesia using a face-to-face or in-person interview method. They were conducted between July and August 2010. The selection of sample is explained in a previous section (see section 3.9.1.1). The interviewees were contacted by and email and phone by the researcher. Whenever possible, before the interview, the researcher attempted to send the research participants the interview materials, such as the brief of the research, the consent form, and the interview guidelines. The interview guidelines consist of four themes to be asked: opinion on community-based programme, familiarity about project risk management, experienced on problems of community-based project, and opinion about its critical success factors.

Prior to interview, the researcher introduced the research and its objectives, the structure of the interview, and the ethics of the interview. After that, researcher asked the participant to sign the consent form and sought their permission to digitally record the interview.

Total numbers of interviews conducted were 20. Interviews were limited to 20 because at this number the information gathered from the interviewees was saturated. There was almost no new information expressed by interviewees at this number. It is not a surprise, as suggested by Guest *et al*. (2008) in their research about data saturation in interviewing, they found that data becomes saturated after the first twelve interviews, and even the basic themes were proposed after as early as six interviews.

The participants come from different backgrounds, such as government officials, practitioners, and academics, and have different case study experiences. Details of interviewee data is presented in Table 3.6.

Table 3.6 List of interviewees, job function and case study experienced

Interviewee	Job function/Organisation	Case study		
		Aceh	Yogyakarta	West Sumatra
Interviewee 1	Practitioner/NGO and donor	√	√	
Interviewee 2	Practitioner/NGO and donor	√	√	
Interviewee 3	Academia	√	√	
Interviewee 4	Government Official	√	√	√
Interviewee 5	Government Official	√	√	√
Interviewee 6	Practitioner/NGO	√	√	√
Interviewee 7	Practitioner/NGO	√		√
Interviewee 8	Practitioner/NGO	√		√
Interviewee 9	Practitioner/NGO	√		√
Interviewee 10	Practitioner/NGO	√		√
Interviewee 11	Government Official			√
Interviewee 12	Practitioner/Consultant			√
Interviewee 13	Practitioner/Consultant			√
Interviewee 14	Practitioner/Consultant			√
Interviewee 15	Academia			√
Interviewee 16	Academia			√
Interviewee 17	Practitioner/Consultant			√
Interviewee 18	Practitioner/Consultant			√
Interviewee 19	Practitioner/Consultant			√
Interviewee 20	Practitioner/Consultant			√

3.9.1.3 Questionnaire survey

There are many techniques available to carry out risk identification and risk analysis. Forbes *et al*. (2008) find that there are 36 different techniques from which to choose, however, only a small number are used in practice. Some of the techniques available are sensitivity analysis, Monte Carlo simulation, risk premium, and risk analysis using intuition/judgment/experience. Among these techniques, Akintoye and MacLeod (1997) found that the most common techniques used are the intuition/judgement/experience technique, which they found to be implemented by 77% of contractors and 100% of project management. Other techniques were less common in practice because of lack of familiarity, over-sophistication, and doubt about their applicability. Moreover, the checklist is one method of implementing the experience-based technique (Birch and McEvoy, 1992). The checklist can be provided by designing a questionnaire. Thus, this research used questionnaires in order to analyse the risk in CPHRP.

Questionnaire survey is the second stage of data collection method in this study. The questionnaire is composed using the results from the empirical investigation via semi-structured interviews and the literature review findings. The combination from these two sources of data makes the questionnaire more comprehensive. The primary objective of the questionnaire is to quantify the magnitude of advantages, key success factors and risk factors on community-based post-disaster housing reconstruction. It is difficult to magnify these topics using other techniques, such as an interview. As the aim of this research is to establish a model of a community-based project, the risk analysis (assessment) method is immensely important. Thus, even though it is part of the case study, the questionnaire (quantitative data) has been seen as the principal method.

There were three main questions in the questionnaire: the advantages, risk probability and impacts, and critical success factors (CSFs). Respondents were invited to judge how significant the level of advantage of community-based approach was. It uses five point Likert Scale: (1) 'not significant at all', (2) 'slightly significant', (3) 'significant', (4) 'very significant', and (5) 'extremely significant'.

Identified risks in the community-based project were listed, beginning with the initiation stage and leading to housing design. Respondents were invited to justify the probability of occurrence of a particular risk, and if it did occur, how it impacts on the project objectives, measured in terms of time, cost, quality, and satisfaction. Both the scaling for probability and impacts are very low, low, moderate, high, and very high. The explanation of the scaling is also provided in the questionnaire and can be seen in Table 2.13.

The final section of the questionnaire aimed to investigate the degree of influence of selected success factors (SSFs) of a community-based project. The identification of SSFs was carried out through an extensive literature review and interviews conducted in Indonesia. In the questionnaire, respondents were invited to rate the level of influence of SSFs based on a five-point Likert Scale, varying from (1) ‘Not influential at all’, (2) ‘Slightly influential’, (3) ‘Influential’, (4) ‘Very influential’, and (5) ‘Extremely influential’.

Following the steps above, a structured questionnaire was developed and piloted in November 2011, to ensure that the questionnaire was easily understandable, easy to follow, and to gather feedback if there was a factor missing in the questionnaire. It was distributed to fellow researchers in disaster management, a government official, and NGO staff. The results from the pilot study required minor revisions to the format of the questionnaire and additions on some factors. The finalized questionnaire consists of 22 advantages, 61 risks, and 32 SSFs, and is drafted in two languages, English and Bahasa Indonesia. This is necessary since the majority of respondents speak Bahasa Indonesia, while only a few speak English.

The questionnaire was administered in December 2011 and completed in February 2012. The sampling selection and the process for gathering respondents are as explained in section 3.9.1.1. The questionnaire was emailed to 92 potential respondents and 73 completed questionnaires were received by the researcher, representing a 79% feedback rate. The response rate was considered very satisfactory. Among these 73 questionnaires, 65 questionnaires were categorized as valid. The validity criterion was based on two factors, that the respondent had had an experience of a community-based project and that one of the project locations the respondent was involved in had to be in the case study location. These criteria are necessary because if respondents had never had an experienced in CPHRP in one of the case location then their response to the questionnaire survey could be misleading.

3.9.1.4 Semi-structure interview for validation

This interview aims to validate and refine the research findings if necessary. It is conducted using the semi-structured interview process and the main question is whether the findings from the quantitative analysis successfully capture the real phenomena of the investigated topic. The questions are categorised under three main headings: advantages, critical success factors, and risk analysis. The headings were based on the findings from the analysis of the questionnaire survey (research objectives). Furthermore, the interview was conducted with four experts on community-based post-disaster housing reconstruction. The selection criteria for the interviewee were based on the experience of the interviewee. The interviewees had to have at least two experiences in the case study location and to have come from different job functions. Four interviewees were classified as satisfactory, because after conducting the interviews all of them expressed their agreement with the research findings. Details of interviewee data are presented in Table 3.7.

Table 3.7 Data of interviewee in semi-structured interview for validation

Interviewee	Job function	Case study		
		Aceh	Yogyakarta	West Sumatra
Interviewee 1	Practitioner	√		√
Interviewee 2	Government official	√	√	
Interviewee 3	Government official/practitioner	√	√	√
Interviewee 4	Practitioner	√		√

3.9.1.5 Connection between data collection techniques and research objectives

This section aims to present how various data collection techniques (section 3.9.1) deployed to meet the objectives of the research. Table 3.8 shows the connection between the objectives and data collection techniques.

The next section describes the analysis methods that were carried out for qualitative data (interview) and quantitative data (questionnaires).

Table 3.8 Research objectives and their relevant data collection techniques

Research objectives	Data collection techniques			
	Literature review	Case study		Expert interview
		Interview	Questionnaire	
to understand the context of community based post disaster housing reconstruction	V	V		
to identify and analyse the limitations of community-based post-disaster housing reconstruction	V	V	V	V
to establish the critical success factors of community-based post-disaster housing reconstruction	V	V	V	V
to establish a model of risk management guidelines to ensure the success of community-based post-disaster housing reconstruction project	V	V	V	V

3.9.2 Data analysis

Creswell (2006) states that there are three ways that can be adopted to combine qualitative and quantitative data: merging or converging the two datasets by actually bringing them together, connecting the two datasets by having one build on the other, or embedding one dataset within the other so that one type of data provides a supportive role for the other dataset (Figure 3.7).

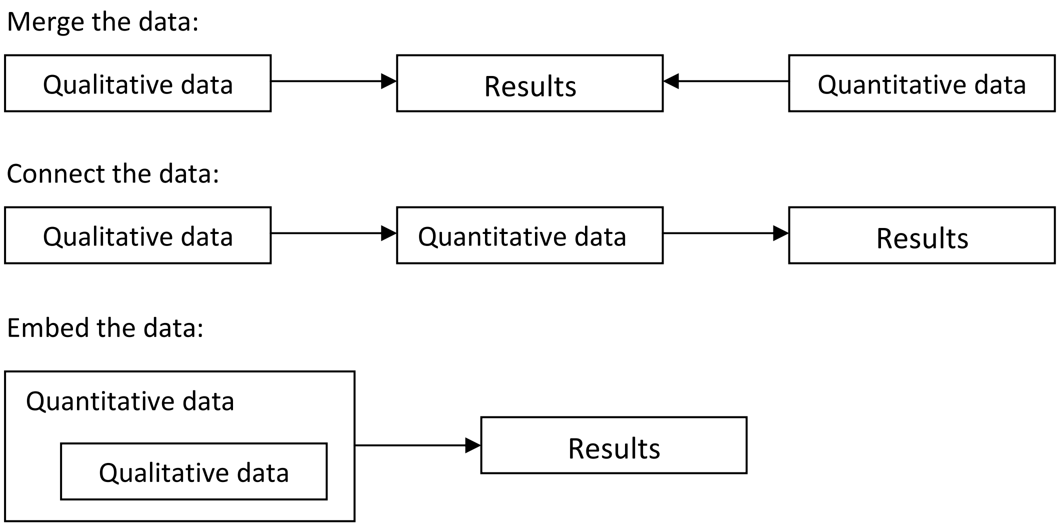

Figure 3.7 Three ways of mixing quantitative and qualitative data
(source: Creswell, 2006)

In more detail, Morgan (1998) developed a framework for combining qualitative and quantitative methods using a Priority-Sequence Model. This model requires two decisions to be made: first, about the priority of the methods or which method to be the principal and which the complementary, and second, about the sequencing between the complementary and the principal methods. As can be seen from Figure 3.8, four basic research designs were generated by these two decisions.

Priority Decision

Sequence Decision	Principal Method: **Quantitative**	Principal Method: **Qualitative**
Complementary Method: **Preliminary**	1. Qualitative Preliminary qual → QUANT Purposes: Smaller qualitative study helps guide the data collection in a principally quantitative study - can generate hypotheses, develop content for questionnaires and interventions, etc.	2. Quantitative Preliminary quant → QUAL Purposes: Smaller quantitative study helps guide the data collection in a principally qualitative study - can guide purposes sampling, establish preliminary results to pursue in depth, etc.
Complementary Method: **Follow-up**	3. Qualitative Follow-up QUANT → qual Purposes: Smaller qualitative study helps evaluate and interpret results from a principally quantitative study. - can provide interpretations for poorly understood results, help explain outliers, etc.	4. Quantitative Follow-up QUAL → quant Purposes: Smaller quantitative study helps evaluate and interpret results from a principally qualitative study. - can generalize results to different samples, test elements of emergent theories, etc.

Figure 3.8 Complementary combinations of qualitative and quantitative research: the priority-sequence model
(source: Morgan, 1998)

In the first group, qualitative study is positioned as the complementary method and preliminary study, and quantitative study as the principal method and follower. The objective of using the qualitative method as the preliminary is to improve the effectiveness of the quantitative method.

Accordingly, this research follows this first group of Morgan model (Figure 3.8) or the second way Creswell model (Figure 3.7). The qualitative method (interview) functions as a means of acquiring an in-depth understanding of a community-based project, and of exploring the advantages, the limitations, and the risks of a community-based project. Combined with the input from the literature review, the results are transformed into the questionnaire survey, mainly to quantify the probability and the impacts of certain risks. The results of the questionnaire, particularly on risk probability and impact, are the most significant output of the research. Thus, the quantitative study is selected as the primary or principal method.

Miles and Huberman (1994) propose another model of linking qualitative and quantitative methods. They define the model into four categories as illustrated in Figure 3.9. This research adopted the third model. In this model, first, the researcher conducted exploratory qualitative data collection by interviewing respondents. The findings from the interview together with the findings from literature review led to the development of a questionnaire as the quantitative instrumentation. Finally, the findings from the questionnaire were deepened and tested by conducting the next qualitative work, which is the semi-structured interview.

1. QUAL (continuous, integrated collection
-------------------------> of both ------------------------->
QUANT kinds of data)

2. QUANT wave 1 wave 2 wave 3
QUAL ---------- continuous fieldwork -----------------------

3. QUAL --------------> QUANT --------------> QUAL
(exploration) (questionnaire) (deepen, test findings)

4. QUANT --------------> QUAL --------------> QUANT
(survey) (fieldwork) (experiment)

Figure 3.9 Illustrative designs linking qualitative and quantitative data
(source: Miles and Huberman, 1994)

3.9.2.1 Content analysis

Content analysis is carried out on data gathered from interviews. Content analysis is a way of systematically converting text to numerical variables for quantitative data analysis (Collis and Hussey, 2009). However, Bryman and Bell (2011) argue that the content analysis is also connected to qualitative research. According to them, qualitative content analysis is 'an approach to documents that emphasizes the role of the researcher in the construction of the meaning of and in texts'. As a result, by also considering the objective of an interview which is not intended to quantify the texts/words in interview transcripts, this study uses content analysis as a method to identify the emerging themes from the interview transcripts. Accordingly, the aim of content analysis in this study is to identify the advantages of the community-based project, the risks associated with it, and its success factors. Accordingly, in this research the content analysis is conducted a computer software package called NVivo.

NVivo is a software package that supports qualitative and mixed methods research. It has an ability to collect and organise qualitative data, such as interview. The reason to choose NVivo for interview analysis is that the numbers of interviews were too large to handle manually; it is simple, easy to understand, user friendly, and most importantly, it permits a rigorous and comprehensive data analysis process. Moreover, the new version of NVivo (version 10) allows its users to import YouTube videos or data from social media, such as Facebook posts, linkedIn discussions, or tweets from Twitter.

The following is the procedure in conducting the analysis using NVivo software. First, the raw data from the interviews are transcribed into text format using MsWord software. This data is then imported to NVivo. Prior to developing themes in NVivo, the researcher initially establishes the preliminary themes and codes using the literature review and manual analysis on the transcripts. The theme is recognised as 'node' in NVivo. Since NVivo version 9, NVivo no longer uses the terminology of 'free nodes' and 'tree nodes' anymore, as theme is simply known as 'nodes'. Nodes is a structured based key theme of semi-structured interview that reflects the objectives of the study. Finally, after developing the nodes, further analysis is conducted to the coded texts. Results of the data analysis will lead to the development of the questionnaire.

3.9.2.2 Questionnaire survey analysis

There are several software packages available for quantitative analysis, such as SAS, STATA, MATLAB, R, and Statistical Package for Social Sciences (SPSS). In this study, data from the questionnaire survey was analysed using SPSS software version 17.0. It was selected due to its relative simplicity compared to other software, and most importantly, it can satisfy the researcher's data analysing requirements. The analysis was conducted through descriptive and inferential statistics. Descriptive statistics are a method to summarize, describe or display quantitative data (Collis and Hussey, 2009). Descriptive statistics include the measurement of central tendency (mean, median, and mode), measure of dispersion (range, standard deviation, variance, minimum, maximum, and standard errors mean), percentile values (quartiles and percentiles), and measurement of distribution (skewness and kurtosis). In order to represent the particular group of data (i.e. advantages of CPHRP) in a number, this study uses mean as a method of analysis. Further, to analyse the variation of the data, standard deviation analysis is used.

Inferential statistics are used to examine whether the data differs from the hypothetical value, i.e. in CSFs, certain factors are classified as critical if the mean is higher or equal to 4.00. Accordingly, the researcher used t-test to do this. More specifically, since we only compare one group of data to its hypothetical value, one sample t-test is the most appropriate method. The researcher chose the two-tails test to satisfy the confidence level (95%) rather than the one-tail test since the first is more powerful than the latter. The process by which this analysis is carried out is that the researcher decides the minimum value required (i.e. ≥4.00). The researcher then includes this value to be set as population mean. Finally, the researcher analyses whether the factor's scores are different from the population mean. If they are different and more than the minimum value required, then these factors would be appropriate to use .

Raw data from the questionnaire survey is inputted manually to SPSS software using the specific code (see section 3.9.1.3). For instance, for one particular advantage of the community-based approach, where a respondent ticked 'extremely important', the code input to the SPSS software is '5'. Having inputted all the raw data, it is analysed to find out the means and standard deviation of each factor, including the one sample t-test.

For advantages, the variable will be categorised as ‘very significant’ if the mean is equal to or more than four (≥ 4.00). It was based on the categorisation used in the 5-Likert scale in the questionnaire, where 1 is labelled as ‘not significant at all’, 2 as ‘slightly significant’, 3 as significant, and the highest rate 5 as ‘extremely significant’. In cases of more than one factor having the same mean value, the factor with the lower standard deviation is classified as more significant as it implies that the data point tends to be closer to the average compared to the higher standard deviation.

The same conditions are applied in deciding the critical success factors (CSFs). The CSFs question also deployed a 5-Likert scale, starting from 1 (not influential at all) to 5 (extremely influential). To be classified as CSFs, the value of the mean of success factors has to be equal or more than four (≥ 4.00), which indicates that the level of influence has to be more than ‘influential’ – it has to be at the level of very influential or higher. Several studies of CSFs, such as Lu *et al*. (2008), Shen and Liu (2003), and Kulatunga *et al*. (2009), also set the level to be classified as CSFs at as four or above. If one factor has the same average, the factor with the lower standard deviation would be classified as more influential, which means that it does not vary or disperse greatly from the average.

Risk assessment is conducted by multiplying the probability of risk occurrence with its impact factor. The analysis is into what extent risk occurrence will affect the project objectives, which are time, cost, quality, and beneficiaries’ satisfaction. For this analysis, the first step is to calculate the average of probability of a particular risk and the average of risk impact. After having the average of risk probability and risk impact, these two numbers are multiplied, and the result is called the probability-impact (PI) factor. For example, the average probability of the risk of ‘unclear reconstruction policy’ is 0.7, and the average of its impact on time is 0.4. Then the PI factor is: 0.7 x 0.4 = 0.28. To determine whether the impact is classified as a high risk or not, the probability impact matrix in Table 2.13 is deployed as reference. This PI matrix is designed by PMI (2008). Moreover, PMI (2008) states that it is dependent on the organisation to describe the parameters of probability and impact (description of to what extent the probability is low or high, or to what extent the impact is low or high) and also for the classification of high risk, i.e. what PI factor a risk can be classified as high. For this research, risk is classified as 'high risk' if the probability impact index is higher or equal to 0.20. The reason behind this number is that it was found that the probability is ranges from 0.5 to 0.7 and impact between 0.2 and 0.4, so looking back at Table 2.13, the researcher decided that the PI factor 0.20 is the minimum value for a risk to be classified as a high-risk event.

Having described all the parameters in the methodological framework, from research philosophy to date collection techniques and analysis, Figure 3.10 summarizes the research methodology to be conducted for this research.

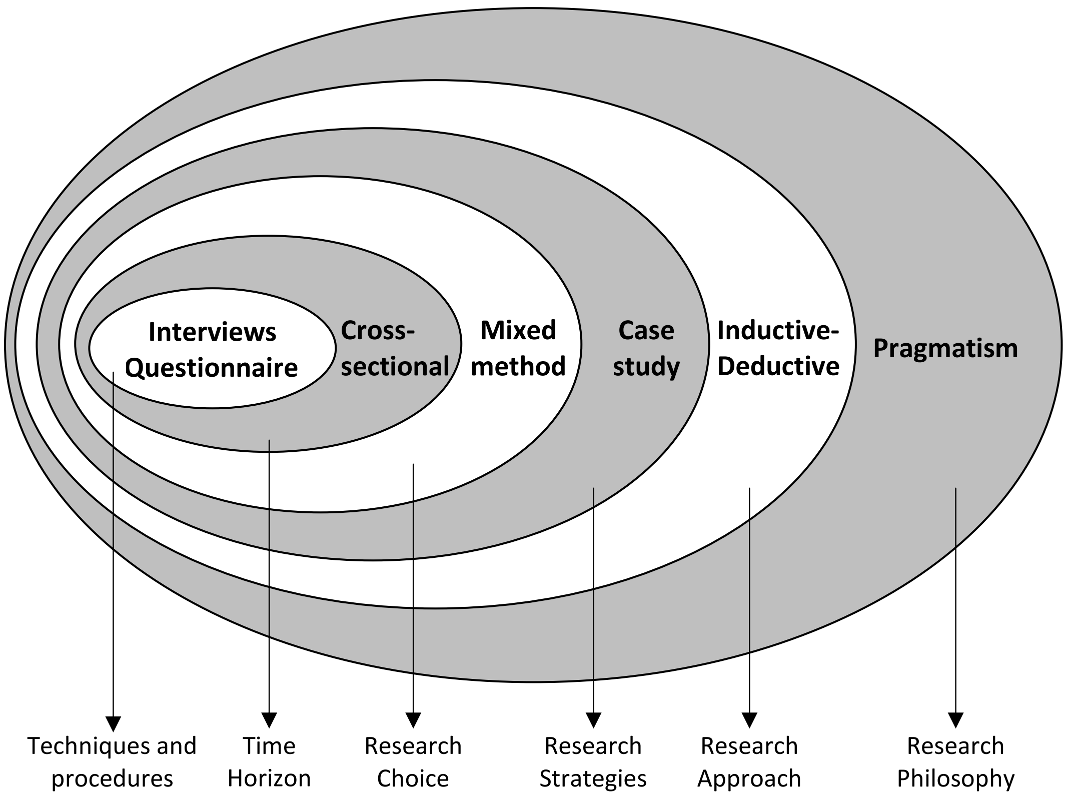

Figure 3.10 The research onion of this study
(adapted from Saunders *et al*., 2009)

3.10 Thesis write-up

Writing-up the thesis is the final stage of the PhD process. This process does not start after the researcher has finished the data analysis and arrived at the research output, instead it starts at the beginning of the PhD journey. This stage aims to allow the researcher to focus on writing the thesis into a structured form (chapters).

3.11 Validity and reliability

Validity and reliability are two terminologies that apply to an examination of the quality of the research. According to Easterby-Smith *et al*. (2012) validity is 'the extent to which measures and research findings provide accurate representation of the things they supposed to be describing', in other words, it concerns the question of whether the research findings accurately reflect the investigated phenomena (Collis and Hussey 2009). Reliability concerns whether the results of the study are repeatable (Bryman and Bell, 2011); thus, the objective of reliability is to minimise the errors and biases during the data collection process (Amaratunga *et al*., 2002). As a result, a reliable research can produce the same findings if carried out by the same procedures.

The process for establishing the validity and reliability of a research study is viewed differently by qualitative and quantitative methods (Neuman, 2011). Despite the differences, Morse *et al*. (2002) stress that validity and reliability are achieved if researcher rigorously follows a number of verification strategies during the research process. Researchers have constructed different methods (terminology) regarding validity and reliability, such as Cook and Campbell (1979) cited in Yin (2009), Lincoln and Guba (1985), Onwuegbuzie and Johnson (2006), and Neuman (2011). Accordingly, this research follows the terminology proposed by Yin (2009): construct validity, internal validity, external validity, and reliability.

Construct validity concerns establishing correct operational measures for the concepts being studied and is implemented during the data collection process (Yin, 2009). Construct validity can be met by deploying multiple sources of evidence. This research deploys a multiple data collection method, mixing qualitative and quantitative approaches in a mixed methods approach. According to Abowitz and Toole (2010) the use of mixed methods in a study is a broader form of triangulation.

Internal validity concerns establishing ‘a causal relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationship’ (Yin, 2009). It is applicable for explanatory study. As this research involves the explanatory study, the internal validity is met by ensuring that the research was built using the logic model, and by executing pattern matching and explanation building during the data analysis.

External validity refers to a question about whether the research findings can be generalised. It is conducted during the research design process. In this research, the process from the first stage of data collection (interview) (see section 3.9.1.2) to the second stage (questionnaire survey) (see section 3.9.1.3) and the use of multiple case studies (see section 3.6.2) are the way to ensure the external validity can be achieved.

The reliability that is the concern of this research is achieved by creating the case study protocol, in which the step-by-step process of the research is explained.

3.12 Summary and the link

This chapter has presented the research methodology adopted for this study. First, it presented the personal motivation of the researcher in conducting this study, followed by the discussion of philosophical assumptions. The philosophical paradigm of the research stands at pragmatism. The research strategy adopted is multiple case studies in three areas affected by earthquakes in Indonesia: Aceh, Yogyakarta, and West Sumatra. Furthermore, it discussed why a mixed-method design is the most appropriate method in order to achieve the aim and objective of the research. At the end, it discusses how the issue of validity and reliability are met. The flowchart of the data collection method and theory building can be seen in Figure 3.6, and the summary of the methodological approach is presented in Figure 3.10. The next chapter presents the process of the establishment of the research conceptual framework.

Chapter 4 - CONCEPTUAL FRAMEWORK

4.1 Introduction

The previous chapter presented the methodological process of this study. This section describes the process adopted in developing the conceptual framework of the research. This chapter begins by reasoning why the conceptual framework is proposed in this research, followed by key issues that need to be addressed in the conceptual framework and finally the development of the conceptual framework.

4.2 The need for a conceptual framework

According to Miles and Huberman (1994), a conceptual framework aims to explain the main concepts of the research, its key factors, its variables and its relationships, either graphically or in narrative form. Maxwell (2005) expands this terminology to include the actual ideas and beliefs about the research topic. He stresses that the most important aspect of developing the conceptual framework is that it is a model of what is out there, and what is going on and why, hence it is a tentative theory of the investigated phenomenon. Moreover, Yin (2009) adds that by conceptualising the investigated phenomenon, the researcher can illustrate the main concepts of the study, the ways they are interrelated, and the boundaries within which the concepts and interrelationships are applicable. As a result, the development of a conceptual framework is an essential part of research process.

4.3 Key issues

The conceptual framework was developed using key areas of the research that were identified through a literature review (Chapter 2). Some of the key areas are: the importance of post-disaster housing reconstruction (section 2.4.1), the concept of community-based post-disaster housing reconstruction (section 2.5.3), the significance of project risk management in the construction industry (section 2.6.1), and finally the need for the application of project risk management practice in post-disaster housing reconstruction (section 2.6.3).

4.3.1 The importance of post-disaster housing reconstruction

Following the massive destruction after an earthquake disaster, housing reconstruction is probably the most important project during the reconstruction programme. This programme is often viewed as the key factor in deciding the success of the whole recovery process. After the emergency period, survivors will normally want to come back to their normal life as soon as possible. Particularly for those who lost their houses, this can only be provided if they have a home. They desperately require a home because it is a basic need of a human being. They need a place where they can feel safe and comfortable, and a place where they can consider starting a new life (see section 2.4.1). Barakat (2003) emphasizes that housing reconstruction is the centre for social and economic recovery. Staying for a long time in temporary shelter can have negative effects. As a result, delivering good quality houses to beneficiaries on time and within budget is immensely important. However, this ultimate goal is not easy to achieve. Many problems occurred during the reconstruction stage and affected the success of reconstruction programme. It can bring dissatisfaction among beneficiaries and in worst cases, it can fail the reconstruction programme.

4.3.2 The concept of community-based housing reconstruction

The community-based approach is one method available in providing houses for beneficiaries. This method can bring a lot advantages to beneficiaries, both physical and psychological (see section 2.5.3)

Within this concept, communities are not only positioned as the object of the reconstruction, but should be empowered to control their own housing reconstruction project. Despite this simple rule, the implementation is easier said than done. The understanding of this method by the implementer is still very limited because there has never been a thorough awareness of what the level of community involvement in a community-based project should be. The 'community-based' has become a generic term to label the programme, indicating that it is only for the benefit of community but also to make a good impression. Only consulting the community about their needs without a guarantee that their voice will take into account is often referred to as a community-based approach. As a result, developing a definition of what 'community-based' means in post-disaster housing reconstruction is necessary.

4.3.3 The significance of project risk management in the construction industry

A construction project is a unique and complex process. It exposes high uncertainties and involves risks. In a construction project, risk is perceived as an event that can create negative consequences and as a barrier preventing a project from meeting its objectives. The application of a risk management process in this sector has proven to be an essential activity for a project to be successful and meet its objectives. Failure to deal with risk brings many negative consequences.

The typical risk management process is begun by identifying the potential risks followed by their assessment. After that, a risk treatment or risk response strategy is developed and communicated to everybody involved in the construction project.

4.3.4 The need for the application of project risk management in housing reconstruction

Post-disaster housing reconstruction is inevitably a construction project. The disaster circumstances add to the complexity of this project. Moreover, the intense involvement of the community in post-disaster housing reconstruction projects even makes it more distinctive. These situations bring many uncertainties and risks that can prevent the project from meeting its objectives. As a result, the application of risk management practice may be one solution to enhance the success of the post-disaster housing reconstruction project.

4.4 Development of a conceptual framework

This section elaborates how the conceptual framework is structured. It involves the identification of the main concepts elicited from the literature review, the interrelationship among them, and their boundaries.

4.4.1 Main concepts

The previous section (section 4.3) has indicated the key issues that contribute to the main concepts in developing the conceptual framework. As explained in section 4.3.1, housing reconstruction is the main programme in a reconstruction project and needed immensely by disaster survivors. Community-based, which is one of the methods of delivering houses to the beneficiaries, can produce many advantages. However, this method still has many problems that indicate that certain risks exist. Risks can affect the achievement of project objectives. Meanwhile, the risk management process has been acknowledged in the construction industry as an important part of delivering a successful project. Thus, the application of a risk management approach in post-disaster housing reconstruction can enhance the success of community-based post-disaster housing reconstruction project.

4.4.2 Interrelation

This research combines two different environments, disaster management and the best practices of risk management in the construction industry. In the disaster management cycle, one of the phases is the recovery, sometimes called the reconstruction phase. Housing reconstruction is part of it and a community-based approach in one way of delivering houses to beneficiaries.

The community-based approach has distinct advantages compared to other approaches in post-disaster housing reconstruction, contributing to the success of housing reconstruction programmes. Furthermore, investigating the success factor of community-based projects helps the community-based approach to achieve its objectives.

Despite the distinct advantages, this method is exposed to risks that can influence its success. To minimise negative consequences, the risk management method needs to be implemented. This begins with investigating the problems, in other words, the risk identification. Following this, risk assessment is carried out. With this method, high potential risk events can be revealed. By giving particular attention to the high-risk events, the success of the community-based approach can be achieved.

However, if the risks are found to be too high and cannot be tolerated, then other options to implement housing reconstruction, such as community-based approach, has to be considered.

4.4.3 Boundary

This study is conducted in Indonesia, a country hit severely by earthquakes in recent years and needing massive housing reconstruction as a consequence. Particular attention is given to the pre-construction stage of community-based method as this stage has more risks compared to the construction stage.

4.5 Conceptual framework

The pertaining conceptual framework for this study which can be seen in Figure 4.1 is developed by combining the main concepts, their interrelationships, and their boundaries as explained in section 4.4.

4.6 Summary and the link

This chapter presents the process adopted to develop the conceptual framework. It involves the integration of three factors: the main concepts, the interrelationship and the boundaries. With its creation, it is hoped that the main idea of the research will be clarified. The next chapter presents the data analysis of this study.

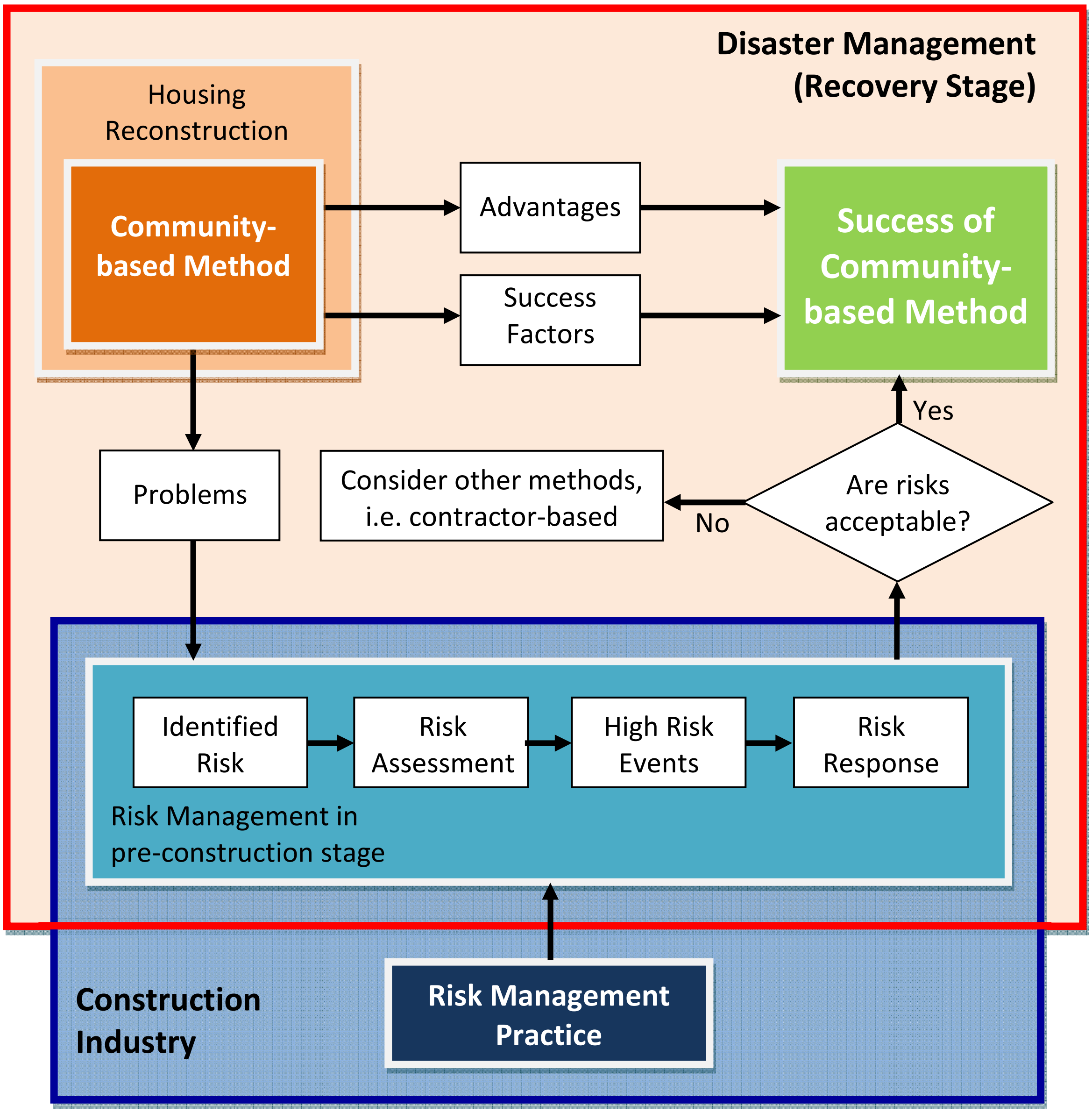

Figure 4.1 Conceptual framework of the research

Chapter 5 - DATA ANALYSIS

5.1 Introduction

Chapters 3 and 4 describe the methodology and the conceptual framework adopted in this research. This chapter presents the data analysis of the semi-structured interview and questionnaire survey and is divided into four parts. Part 1 introduces the three case studies areas: the geography and demography of disaster-affected area, the impact, and the method adopted for housing reconstruction. The locations of the case study areas are shown in Figure 5.1. Part 2 analyses the interview data, includes the advantage and limitation of CPHRP, the risk identification, and the critical success factors. Part 3 presents the quantitative analysis of the questionnaire survey. This section further discusses the advantages, the risk probability and impact, the probability impact factors, and the CSFs. Part 4 details the cross-case analysis and discusses the validation of the findings by conducting an expert interview.

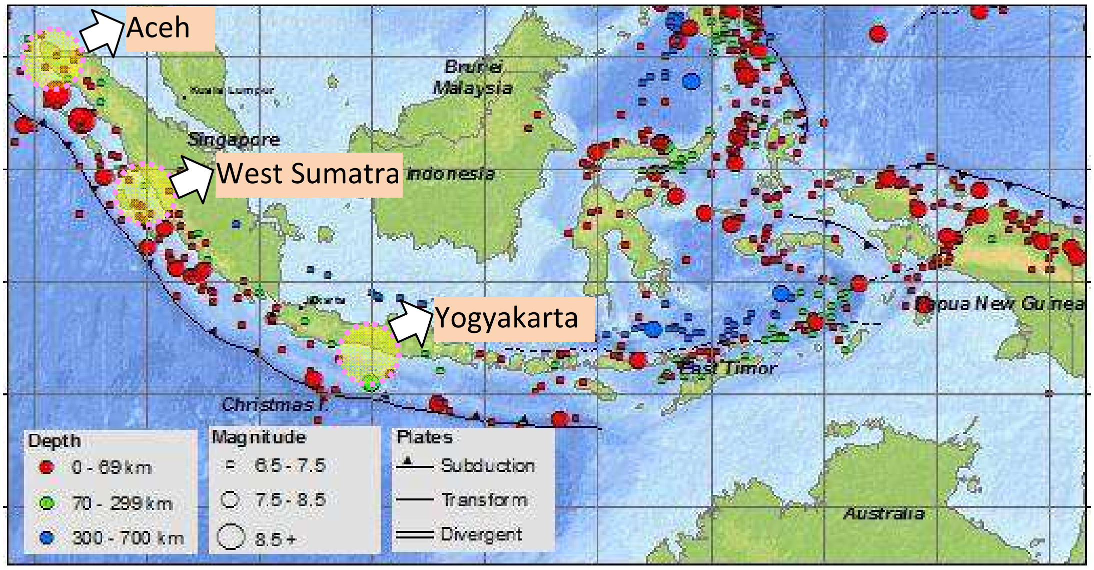

Figure 5.1. Location of case studies in Indonesia's seismicity map from 1900-2013
(Source: after USGS, 2013)

PART 1: Introduction to case study

5.2 Introduction to case study 1: Aceh reconstruction

5.2.1 Geography and demography

Aceh province is located at the western end of Indonesia. It has 17 regencies and 4 cities. The population is 4.4. million. The disaster has affected around 2.8 million people in Aceh, where 25% of them in urban areas, and the remaining in rural areas. The affected areas with the largest number of inhabitants are Bireuen (348,000 people), North Aceh (328,500), East Aceh (292,000), and Banda Aceh (239,000).

In 2003, Aceh's nominal GDP was Rp. 38.6 trillion, contributing 2.3% of the national GDP. The main source of economic generation in Aceh is oil and gas production, accounting for 43% of regional GDP, followed by the agricultural sector at 32.2% (Bappenas and International donors, 2005). Nias is a district of North Sumatra province. Its population was 711,611.

A giant earthquake at 9.0 Richter scale struck the west coast of northern Sumatra Island on 26 December 2004. The epicentre of the earthquake was in the Indian Ocean, 30 km in depth, and located 250 km from Banda Aceh. The earthquake triggered a huge tsunami wave that hit 12 nations, and Indonesia, particularly Aceh province, suffered the worst. The west and north-west parts of Aceh were the most heavily hit by the tsunami and Banda Aceh was the worst affected. As many roads were impassable and bridges destroyed, numerous villages became isolated. The highest human toll is in Banda Aceh and the nearby districts of Aceh Besar and Aceh Jaya. Total fatalities in Aceh amounted to more than 120,000 people. Whilst Aceh was still in the emergency period, on 28 March 2005 another earthquake at 8.7 on Richter scale hit Nias island, the adjacent island of Aceh province. The death toll of this earthquake was recorded as 1,313 people. The epicentre of the Aceh and Nias earthquakes is shown in Figure 5.2. The initial damage and loss assessment is USD 4.9 billion (BRR and partner, 2006).

The impact of the disaster in Aceh and Nias was unprecedented and considered as one of the most devastating in history. The final number of fatalities was 127,720, and 93,285 were missing. The number of houses destroyed was 139,195 units. Detail of the disaster impact is shown in Table 5.1.

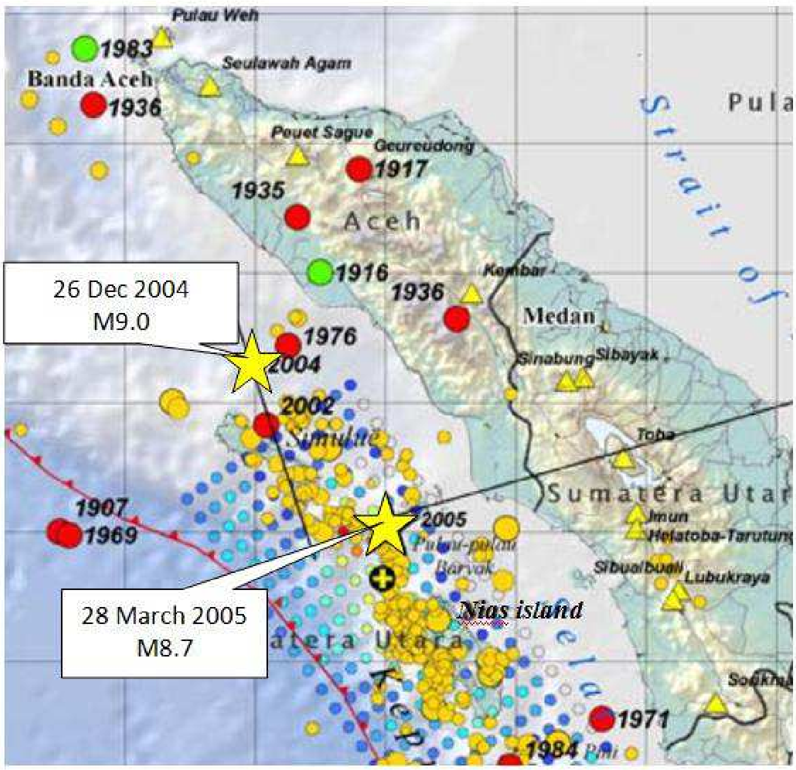

Figure 5.2 Epicentre of Aceh and Nias earthquakes

Table 5.1 The impact of disaster in Aceh and Nias

No	Impact	Number
1	People displaced	635,384
2	People killed	127,720
3	Houses destroyed	139,195
4	Hectares of agricultural land destroyed	73,869
5	Teachers killed	1,927
6	Fishing boats destroyed	13,828
7	Religious facilities destroyed	1,089
8	Kilometres of road destroyed	2,618
9	Schools destroyed	3,415
10	Health facilities destroyed	517
11	Government buildings destroyed	669
12	Bridges destroyed	119
13	Ports destroyed	22
14	Airports or airstrips destroyed	8

(source: BRR, 2009a)

5.2.2 Reconstruction plan

Acknowledging the scale of destruction in Aceh and Nias, the Government of Indonesia (GOI) established a master plan book in April 2005, intended as a guideline for Aceh and Nias reconstruction. This book suggested that for Aceh and Nias reconstruction a special organisation was required. This organisation was later called Badan Rehabilitasi dan Rekonstruksi (Rehabilitation and Reconstruction Agency/BRR) for Aceh and Nias. This book set up a policy for housing reconstruction to provide a core house of 36 square metres for each family. The government planned to provide assistance in cash, Rp. 28 million for heavily damaged or destroyed houses, and Rp. 20 million for slightly damaged houses. The schedule aimed to complete the housing reconstruction within less than 2.5 years (GoI, 2005).

Following the master plan, Government Regulation No. 2 /2005 on 28 April 2005 established BRR. Under a state of emergency, this Government Regulation was then made Law No. 10/2005. BRR consisted of three boards: an executing agency, an advisory board, and a supervisory board. The position of this organisation within the government structure equated to ministerial level, as a result it had a full mandate and a direct link to the president.

The time schedule set up by BRR for Aceh reconstruction is demonstrated in Figure 5.3; the original plan was to complete within 2.5 years in mid 2007. Particularly for housing reconstruction, it was estimated in 2005 that the number of new houses needed by survivors was between 80,000 and 110,000 houses (BRR and International Partners, 2005). Later, it was found that the final figures of totally destroyed houses was 139,195 houses, and BRR successfully constructed 140,304 houses (BRR, 2009b).

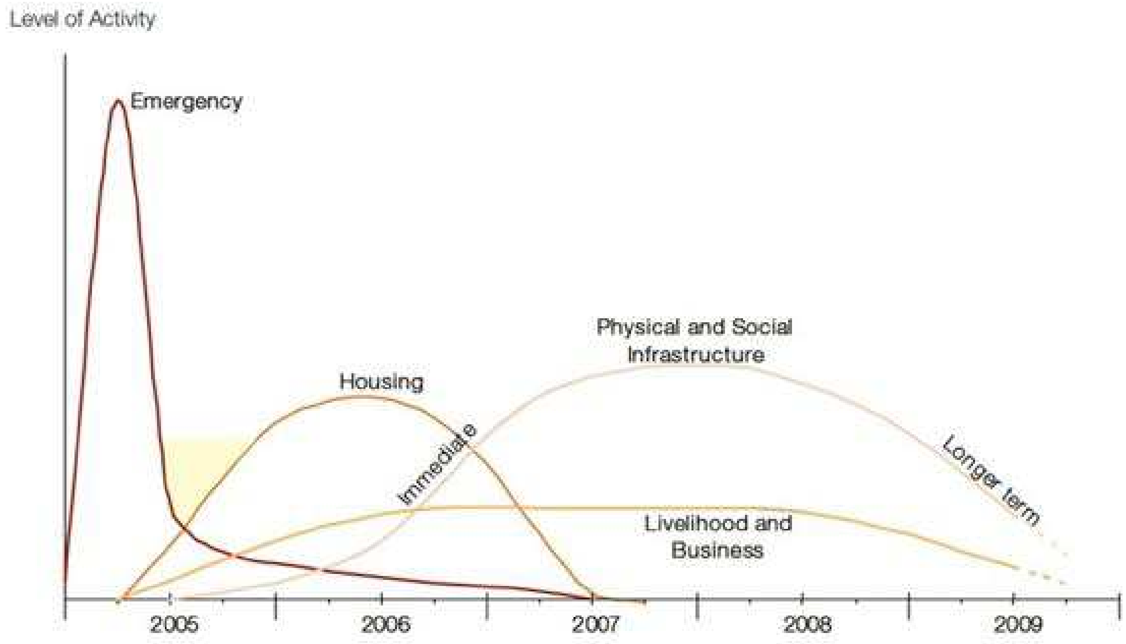

Figure 5.3 Time schedule for Aceh reconstruction
(source: BRR and International Partners, 2005)

According to BRR (2009a), three types of financing options are available:

a. On-budget/on-treasury. In this option, donors channelled their funds through the government budget by signing a grant or loan agreement. Under this mechanism, donors use the GOI budgetary system and regulations to disburse their funds. The advantage of this process is its accountability, but it is slow in responding to reconstruction needs.

b. On-budget/off-treasury. In this scheme, donor projects were accounted for in the national budgetary system, but BRR lacked the full authority to influence the implementation process.

c. Off-budget/off treasury. In this system, NGOs can implement their own implementation mechanism, so they can bypass the long national budgetary system process.

In terms of financing, BRR was very successful in turning pledges into commitment. Despite a bad reputation in Indonesia for corruption (ranked 133rd in 2004 the corruption perception index), BRR can convert 93% of pledges into commitment. The comparison of funding for reconstruction needs, pledges, and commitment is shown in Figure 5.4. According to BRR (2009a), this impressive achievement can only be achieved by demonstrating credibility to international organisations and to the Acehnese. The anti-corruption unit was also established to guard against misconduct in BRR itself, as well as in any reconstruction projects. This autonomous unit was the first of its kind to be established by an Indonesian government agency.

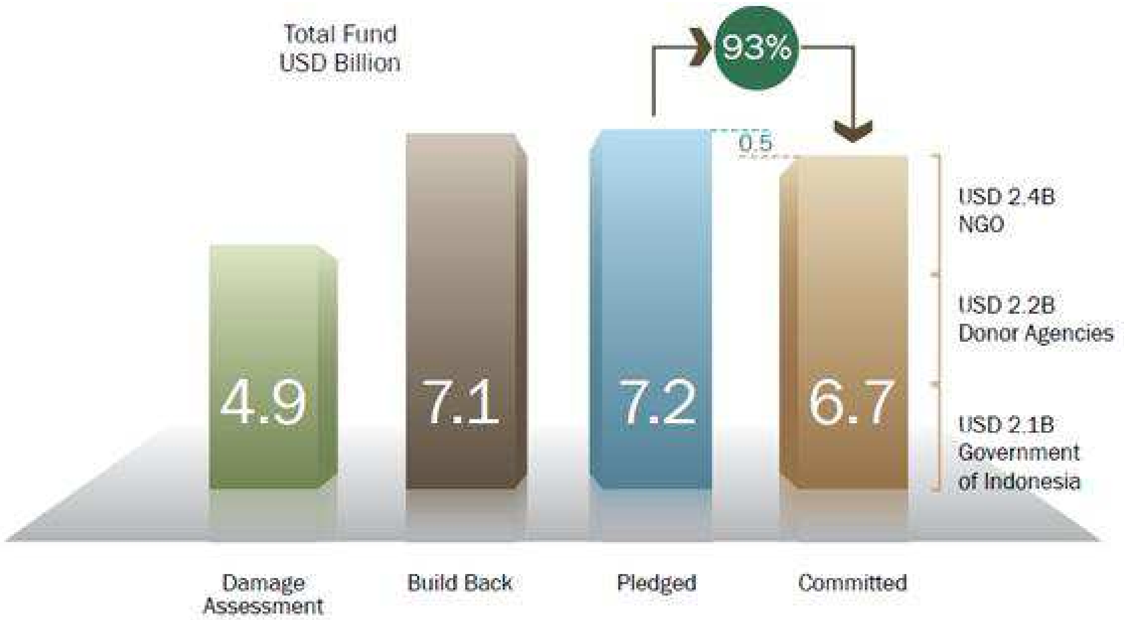

Figure 5.4 Aceh and Nias reconstruction needs, pledges and commitment
(source: BRR, 2009a)

BRR had a dual role in the Aceh reconstruction effort, first as the implementing agency of its own project and second, as project coordinator for other organisations. In terms of housing reconstruction, as shown in Figure 5.5, BRR were responsible for building 57,000 houses and coordinating the building of 90,000 houses by NGOs.

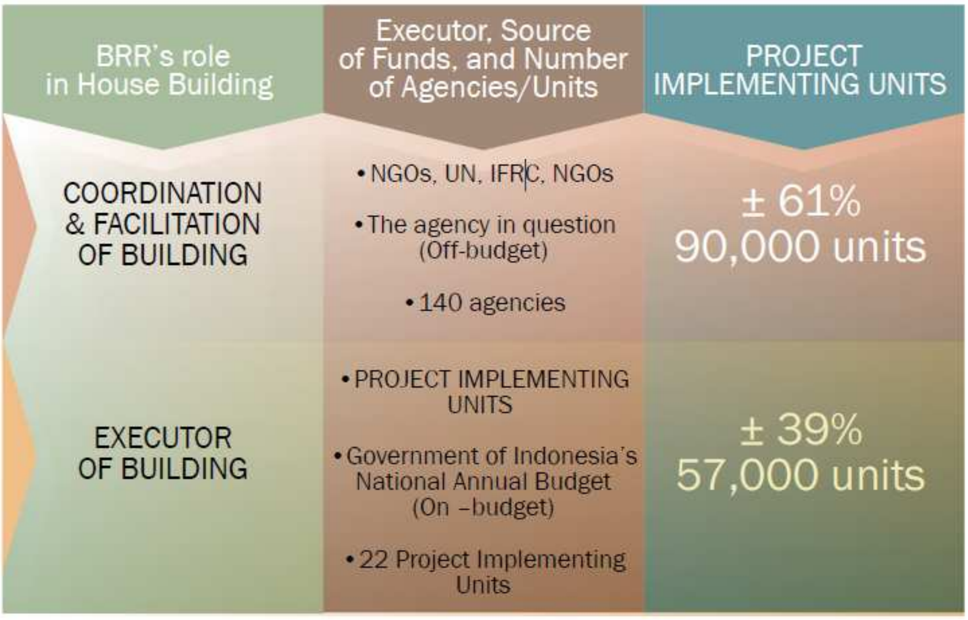

Figure 5.5 BRR's role in housing reconstruction project
(source: BRR, 2009a)

The organisational structure of Aceh and Nias reconstruction is shown in Figure 5.6; NGOs can directly implement their preferred method of assistance to the community. Their relationship with the government was in the form of coordination and consultation. The government effectively appointed which area the NGOs should go into to provide their housing assistance, and the NGOs could then implement their own procedures and mechanisms. While most housing units provided by BRR used a contractor-based approach, many NGOs opted for a community-based approach. Two leading organisations highlighted by the researcher were UN-Habitat and UPLINK. These two organisations successfully implemented community-based approaches in Aceh and Nias reconstruction. Details of their programme are presented in section 2.5.3.

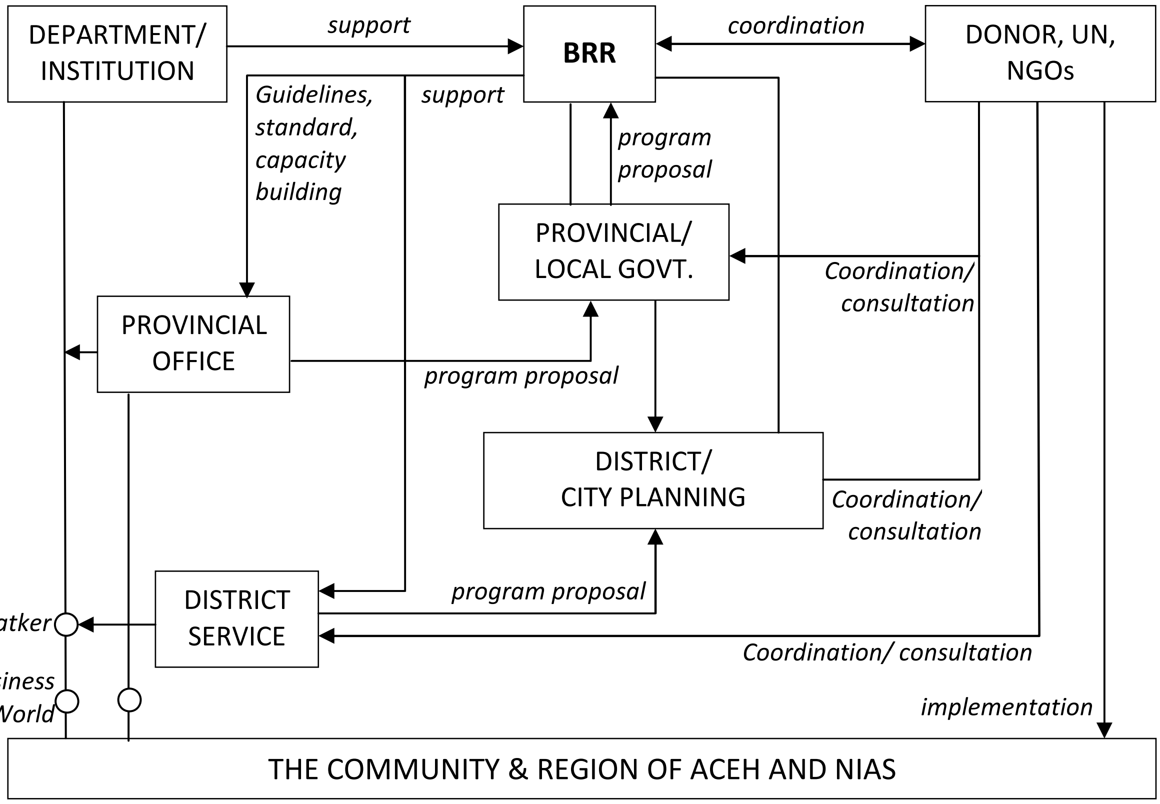

Figure 5.6 Stakeholders relationship for Aceh reconstruction

5.3 Introduction to case study 2: Yogyakarta reconstruction

5.3.1 Geography and demography

The area affected by the Yogyakarta earthquake is geographically small but densely populated. It was inhabited by around 4.5 million (2% of the national population) concentrated in an area equivalent to 0.2% of the national territory. The density in the most affected districts, Bantul and Klaten, was approximately 1,600 inhabitants per km2. According to BAPPENAS *et al*. (2006), two out of five districts in Yogyakarta were significantly poor compared to national districts, while Central Java Province was even poorer. The affected areas were occupied by 880,000 poor people.

5.3.2 The disaster and its impacts

On 27 May 2006, an earthquake hit the Provinces of Yogyakarta and Central Java. The epicentre was estimated at about 30 kilometres south of Bantul district in Yogyakarta Province. The first earthquake measured 6.2 on the Richter Scale. This shallow earthquake at 33 km depth resulted in massive devastation, particularly in the districts of Bantul in Yogyakarta Province and Klaten in the Central Java Province. The fatalities were 5,716 human lives. Details of death tolls per districts are shown in Table 5.2.

Table 5.2 Death toll resulting from Yogyakarta earthquake

Death toll	Damage
Yogyakarta Province	4,659
Bantul	4,121
Sleman	240
GunungKidul	81
Yogyakarta City	195
KulonProgo	22
Central Java province	1,057
Klaten	1,041
Sukoharjo	1
Magelang	10
Purworejo	1
Boyolali	4
Wonogiri	0
Total	5,716

(source: BAPPENAS *et al*., 2006)

The scale of housing destruction in the affected areas is higher compared to the Aceh disaster. Housing damage and losses account for more than 50% of the total, with an estimated 154,000 houses completely destroyed and 260,000 houses suffering some damage (BAPPENAS *et al*., 2006). Figure 5.7 shows the distribution of damage and losses in the housing sector per district/city in Yogyakarta and Central Java.

Total damage and losses were estimated at Rp. 29.1 trillion (USD 3.1 billion) with the housing sector contributed at Rp. 15,296 billions. The four rural districts of Bantul, Sleman, and Gunungkidul (Yogyakarta), and Klaten (Central Java) contributed to the 91% of total damage in the housing sector. Details are shown in Table 5.3.

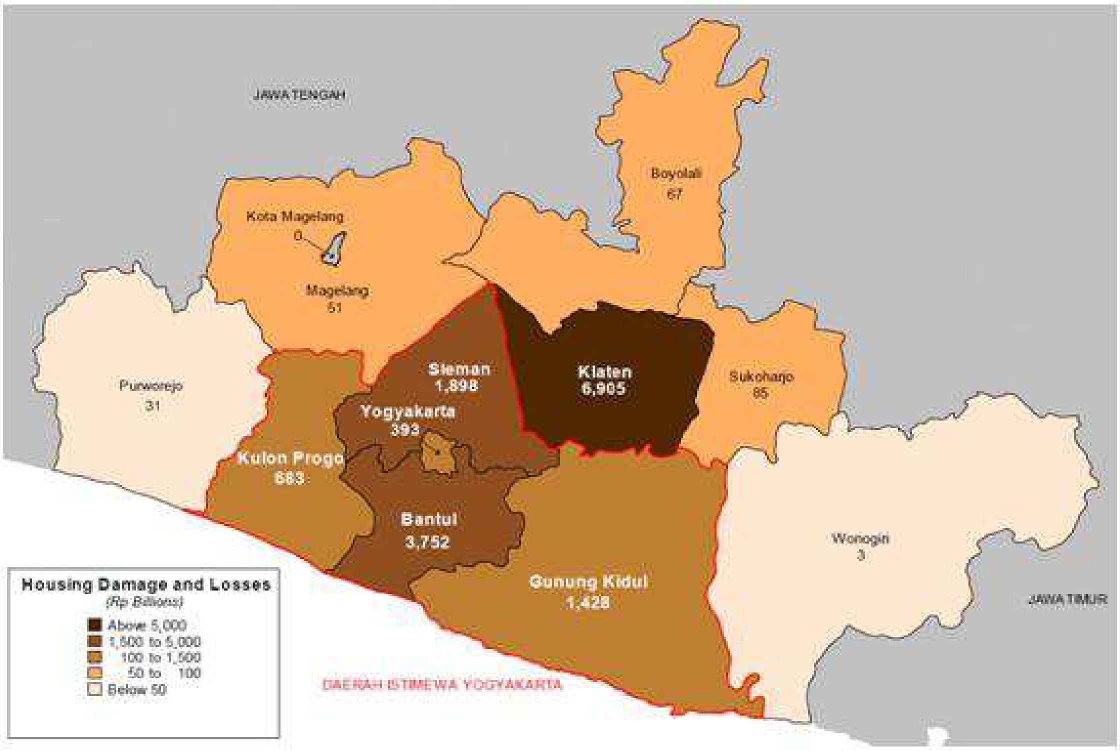

Figure 5.7 Distribution of damage and losses on housing sector per district/city (Rp. Billion) (Source: BAPPENAS *et al.*, 2006)

Table 5.3 Damage and losses in the housing sector after Yogyakarta earthquake (Rp. Billions)

	Damage	Losses	Total
Yogyakarta Province	*7421*	*733*	*8154*
Bantul	3419	333	3752
Sleman	1724	175	1899
GunungKidul	1299	129	1428
Yogyakarta City	358	35	393
KulonProgo	621	62	683
Central Java province	*6494*	*649*	*7143*
Klaten	6278	627	6905
Sukoharjo	77	7.4	84.4
Magelang	47	4.6	51.6
Purworejo	28	3	31
Boyolali	61	6	67
Wonogiri	3.1	0.3	3.4
Total	13915	1382	15297
% of total damage and loss to all sectors	61	22	53

5.3.3 Reconstruction plan

The action plan for Yogyakarta and Central Java reconstruction was prepared by BAPPENAS, in collaboration with the local government of Yogyakarta and Central Java. The principle of reconstruction was to utilize reconstruction to recover livelihoods and promote community resilience towards potential natural disasters in the future. GOI therefore adopted a community-based approach for housing reconstruction. According to Hadi (2009), this reconstruction programme was one of the largest CPHRP in the world, with the total number of heavily/destroyed houses amounting to 177,469 in Yogyakarta province and to 104,084 in Central Java Province.

The initial policy framework in housing reconstruction was to provide small grant assistance (known as a stimulant) equal to Rp. 20 million per household. The timeframe for reconstruction was set for 18 months until the end of 2007. However, after further analysis the grant was reduced to Rp. 15 million (BAPPENAS *et al*., 2008) and the timeframe for reconstruction extended until December 2008 (Hadi, 2009).

Unlike the Aceh and Nias reconstructions, in Yogyakarta most of the reconstruction financing was funded by the GOI. Total funding allocated for the whole sector was Rp. 7.53 trillion, in which the government contributed 86%. In the housing sector, government contribution was even higher at 89%. Details of funding allocation in the housing sector are show in Table 5.4.

Table 5.4 Funding for housing sector in Yogyakarta and Central Java (Rp. millions)

Funding source	Implementation		Allocated	Total
	2006	2007	2008	
National budget	2,879,430	2,737,686	2,000	5,619,116
Regional budget	58,644	7,707	-	66,351
Donor/NGOs/Community	671,241			671,241
Grand total				**6,356,707**

(source: after Bappenas *et al.*, 2008)

The Yogyakarta and Central Java reconstruction effort was legalised under Presidential Decree No. 9/2006. Under this decree, the GOI established a National Technical Team (TTN) as coordinator for reconstruction and providing an implementation strategy. The implementing agency was the local government of Yogyakarta and Central Java. Organisation structure is shown in Figure 5.8.

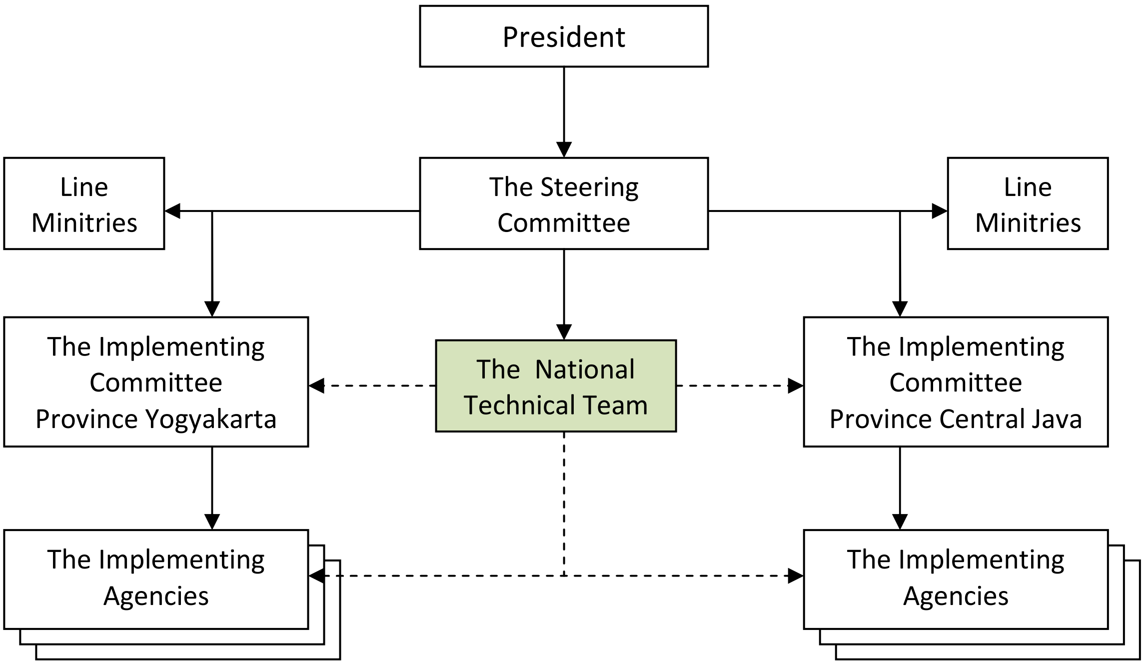

Figure 5.8 Organisational structure based on Presidential Decree No. 9/2006
(source: Hadi, 2009)

Following the Presidential Decree No. 9/2006, the Ministry of Public Work established the Ministry of Public Work Decree No. 19/PRT/M/2006 as a guideline for post-disaster rehabilitation and reconstruction in Yogyakarta and Central Java. Based on this decree, a more detailed implementation organisation structure was established (see Figure 5.9). This structure ranges from national to village level. At national level, the working unit under the Directorate General for Human Settlement was helped by the National Management Consultant (KMP) whose task was to monitor, coordinate and supervise two Regional Management Consultants (KMW) in Yogyakarata and Cenral Java. At provincial level, the governor established another working unit and was helped by KMW. At district level, personnel for budget authorisation were appointed, and the implementation and monitoring was carried out by a coordinator in each district. At sub-district level, a project manager (PJOK) was appointed to administer the implementation of reconstruction in his/her working area. At village level, beneficiries were grouped into community organisations (KSM-P). Each community organisation consisted of 8-15 households. The facilitator enabled the community to build their own houses. The facilitators were recruited by the budget authority at district level but coordinated by KMW.

The grant for the community (BLM-P) was disbursed to the community in two stages. Initially, the community was given 40% of the total funding before starting the work and the rest (60%) when 75% of the initial funding had been used and the progress of the housing construction was 30% complete. The funding mechanism followed the procedure of the Ministerial of Finance. Funding was disbursed directly to a community bank account.

As can be seen in Figure 5.10, there are five steps involved in the implementation of CPHRP in Yogyakarta and Central Java. First, the consolidation and socialisation of the affected community, followed by the establishment of a community group. Third, prioritisation of housing reconstruction and preparation of a guideline for earthquake resistance houses. After that, the community with the assistance of the facilitators make an arrangement for funding disbursement. Finally, there is the housing reconstruction.

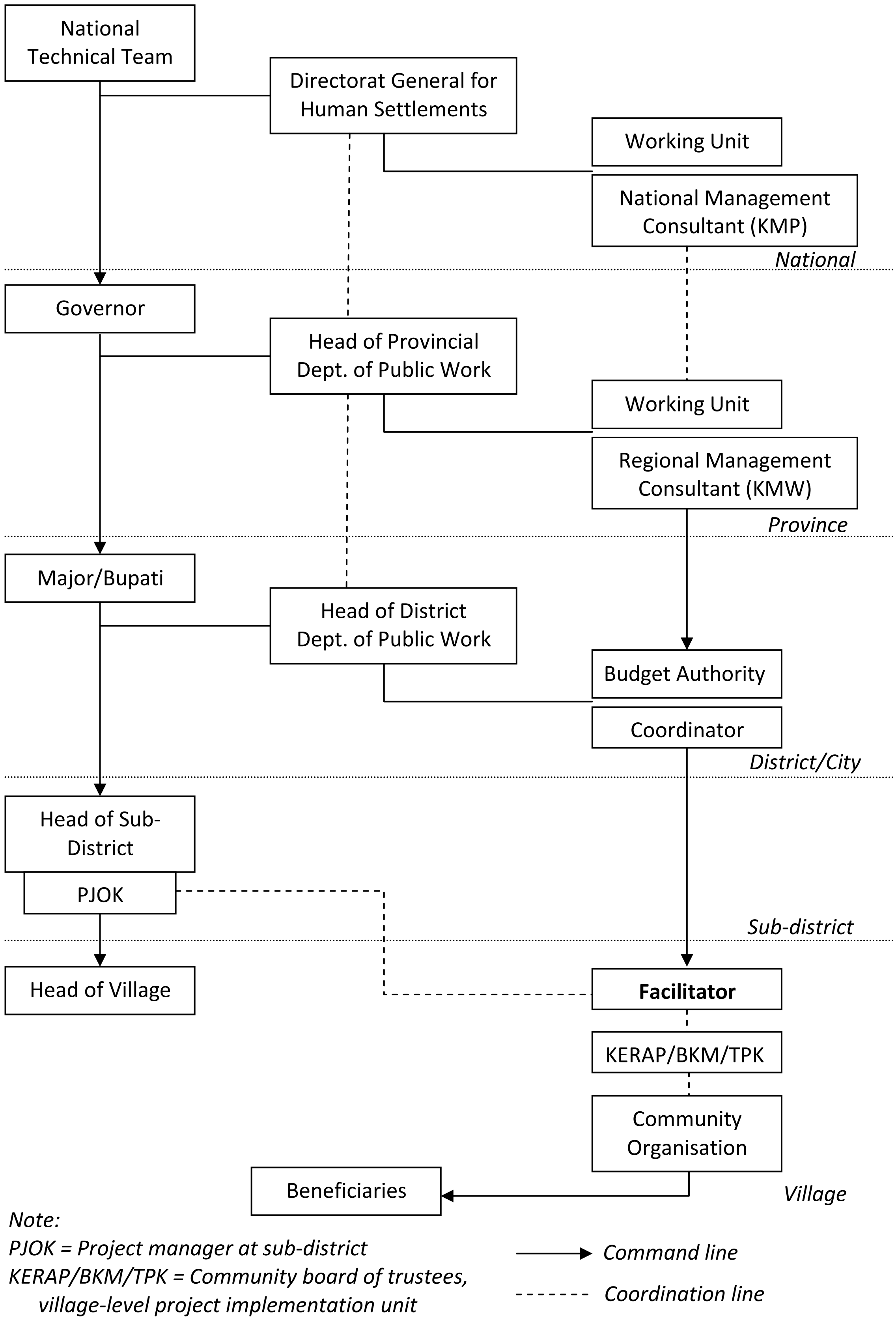

Figure 5.9 Organisation structure for reconstruction implementation
(source: Ministry of Public Work, 2006)

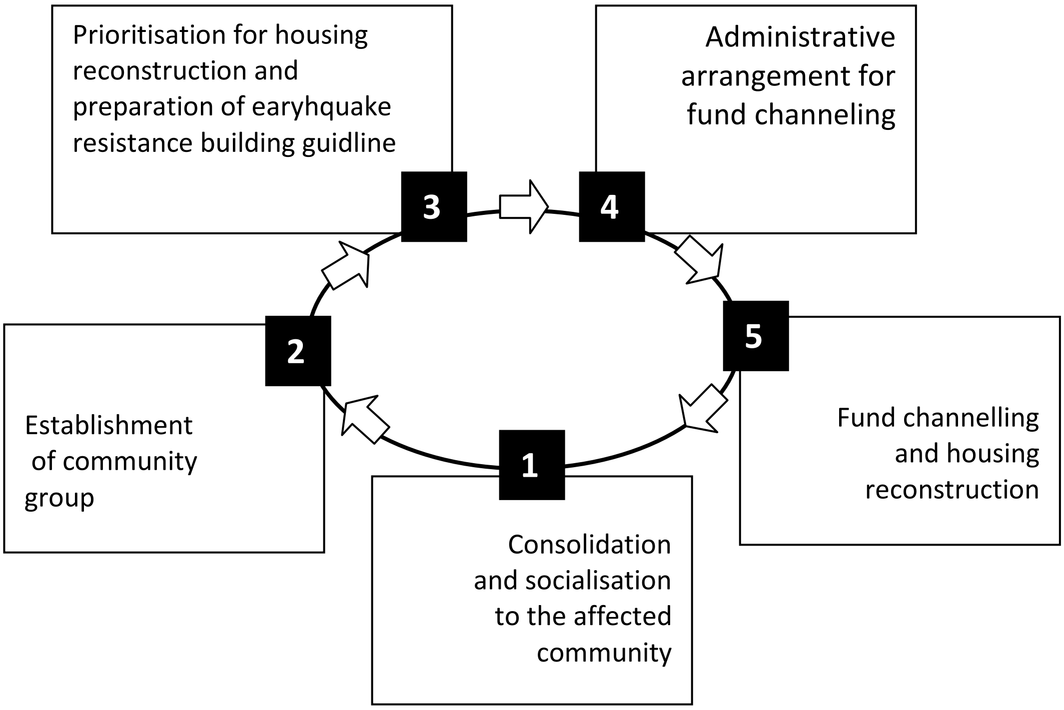

Figure 5.10 Implementation strategy for housing reconstruction
(source: Hadi, 2009)

5.4 Introduction to case study 3: West Sumatra reconstruction

5.4.1 Geography, demography, and economy

West Sumatra Province is located on the west coast of Sumatra Island. It is divided into 12 districts and 7 cities. The total population in 2008 was 4,697,764. The population distribution for each district/city is presented in Table 5.5.

The three main contributors to the West Sumatran economy in 2007 were the agricultural sector at 24.46%, followed by the trade, hotel and restaurant sector, and the services sector, at 17.74% and 15.68% respectively. The GDP of West Sumatra is Rp. 71.21 trillion (US$ 7.1 billion) and RGDP per capita is Rp. 14,950 million (US$ 1,495).

According to the Indonesia Disaster Risk Index (IRBI), this province is categorised as a high-risk province and is positioned at number six out of 33 provinces in Indonesia (Kurniawan *et al.*, 2011). Types of disaster that frequently occur in this area are earthquakes, tsunami, flood, landslide, volcanic eruption, and drought. The disaster most threatening to the community is earthquakes, which also can trigger landslides and tsunami.

According to BAPPENAS (2009), West Sumatra has suffered 14 major earthquakes between 1822 and 2009 and several of them caused tsunamis. Earthquakes in West Sumatra are generated in two ways, first from the subduction plate at the west coast of Sumatra that potentially triggers giant earthquakes and tsunami, and second from the Semangko fault that lies inland. This fault is very active and split Sumatra Island into two, extending from north to south along the Bukit Barisan mountain range. Although the magnitude of earthquakes from this fault is relatively small compared to earthquakes originating from the subduction zone, the impact is more destructive because it occurs more frequently and because the hypocentre is close to settlement areas.

Table 5.5 Population of district/city in West Sumatra

No.	District/city	Population		
		Male	Female	Total
1	Padang City	406,368	431,822	838,190
2	Pesisir Selatan District	214,715	221,245	435,960
3	Agam District	213,520	214,825	428,345
4	Padang Pariaman District	178,687	205,849	384,536
5	Solok District	176,588	174,927	351,515
6	Tanah Datar District	160,464	174,668	335,132
7	Lima Puluh Kota District	164,114	165,407	329,521
8	Pasaman Barat District	166,096	161,692	327,788
9	Pasaman District	124,367	128,781	253,148
10	Sawahlunto/Sijunjung District	97,625	99,981	197,606
11	Dharmasraya District	89,279	86,294	175,573
12	Solok Selatan District	64,716	65,642	130,358
13	Payakumbuh City	54,516	50,532	105,048
14	Bukittinggi City	51,336	52,942	104,278
15	Pariaman City	33,539	36,960	70,499
16	KepulauanMentawai District	35,418	31,799	67,217
17	Solok City	29,137	27,983	57,120
18	Sawahlunto City	26,419	27,494	53,913
19	Padang Panjang City	24,748	27,269	52,017
	Total	2,311,652	2,386,112	4,697,764

5.4.2 The disaster and its impacts

A giant 7.6 earthquake on the Richter scale struck the West Sumatra Province on 30 September 2009 at 5.16 pm local time. The epicentre was located at coordinates 0.84 longitude and 99.65 latitude, 57 km off the coast of northwest Pariaman, and at a depth of 71 km (Figure 5.11). A major aftershock took place at 5.38 pm with a magnitude of 6.2.

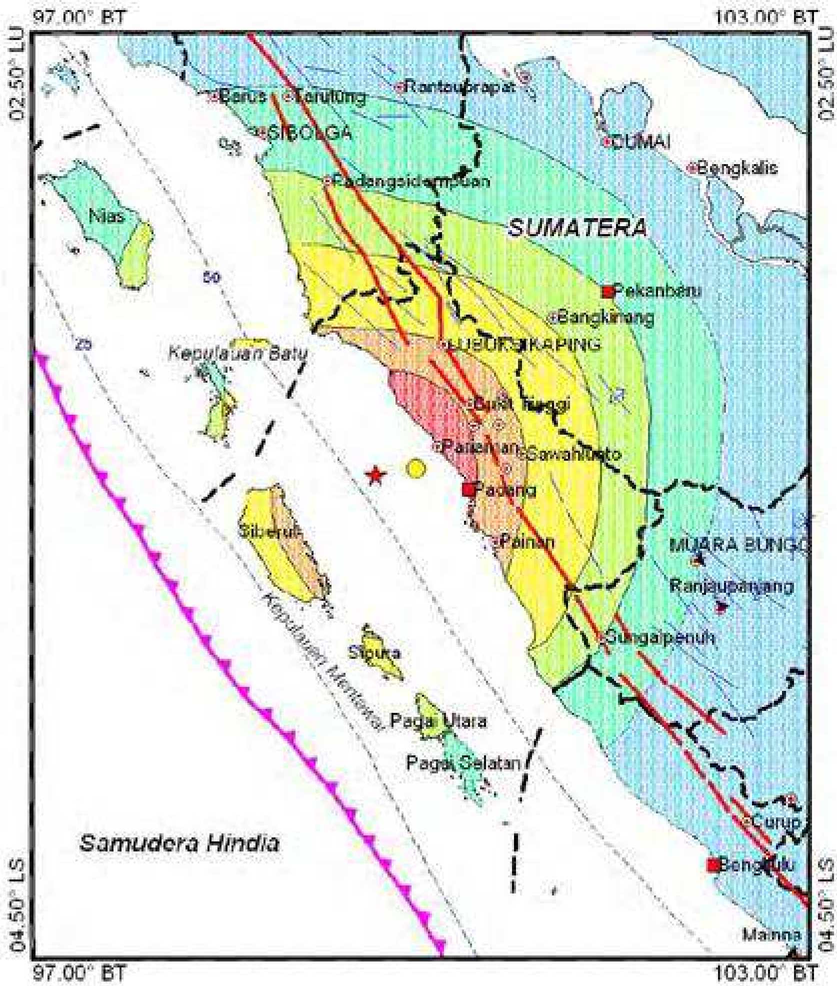

Figure 5.11 Epicentre of West Sumatra earthquake
(*Source:* Volcanological Survey of Indonesia, http://vsi.esdm.go.id).

Twelve districts were affected by the disaster. The most severely affected areas were Padang City, Pariaman City, Padang Pariaman Districts, and Agam Districts. The fatalities totalled 1,195 people and the number of damaged houses was 249,833. Details of the earthquake's impact can be seen Table 5.6 and the number of houses damaged per district in Table 5.7.

Table 5.6 Impacts of West Sumatra earthquake

Impact and damage	**Total**
Fatalities	1.195 people
Severely injured	619 people
Slightly injured	1.179 people
Missing	2 people
Heavy damage	114.797 unit
Moderate damage	67.198 unit
Light damage	67.838 unit
Government building damage	442 unit
Education facilities damage	4.748 unit
Health facilities damage	153 unit
Place of worships damage	2.851 unit
Market damage	58 unit
Bridge damage	68 unit

Table 5.7 Damage to housing sector

No	City/District	Damaged Category			Total
		Heavy	Moderate	Light	
1	Padang City	33.597	35.816	37.615	107.028
2	Pariaman City	6.685	4.115	2.605	13.405
3	Solok City	2	2	6	10
4	Padang Panjang City	17	164	413	594
5	Tanah Datar District	28	115	105	248
6	Padang Pariaman District	57.931	16.291	12.945	87.167
7	Kepulauan Mentawai District	3	0	136	139
8	Agam District	11.796	3.797	4.353	19.946
9	Solok District	145	243	357	745
10	Pasaman District	197	13	931	1.141
11	Pasaman Barat District	3.240	3.046	2.862	9.148
12	Pesisir Selatan District	1.156	3.596	5.510	10.262
	Total	114.797	67.198	67.838	249.833

According to Bappenas, (2009) total damage and losses were Rp. 19.2 trillion (USD 2.2 billion), with a composition of Rp. 17.2 trillion for damage and Rp. 3.5 trillion for losses. The dominant contributor to damage and loss was the housing sector at 74%.

5.4.3 Reconstruction Plan

In the national action plan for West Sumatra reconstruction (Bappenas *et al.*, 2009), there are three reconstruction scenarios available based on funding availability:

- Scenario 1: Excess budget availability, reconstruction expected to be done on the whole region of West Sumatra, not limited to the affected area.
- Scenario 2: Adequate budget availability, reconstruction focuses to meet the minimum standard of service development on all sectors in the affected area.
- Scenario 3: Low budget availability, the priority of reconstruction is on the housing sector, to meet the minimum standard of service, and to stimulate economic activities.

Unfortunately, due to limited funding, the reconstruction of West Sumatra fell under scenario 3 where the budget availability is low (Pranoto *et al.*, 2011). As a result, reconstruction focused on:

- The housing sector and its infrastructure.
- Public infrastructure.
- Social aspect, focusing on providing the basic public service and needs of the poor and vulnerable groups.
- Economy, focusing on restoring economic activities.
- Cross-sector aspect, focusing on reconstructing government buildings in order to restore services for the people.

The reconstruction model implemented in West Sumatra reconstruction very much replicated the Yogyakarta and Central Java's reconstruction model. Most of the funding was from the government budget. Like the TTN in Yogyakarta and Central Java reconstruction, in West Sumatra reconstruction's special working unit was known as the Technical Support Team (TPT), formed under the Head of National Disaster Management Agency of Indonesia (BNPB) No. 109/BNPB/XI/2009 on 20 November 2009. TPT consisted of a member from BNPB, local government, and the university. Its task was to establish a general policy for reconstruction, to develop a detailed reconstruction plan, to coordinate its implementation, and to undertake monitoring and evaluation. The mechanism for rehabilitation and reconstruction in West Sumatra was as demonstrated in Figure 5.12.

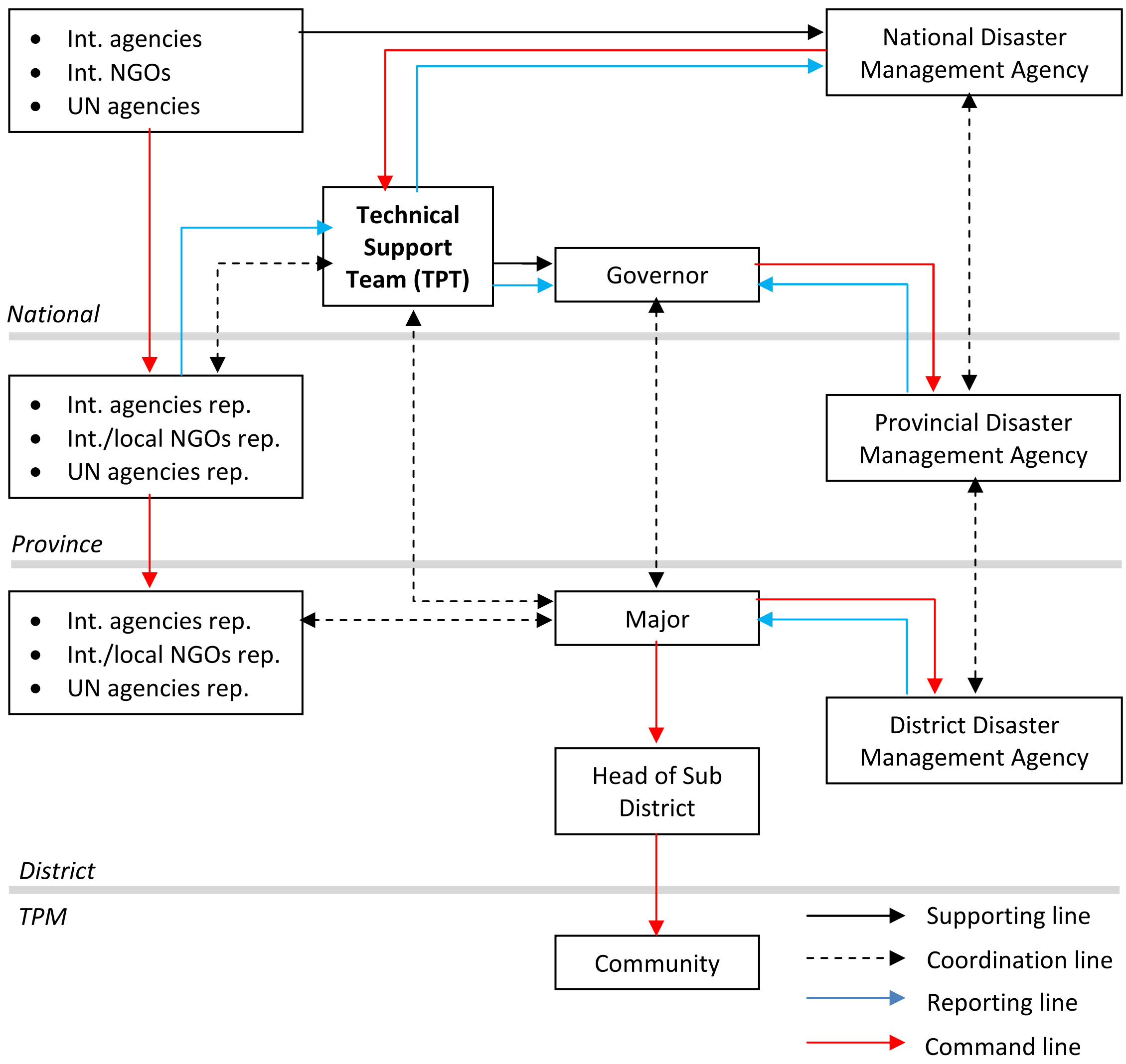

Figure 5.12 Mechanism for West Sumatra rehabilitation and reconstruction (source: Pranoto *et al*, 2011)

As noted earlier, West Sumatra reconstruction had limited funding, as a result housing reconstruction was divided into three stages, stage I (the pilot project) and stage II in 2010 and stage III in 2011. Initially the housing reconstruction was to be accomplished by the end of year 2011. However, up to 2012 the housing reconstruction had not yet been completed. The timeline for the housing sector is shown in Table 5.8.

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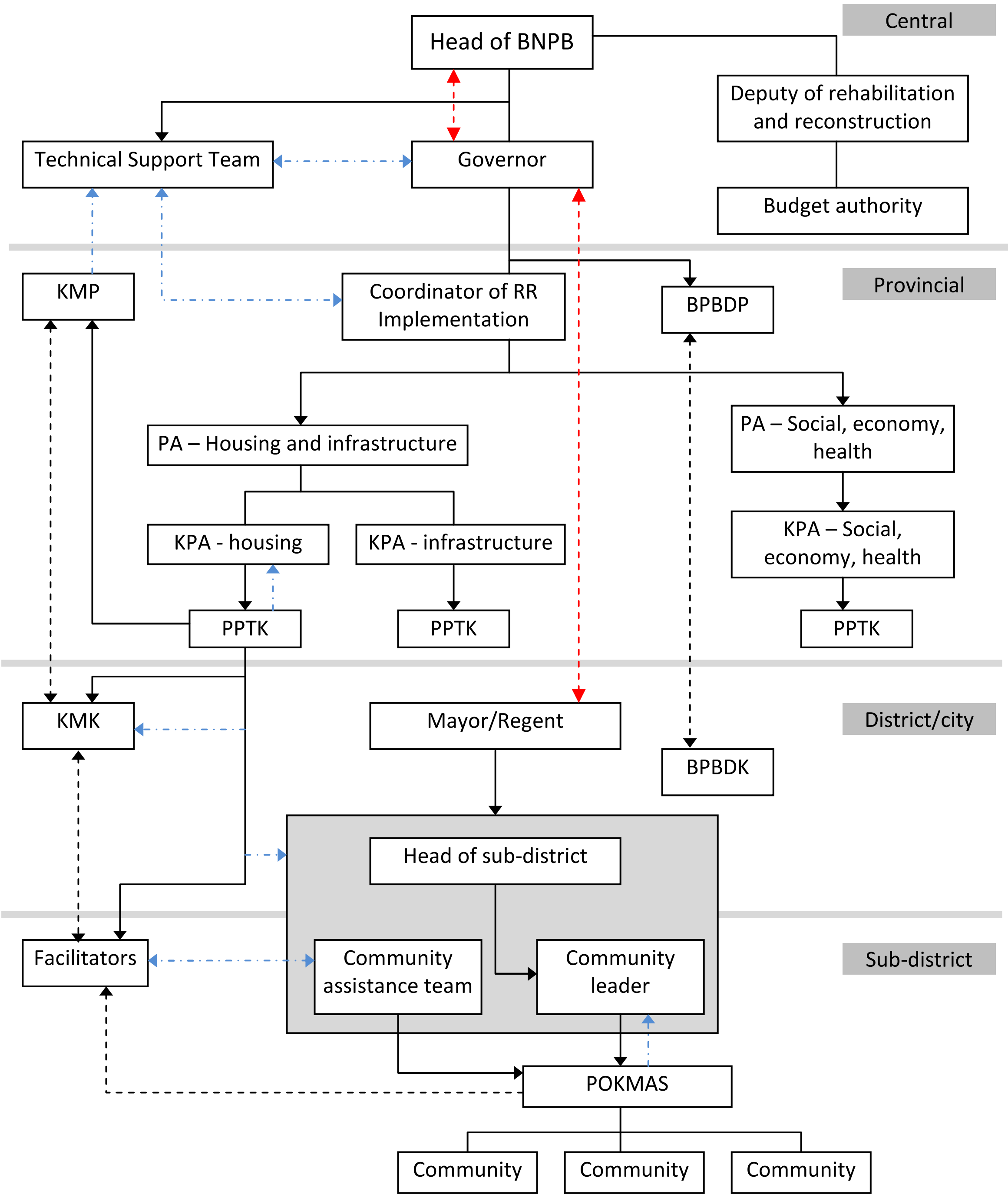
Table 5.8 Timeline for reconstruction per sector in West Sumatra

Reconstruction Activity	Year 2010				Year 2011			
	I	II	III	IV	I	II	III	IV
Housing Sector	Stage I			Stage II		Stage III		
Social Sector								
Economy Sector								
Infrastructure Sector								
Govt. Building Sector								

(source: Pranoto *et al.*, 2011)

At the first stage, structural organisation for West Sumatra reconstruction can be seen in Figure 5.13. The Governor Circular Letter No. 44/I/Sosbud/Bappda-2010 regarding technical guidelines for post-disaster rehabilitation and reconstruction formed this organisation. In this structure, TPT's role was to formulate policy and strategy, whilst provincial government through the Department of Road Infrastructure and Human Settlement (Prasjaltarkim) and eight other working units (SKPD) had the role of implementer. On each SKPD, a Budget Authority Officer (KPA) was appointed. To help KPA, management consultants were appointed, one at provincial level known as the Provincial Management Consultant (KMP) and three District Management Consultants (KMK).

According to Pranoto *et al.* (2011), there was a delay in phase 1 of reconstruction because funding channelled to the Provincial Budget (APBD) could not be immediately disbursed, as it needed to be transferred to provincial DIPA (Issuance of Spending Authority), and had to have approval from the Ministry of Home Affairs. This process for DIPA preparation took 2-3 months. Secondly, there was no common understanding regarding the utilisation of a standard unit price between TPT and the Local Budget Management Board (BPKD). BPKD requested to use a provincial unit standard, whilst TPT argued that it should use the central unit price standard.



: Command line
: Coordination line
: Facility line
: MOU

RR: Rehabilitation and reconstruction
MOU: Memorandum of understanding
PA: Budget user
KPA: Budget authority
PPTK: Official of technical implementation activities
KMP: Provincial management consultant
KMK: District/city management consultant
POKMAS: Community group

Figure 5.13 Organisation structure of phase 1 of West Sumatra reconstruction (source: Pranoto *et al.*, 2011)

Compared to the complexity of the organisational strcture of stage I, the organisational structure of the second stage was considerably simplified (see Figure 5.14). In this structure, the Head of BNPB as Budget User (PA) delegated his authority to the Executive Secretary of BNPB as KPA and Programme Implementation Officer (PPK) under the Deputy of Rehabiliation and Reconstruction of BNPB at national level. Further, the head of BNPB assigned the Head of Prasjaltarkim West Sumatra province as PPK for housing reconstruction. Housing's PPK was then asssisted by the PJOK (project manager) at provincial and district levels. They were also helped by KMP and KMK.

At sub-district level, the TPM (Community Assistance Team) was established. TPM consisted of four members, an element from government at sub-district level, a community leader or head of village, a community member familiar with housing construction, and a member of the local police. TPM's task was to assist the community in housing reconstruction, together with the facilitator to validate housing damage category, to approve budget disbursement, to give an advice for technical planning, and to carry out monitoring and supervision of the reconstruction programme.

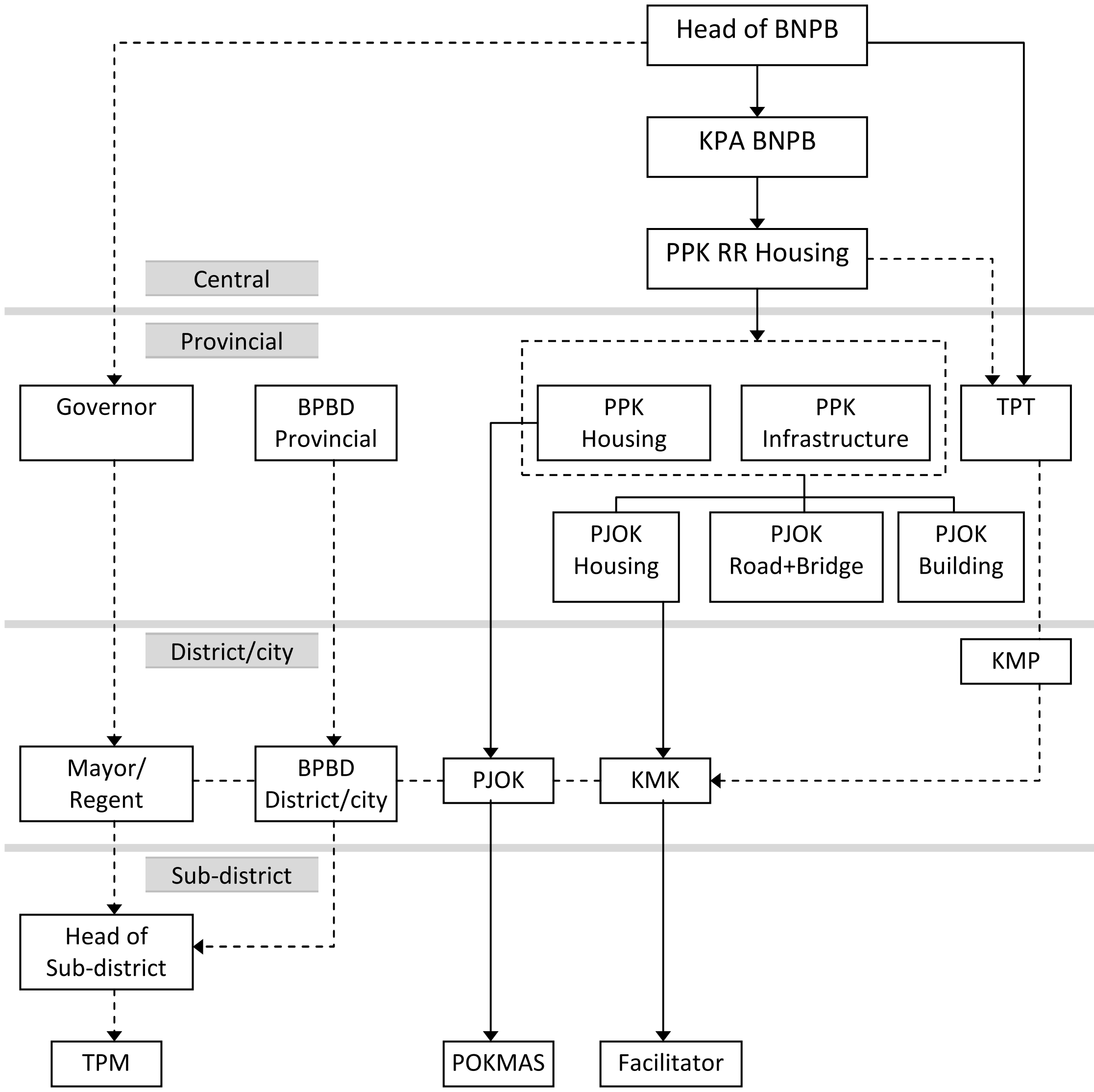


Figure 5.14 Organisational structure of phase 2 of West Sumatra reconstruction (source: Pranoto *et al*., 2011)

Pokmas is a community organisation which consists of 20-25 households. Its establishment was facilitated by TPM and a facilitator. The grouping was based on geographical condition or housing within the adjacent area. An appointed Bank transferred funding for housing reconstruction to the Pokmas account. The disbursement was to be discussed and agreed on by a Pokmas member.

The facilitator himself is an individual recruited and contracted by KPA or PJOK, and coordinated by KMK. The task of the facilitator was to assist the community in establishing a community organisation (Pokmas) to facilitate the community to build their own houses in order to meet the earthquake resistance code, to help the community to prepare administration for funding disbursement, and to provide a project report. The facilitator team consists of one technical facilitator and one non-technical facilitator. They are responsible for facilitating a minimum of two Pokmas (40-50 houses) and a maximum of four Pokmas.

KMP and KMK were appointed to assist the government in the implementation of the CPHRP. There was one KMP based in the province and three KMKs based at district level. The main task of KMP was to provide technical and administrative support to provincial PJOK, to carry out coordination and communication to all stakeholders, and to carry out socialisation of the programme. For KMK their task was to assist PJOK at district level to coordinate the implementation of the reconstruction programme, and to disseminate the guidelines for the reconstruction programme to TPM and the facilitator.

The steps for implementation of CPHRP in West Sumatra were very much the same as in Yogyakarta, from socialisation to construction (see section 5.3.3 and Figure 5.10).

5.5 Summary of Part 1

Part 1 has described the geography and demography, the impact of disaster, and the method adopted for housing reconstruction in the case study areas. The total of heavily damaged houses is more than 400,000 houses, while the loss and damage exceeded US$ 10 bn. In each location, the housing sector was the highest contributor to the loss and damage figure. CPHRP have been implemented in these areas, beginning with Aceh reconstruction in 2005, followed by Yogyakarta and West Sumatra reconstruction in 2006 and 2009 respectively.

In Aceh, the leading organisations involved in implementing CPHRP were NGOs, while in Yogyakarta and West Sumatra the leading organisation was the government. As the funding was not a big issue during Aceh reconstruction, beneficiaries whose houses were heavily damaged or destroyed received complete houses which cost around US$ 5.000. Most of the funding came from donors. Unlike Aceh reconstruction, the main source of funding in Yogyakarta and West Sumatra came from the government budget. The funding was also very limited. As a result, the government can only afford to help the community to the tune of US$ 1,650 for heavily damaged homes, US$ 1,100 for moderately damaged homes and US$ 550 for minimally damaged homes. The function of the funding is as a stimulus for a community to start their own housing reconstruction project.

This first part introduces the impact of earthquakes in the case study locations and how the reconstruction was carried out. The next section (Part 2) analyses and discusses the data gathered from the semi-structured interviews.

Part 2: Qualitative data analysis

5.6 Semi-structured interviews

5.6.1 Introduction

This section analyses the data captured from semi-structured interviews. The aim of the interview is to identify as many advantages, problems, and CSFs of CPHRP perceived by respondents as possible. In terms of the risk management process, the purpose of the interviews is as a method of risk identification. Other questions in the interview are about the limitations of CPHRP, the ideal stakeholder's role in CPHRP, and whether the respondents had any experience of implementing project risk management principles. In this study, the researcher did not intend to separate the interview and its analysis into particular case studies, as the analysis of each interview will be combined in order to develop a generic questionnaire. In other words, the interview analysis is seen as a complementary method used to develop a questionnaire, which functioned as a principal method (see Figure 3.8). The interview also functioned as an exploratory stage for the research (see Figure 3.9).

During the first phase of data collection, 20 interviews were carried out. Details of interviewees can be seen in Table 3.6 and to simplify the discussion and analysis the interviewees were coded as INT (see Table 5.9). The project location where interviewees had worked is shown in Figure 5.15. The guideline for semi-structured interviews can be found in Appendix B.

Table 5.9 Semi-structured interview respondent codes

Interviewee	Code	Interviewee	Code
Interviewee 1	INT1	Interviewee 11	INT11
Interviewee 2	INT2	Interviewee 12	INT12
Interviewee 3	INT3	Interviewee 13	INT13
Interviewee 4	INT4	Interviewee 14	INT14
Interviewee 5	INT5	Interviewee 15	INT15
Interviewee 6	INT6	Interviewee 16	INT16
Interviewee 7	INT7	Interviewee 17	INT17
Interviewee 8	INT8	Interviewee 18	INT18
Interviewee 9	INT9	Interviewee 19	INT19
Interviewee 10	INT10	Interviewee 20	INT20

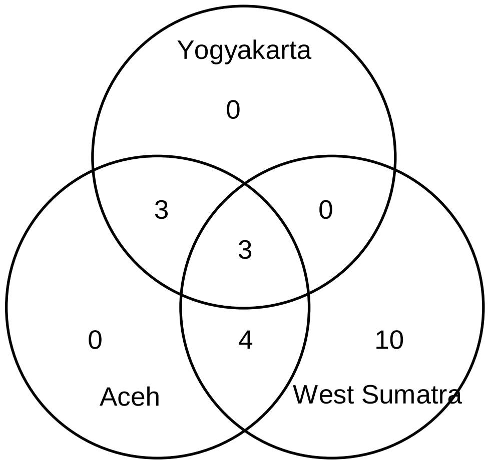


Figure 5.15 Number of semi-structured interview respondents based on project location

5.6.2 Advantages

The main question for this theme asks 'what is the advantage of CPHRP for stakeholders?' However, this research has a limitation in terms of finding out the true advantages for the community, since interviewing the community directly is not an easy task. First of all the researcher has to acquire permission from the government or at least from the community leader as contacting the community directly is sometimes a sensitive issue. This process is time consuming due to bureaucracy. Second, to gather the views of the community, the researcher has to visit the affected area. Moreover Aceh, West Sumatra and Yogyakarta are located far away each other. Aceh and West Sumatra are located at the north and at the middle of west coast of Sumatra Island respectively, while Yogyakarta is in the centre of Java Island. There are no direct flights between these cities and all flight have to be connected from Jakarta. The distance from Banda Aceh (the capital of Aceh province) to Padang (the capital of West Sumatra province) is about 1000 km and from Padang to Yogyakarta is about 1400 km. As a result, due to time limitation and costs of direct interviewing, the researcher focuses on interviewing respondents that had an experience in CPHRP, such as government officials, practitioners, and academia.

The coding structure for advantages is shown in Figure 5.16.

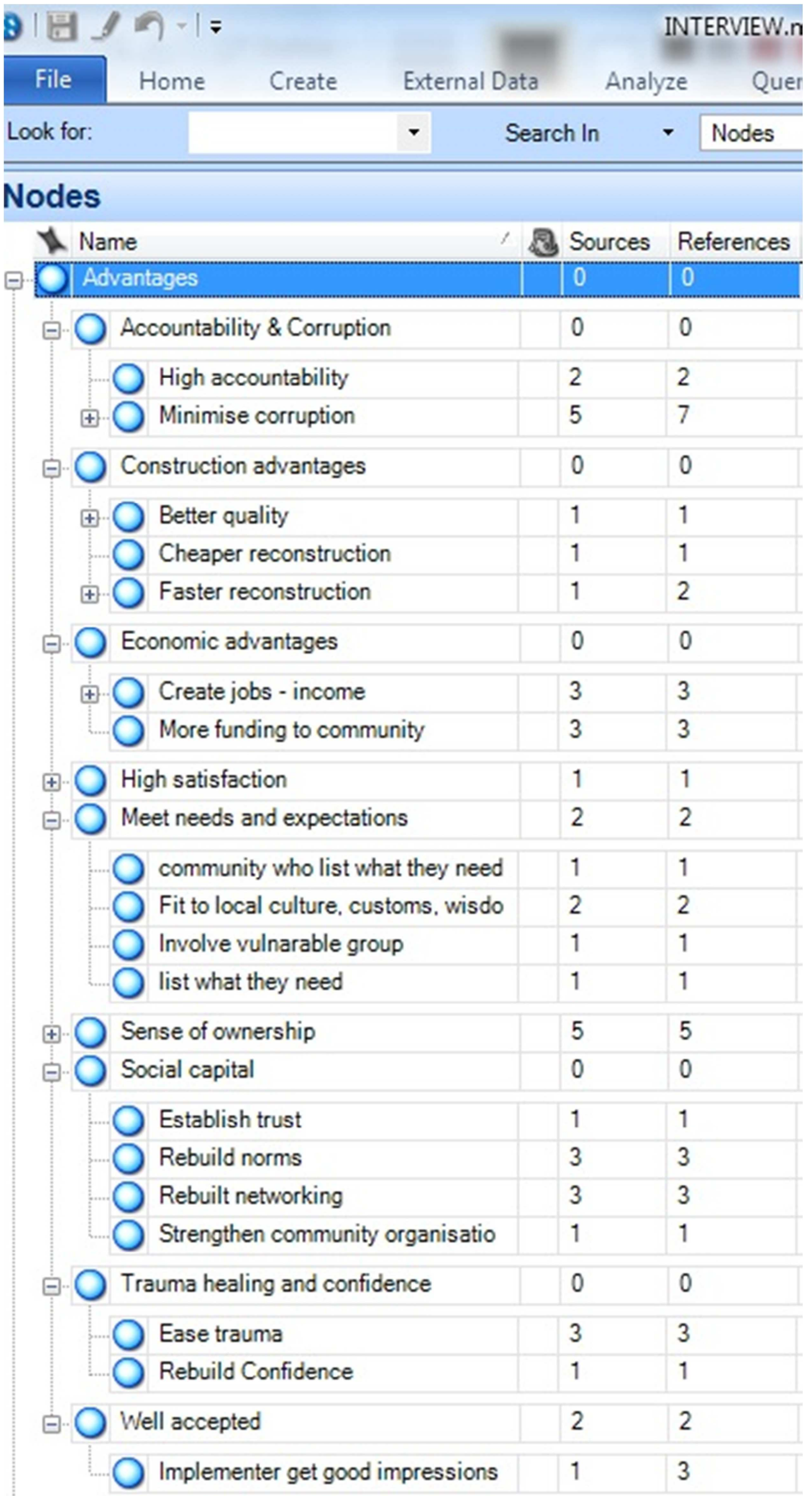


Figure 5.16 Coding structure for advantages

5.6.2.1 Construction advantages

The traditional objectives of a construction project are to meet the agreed costs, the desired quality and the delivery time, and whenever possible to lowering the costs, achieving higher quality than initially expected and delivering the product before its due date. In a post-disaster reconstruction context, the housing reconstruction has similar objectives. Beneficiaries desperately want to get into their new houses as soon as possible. They hope their new house can withstand any possible future disaster, and can be completed without any cost escalation. It is believed a CPHRP can meet these objectives.

According to INT6, with the implementation of a community-based method for housing reconstruction, a project can be quickly completed. Based on his experience, the fastest a community can completely finish one new house is 30 days. Interestingly, this occurred when the form of community participation was empowerment, when they acted as the labour for their own housing project. He said:

> *"For those who can do the construction by their own, normally the construction will be much faster. In our experience, the fastest one is 30 days, from buying the material until painting the roof, 30 days finished. (emphasize) With one note, they do it by themselves."*

Moreover, if we analyse in the wider context of the whole housing reconstruction, CPHRP gives an opportunity for all stake holders including beneficiaries to work together to complete the reconstruction. As a result, this method can accelerate the reconstruction programme. INT6 said:

> *"In reconstruction, everybody urges everything can be done in short time, but sometimes government can't handle everything. So, by doing this method (community-based) it accelerates the reconstruction process, because we work together, all stakeholders"*

Implementing the CPHRP can also reduce construction cost. As expressed by INT6:

> *"Based on our experience, the cost (of CPHRP) is much less."*

According to him, the reason behind this is:

"Because the community know how to deal with the construction, be it road, infrastructure, or houses, etc. Because they know, it can be cheaper"

In his project, the community takes full control of the budget, indicating that by trusting the community to manage the budget, the community will use it wisely.

In cases where community complete their own housing reconstruction projects, high quality housing can also be produced. INT6 said:

"As a result, this will make the quality better compared to if it is done by other people. Because they built their own houses"

This indicates that because the community build their own house, they will build it to the best of their abilities, producing the highest possible quality, follow the building code, and they will not be cheating. If the house does not meet the required specification, they will suffer the consequences.

The above discussion shows us that CPHRP can deliver the objective of a construction project. On-time delivery, no cost overrun, and a high quality standard of housing project can be fulfilled by the implementation of CPHRP.

5.6.2.2 Accountability and corruption

Respondents perceived that a CPHRP can have high accountability and can minimise corruption practices. INT6 said:

"The accountability is high"

INT1 supported:

"By doing it (housing reconstruction) themselves, the accountability will be high, because it is their own houses".

He added:

"The cases where they steal something are very low, because it is their own houses. If they steal the bar, they can get die. So they will think twice to do it"

INT6 also stressed:

"The corruption is also small"

One reason why the corruption is minimal is transparency. The CPHRP clearly requires transparency from the government, the implementer, even within the community. Without transparency, the community-based method can fail.

INT9 said:

> *"This method is more transparent"*

While INT17 addressed:

> *"Other benefit, community can see the transparency of government. The transparency is because there will be no single rupiahs cut. This is a bit different from other empowerment project"*

The other reason is that the funding goes directly to the community. INT17 said:

> *"The advantage for the community is the community directly receives the funding."*

INT20 said:

> *"If we compare how the money was disbursed in (earthquake disaster in) 2007, the community was suspicious that the funding was corrupted, but not now. Rp. 15 millions go straight into their hands."*

High accountability and less corruption will benefit all stakeholders in CPHRP. Not only the community, but also the government, the implementer or donor will benefit from the application of this method.

5.6.2.3 Economic advantages

Another implication of CPHRP is more funding goes to the community. According to INT6:

> *"Funds that are allocated to the community are higher compared to the one use for management".*

As a result, it can generate income for the community. INT9 and INT15 perceived this kind of advantage. INT9 said:

> *"In economic aspect, it is very advantageous, community can get income".*

INT 17 added:

> *"with this process (community-based), it can generates income for community, because it will involve local community, local labour".*

We can analyse that since more funding goes to the community, CPHRP can generate more income, and can create job opportunities for the community such as labouring. This is a very important aspect, as sometimes disaster destroys sources of income for the community.

5.6.2.4 Meeting needs and expectations

The implementation of CPHRP should guarantee that the whole community is involved in the reconstruction process. The vulnerable groups in a community, such as an old person, a woman or an orphan, sometimes marginalised, will have a contribution to their own housing reconstruction. INT9 said:

> *"All the community was involved"*

INT15 explained the definition of community-based, by relating how the community should be involved and the way government handled the previous post-disaster reconstruction:

> *"First we have to underline the definition of community-based. In my perspective, all process has to involve the community, from planning, implementing to evaluation. So far, it's a top down approach, created by the government, then it's implemented, without seeing whether it is needed or not, take it or leave it. So the problem with this (approach) is it tends to miss the target, between what the community needs and what is provided by the government. So we change the method, community-based. This means, community list what they need, they who implement it, whereas the government only do monitoring, supervising, and facilitating."*

The above statement shows us that a top-down approach can miss community needs and expectations. On the other hand, the needs and expectations of the community can be met by the involvement of the community in the reconstruction process. INT3 said:

> *"because the community is involved in the decision-making process, then the needs and expectations of the community can be accommodated, that's the most*

important thing. Principally in community-based, it is the community who take decision, the community is empowered"

INT14 and INT5 believe that community involvement can also fit to local wisdom. INT14 said:

"It relates to local wisdom of the (affected) area, means we have to see the community way of building (their house) or a pattern based on their culture."

INT15 expressed:

"we applied the local wisdom, such as technology, design, and social."

5.6.2.5 Senses of ownership

The next advantage of CPHRP is that it can achieve a high sense of ownership from beneficiaries of the project. INT8 said:

"...because we do it with the community-based method, the sense of ownership from the community will be high"

The same thought was expressed by INT1:

"The sense of ownership on the project is very high"

So, with high sense of ownership to the project, community will feel that the project belongs to them. As expressed by INT4:

"the advantage is community has a sense of ownership, what they build belongs to them. It would be different if we used the contractor-based method, the contractor is the third party. This is their own houses, built by themselves. So they feel it belongs to them".

Many factors can create a sense of ownership. The involvement of the community in all processes of reconstruction is one of them. As expressed by INT2:

"the most important is the sense of ownership, because they have been involved from the beginning"

Another factor is because community feel that the decision is on their hand. INT3 said:

"After that, because they are the ones who take the decisions, then the sense of ownership will be high, whether it is houses or public facilities".

Furthermore, the involvement of the community can also bring high satisfaction from beneficiaries. As stated by INT10:

> *"In Aceh and Nias, I have worked using contractor-based and community-based methods. With community-based, the satisfaction was very high. It is because they are directly involved in the reconstruction."*

This factor is also related to the construction advantages of CPHRP, discussed earlier in section 5.6.2.1, particularly for the high quality housing produced. As the housing is created by themselves, it will bring pride and satisfaction to the beneficiaries.

5.6.2.6 Trauma healing and confidence

Disasters always leave survivors in a traumatised condition. Losing their property, losing their jobs or source of income, or worse, such as losing their family members, husband/wife lose wife/husband and children, or children lose their parents, are circumstances that cannot be avoided, especially in a huge-scale disaster. This traumatic condition can be healed by the implementation of CPHRP. In the interview, INT1, INT2 and INT6 underlined this advantage.

INT1 said:

> *"With sitting together, planning together, it's very helpful for them to forget what has happened."*

INT2 expressed:

> *"…psychologically, trauma can be erased because they are busy."*

INT6 stated:

> *"When reconstruction is carried out together with the disaster victims, it can give a kind of trauma healing. Those who are in a traumatic situation, need activity. Sometimes people do trauma healing by doing training. But when we invited them to work together, keep them busy, automatically the trauma will disappear"*

From the above citations, it can analysed that the CPHRP can help survivors to erase their trauma because in this method survivors are actively involved in every stage of the reconstruction process that can keep them busy. Because they are busy in discussing reconstruction planning, busy building their own house, slowly they will forget the traumatic condition that they felt.

The CPHRP also helps the community regain its confidence. INT1 said:

> *"They (community) will feel they can gain control back of their life."*

This indicates that after giving them the opportunity to undertake their own reconstruction process, they will feel that they can achieve something. They will not merely position themselves as the victims, but as active participants in the reconstruction programme. As a result, this can rebuild the confidence of the community.

5.6.2.7 Social capital

Disaster can affect the element of social capital in a community, such as trust, norms, and community networking. The implementation of CPHRP is a path to rebuild the social capital of a community. INT1, INT3, INT8, INT11, INT15 perceived this advantage in the interview. INT1 stated how disaster affected the community and what the community-based method can deliver. He said:

> *"First of all, after a disaster, community is disorganised, chaotic; people have lost their family, etc. They have lost their community scheme. With community-based, we can reorganise them."*

In disaster circumstances, the chaotic situation as mentioned by INT1 can lead to suspicion. It potentially creates conflict in community. Suspicion can only be eliminated by rebuilding trust between communities. As a result, creating togetherness is an important factor. INT8 said:

> *"(The community-based) can reduce conflict because everything is shared commitment, working together, bad or good are the responsibility of all".*

INT11 also expressed the important of togetherness in a community by saying:

> *"We know that the government's assistance is a stimulant, so we need to increase togetherness.....to help each other."*

In pre-disaster conditions, togetherness is a norm that usually exists in a community. Disaster can reduce a community thinking only about themselves, not caring about their surroundings. As a result, re-establishing the spirit of community and their social networking are essential. CPHRP can help to re-establish these conditions. INT1 said:

> *"We can rebuild the spirit of community."*

INT3 added:

> *"Finally, social networking can be rebuilt"*

Further, INT15 said that by the implementation of CPHRP, the social impact resulted by disaster can also be minimised. He expressed:

> *"Next is to minimise social impact"*

Another benefit of CPHRP is community organisation. Community organisation that had existed in a community prior to a disaster can be re-established and strengthened. INT1 said:

> *"We can rebuild the community organisation...."*

The above discussion show us that the implementation of CPHRP can rebuild the social capital in the community.

5.6.2.8 Community acceptation

A further advantage of CPHRP is that it is well accepted by community as noted by INT5 and INT9. INT5 said:

> *"I think the first one is, the acceptability of this programme (community-based) by the community is higher, on the other hand the rejection is certainly minimum".*

INT9 added:

> *"this method is really appreciated by the community".*

The positive acceptance by the community will benefit the government or the implementer of this programme. When they proposed this method to the community, and the community accepted it positively, they receive the full support of the community to implement it.

Another advantage for the implementers is that they can make good impressions. INT17 said:

> *"...The long term is that the government can make a good impression on the community, can gain their trust. And also can make the community realise that they need the government"*

It is an important way to increase their reputation and trust in the eyes of other stakeholders. Particularly for NGOs; if they are trusted, they can get more funding from their donors. Moreover, as discussed in section 2.5.3, CPHRP is also far from problems.

5.6.3 Limitation

Despite its numerous advantages, CPHRP also has its limitations. Analysis from the interviews suggests that the limitations of CPHRP can originate in the mechanism or the system required by CPHRP itself, and the capacity of the stakeholders. The coding structure for CPHRP's limitation is shown in Figure 5.17

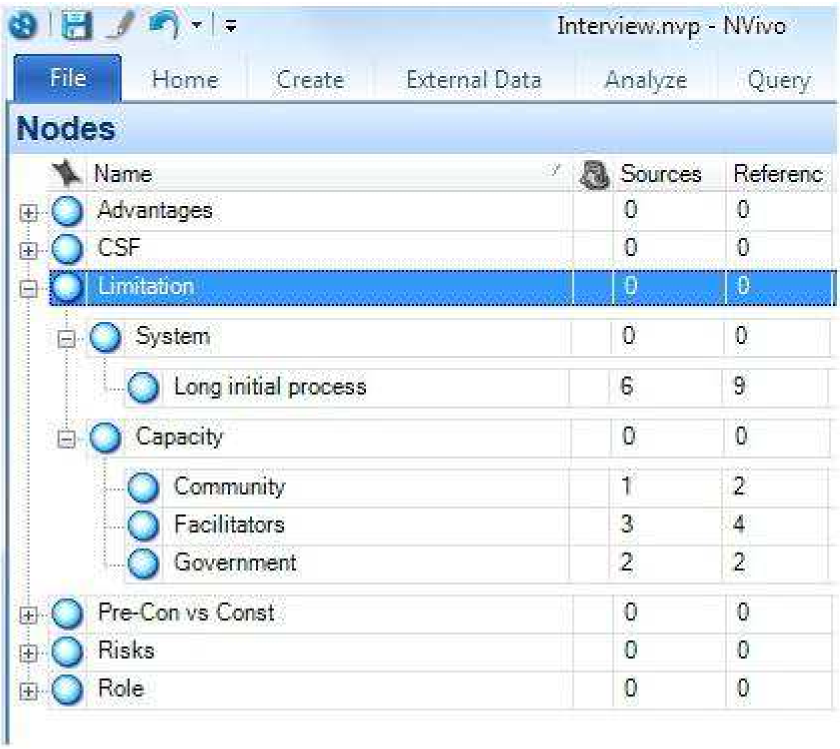


Figure 5.17 Coding structure for limitation of CPHRP

5.6.3.1 System limitation

One of the limitations of CPHRP is due to the long pre-construction process required by this programme, from initiation to housing design. INT8 said:

> *"It has a limitation, because the community-based method is a long process".*

A simple example was given by INT8:

> *"only to gather community is a hard job. What we sometimes do, we give them transportation costs. If the participant is small, the results won't be as expected"*

As noted above by INT8, high community participation is necessary, and INT2 highlighted that increasing the interest of the community in the programme could be very challenging because of its long process. INT2 said:

> *"(the limitation is) to increase the interest of the community…because the process of the community-based method can take about 6-8 months…"*

The long process is not just because it consists of many activities, but also because it is a slow process and cannot be done instantly. As expressed by INT5:

> *"This programme need more time in the beginning. There are many initial activities."*

Further, INT3 added:

> *"because it is a socio-engineering process, it requires a long process. To build a community needs a long time, as a result the outcome cannot be seen instantly. Without patience, the goal can't be achieved. So, it needs a continuous approach and an extended time scale. Well, it sometimes is not compatible with government spending, which has a character of fiscal year and limited budget."*

INT6 gave an example of one particular time-consuming activity during CPHRP, which is establishing community organisation. He said:

> *"The one that take times was to establish community organisation, to organise them... Once this is done, they will become solid, and the next step will be easy… By our experience, in Aceh with all its huge constraints, it takes about 5 months to organise the community"*

Another example is in the design process. It also takes time because it requires consultation with the community several times in order to synchronise it with their needs and expectations. INT2 said:

> *"..learning much from the Aceh case, in design, the implementer may have produced a good design, but the community will have some preferences, they want it to be like this and like that. This will take time and as a result pre-construction becomes extended."*

The above analysis shows that in nature, CPHRP needs sufficient time during the pre-construction process. The expected results cannot be achieved in a short time as pushing it can limit the community contribution, disrupt the process, and in the end can lead to failure.

5.6.3.2 Stakeholders' capacity

Stakeholders' capacity is also a barrier to the implementation of CPHRP. It can be analysed from the capacity of three main stakeholders in reconstruction, government, facilitators, and the community itself.

In Indonesia, CPHRP is widely known following the Aceh reconstruction programme, which started in 2005 and ended in 2009. At the very beginning, according to INT1, there was doubt about the success of this programme if implemented. He said:

> *"At the beginning (in Aceh), the government did not really believe that the community-based method would work because the framework for implementation was not clear or because many stakeholders would be involved in the project management, but because the funding came from donors, the government finally approved this approach."*

Following the success story of CPHRP in Aceh, GOI implemented this method in Yogyakarta's and West Sumatra's reconstruction. However, lack of understanding on how should it should be done has affected the progress.

CPHRP also requires many facilitators in order to facilitate the community to build their own homes. Inevitably, they are the main active participants for the success of CPHRP; as a result, high capacity facilitators are highly necessary. INT1 noted:

> *"The role of facilitator is very important (in CPHRP)."*

INT5 added:

> *"They are the ones who involved the community, forming community organisation, grouped (them). They who plan and implement. The government delegates their role as facilitator".*

However, their availability is very limited, and worsened by the fact that many of them still have no experience in CPHRP. INT15 and INT16 gave an example of the difficulties in recruiting the facilitators. INT 15 said:

> *"The problem emerged, first that the number of facilitators was not sufficient, not ones with the requisite competency. Then many of them are not in a position in their expertise. For example, because we need a lot of civil engineers, the availability becomes very limited. What's the consequence? We recruited people from outside civil engineering, minimum it in related professions, such as architects. When we couldn't find more architects, we recruited people from an engineering background. We trained them. Basically, we explained the basic principles and let them make use of their logic. Minimum on how to build earthquake resistant houses, what to be controlled, we explain all to them. So, we really lack facilitators that have the capacity".*

Almost the same example was explained by INT16:

> *"The number of technical facilitators is very insufficient. First, we look for civil engineering bachelors, but only less than 10% sign up. As a result, we accept people from an electrical background, also from the polytechnics. At the beginning, we also planned to recruit teachers from vocational high school, to be employed in their local area. But it is not accepted…. There's also a plan to recruit our students (civil engineering), but the limitations is they can't be full time in the field."*

The above example can show us how severe the shortage of facilitators is in disaster affected areas. While their availability and knowledge are highly necessary to speed up the reconstruction process, their availability is very limited.

Another limitation originated from the community itself. Community knowledge about construction is very limited. INT2 said:

> *"The limitation is in resources, in local resources. They are not highly educated. Secondly, labour. It's hard to control the labour."*

INT15 also highlighted the availability of labour. He said:

"In community, the limitation is the availability of labour. Labourers who have high levels of skill are very limited, the ones who understand the basics of earthquake resistant houses is very limited. "

5.6.4 Stakeholders' role

In this section, the interviewees were asked about the role of the main stakeholders of CPHRP. The coding structure is presented in Figure 5.18.

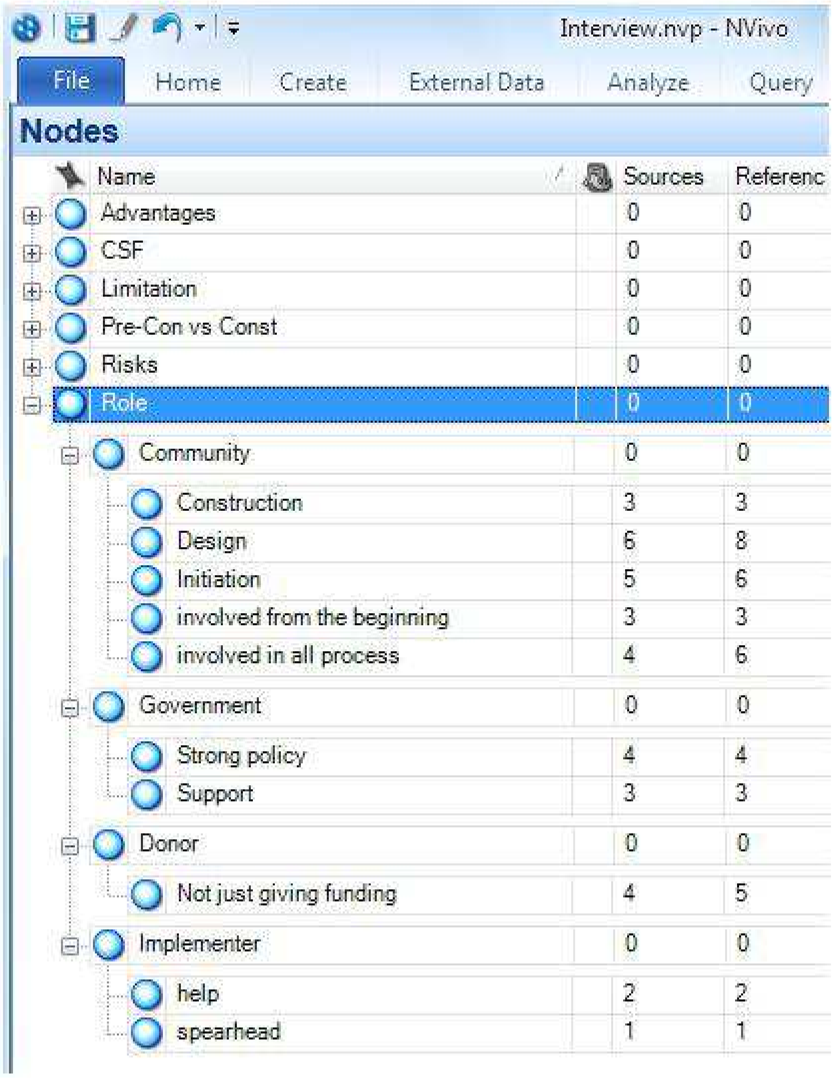


Figure 5.18 Role of stakeholders in CPHRP

5.6.4.1 Community

INT2, INT6, and INT7 emphasize that in CPHRP, the involvement of the community should have begun at the very start of the reconstruction process. INT2 and INT7 said:

> *"They should be involved from the beginning (of the programme)".*

INT6 added that this way is the ideal process for a community empowerment project. He explained:

> *"Ideally, the community should be involved from the very beginning. We did this ideal process. From the start, all design process, even tender (for material procurement) was done by the community. Then, they also carried out the construction. We gave them capacity-building to undertake these activities."*

Moreover, it is also important to involve the community in all aspects of the reconstruction process or in every step of the reconstruction programme, from initiation to implementation. INT9 said:

> *"Principally we have to always involve the community"*

INT1 added:

> *"Community should be involved in all process, from planning, design, to implementation."*

The community can play different roles in CPHRP. The extent of community contribution will depend on the community members themselves, whether they have the capacity to taking part and whether they have the will to contribute. INT 1 said:

> *"It (community participation) will depend on community's will, do they want to learn or not?"*

INT3 explained the different roles of a community. He said that at first a community can act as an owner of the reconstruction project. INT 3 said:

> *"First, the community is the owner of the project, they have to establish themselves as the owner with specific needs and they have to show it"*

During the implementation stage, their role is to become a supervisor, or a builder of their own project, and they need to understand the minimum requirement for a strong/safe house. As explained by INT3:

"Secondly, there are three issues in the process of reconstruction. First, governance, to make sure that there is transparency, so they (community) know how much money they will get, and on what it can be spent. So they are involved in the decision-making process, and because of that, they will also be involved in supervision. Second, managerial process. Perhaps, because it is something that is not easy, something that cannot be done by the community alone, facilitator involvement is needed. … It will be good if managerial capacity is transferred during the facilitation process…for example the community can do business to create income, such as contractor, in this case ideally the community involved as builder.

The third issue proposed by INT3 is very interesting. According to him, community also has a role not to forget their own indigenous knowledge and to understand the minimum requirement of earthquake resistance houses. He said:

"Third issue is minimum requirement of safety, related to indigenous knowledge. Nowadays, a community is exposed to modernisation, and seems to forget their indigenous knowledge in order to adopt new technology, such as a masonry house, without knowledge about its material properties and behaviour. In this case, they need input from external; this is where a facilitator can give input. As a result, the community role is to follow the minimum requirement. Actually the best way is if the community understands the principal…not because it is a must."

5.6.4.1.1 Initiation stage

Although it is suggested that community participation should start from the initiation stage, however in practice this is hardly ever the case. First, because the government already set up the policy and tend not to need input from the community.

INT12 said:

"The community's role in policy-setting is none. It has been set up by central government".

It is added by INT15:

"For the concept that we carried out in West Sumatra, policy setting tends to be the government's domain".

INT5 said:

"In policy setting, most of the policy was still based on reconstruction experience from the past. So, up until now, community participation in policy setting is still none. Very little, might be from indirect input, but no direct input".

The second reason for the lesser contribution of the community relates to the psychological aspect and culture of the Indonesian community. In post-disaster circumstances, a community tends to positioned itself as a victim and as a result become passively involved. They tend to wait for what the government will do for them. INT3 expressed:

> *"Community is the victim. In Indonesia, traditionally the community will position themselves as victims, as a result their involvement in the initiation stages are very small. They will wait".*

The limitation on the understanding on reconstruction process also becomes barrier. As noted by INT8:

> *"At the initiation stage, the community is normally passive, because they are not familiar with the community-based method. Here, we, from outside the community, can contribute, actively participate".*

Almost similar to INT8, INT3 also perceived that the small contribution of community in initiation stages is due to the government not informing them about the reconstruction planning. INT3 said:

> *"Sometimes the community loses their initiative to start the reconstruction immediately. It happens because they do not know exactly what the policy of the government would be."*

5.6.4.1.2 Design stage

Unlike the limited participation during the initiation stages, in the design and construction stage community participation is much more visible. They make huge contributions during planning, housing design, and construction stages. INT15 said:

> *"After that (initiation stage), in planning and implementing, we start to involve the community. For sure, they are involved in the planning; secondly, they are also involved in design, everything under their control. So after they make the design, they also plan how to execute it. In this point, the government's role is facilitating, because they are not the expert, to make sure that earthquake resistant houses are built, this is the highest priority."*

The design of the house depends on the community; facilitators only facilitate what they want. The principle is that the community can express or give input on what they want as expressed by INT3, INT6, INT12, and INT14. INT12 said:

"All (the design) depends on community; facilitators are only there to facilitate them"

INT14 also said:

"Community have participated in design. They can express what they want in community organisation.... Community design their own houses in line with what is suggested by the facilitator."

INT3 restated:

"Community (in design stage) can give input, what they want"

As expressed by INT12 and INT14, the community can freely draw the design that they want and the facilitator will give input to them in order that the design meets the building code. The other way to facilitate the design is by allowing the community to choose from a range of options. It started by heavily consulting with the community on the type of house that they want, and then by producing the initial designs, asking for further input from the community, until finally there are several proposed designs to be chosen from by the community. This approach was implemented by INT6 in Aceh reconstruction. He explained the way he facilitated the housing design. He said:

"First we ask them about their previous house, what does it looks like. Some of them said that their very old house is made from timber, but because of modernisation they have built a masonry (brick) house. Long time ago, it was a stilt house. If floods coming, they are still saved. So we know, there is a transformation. After that, we ask them; if they are given a new house what they want it to look like. They will tell what they want 'I want the house to be like this'. We facilitate and give them options. We explain, for brick house, these are the advantages and disadvantages, for timber house it is like this. Then they will start thinking. It is not only in one occasion, almost take one month. We came from one village to another village, to facilitate it. And finally we came up with some designs. Because of budget constraint, we agree to construct the core house, (area) between 36-42 square metres. …..Finally, we came up with final designs, three types of stilt house and two types of non-stilt house. Everything is calculated, how much material is needed. The community freely choose what they want, for each of the beneficiaries."

Although the designs would already be complete, INT6 still offered the flexibility for minor changes, but on the approval of the architect or facilitator, and only to be carried out prior to construction beginning. INT6 explains:

"…if they have chosen type A, it has 36 (material) cards. For example for paint, it does not mention the colour, so they can choose whatever colour they want. If they want high quality paint, they can add their own money, because the price is already there. On modifying the form of the house, firstly it is not allowed, because we already have the drawings and specifications. It is to minimise the risk, structural mainly. The supervision will be difficult. Imagine, we construct it sporadically, one village 60 houses, and there is 23 villages. But as time goes by, we agree for minor change, but on the approval of an architect. So, modification is carried out not during construction, but before the construction begins. It has to be consulted. So the task and responsibility of facilitator is really hard."

From the above example given by INT3, it can be summarised that it is important first to ask the community about their previous or collapsed houses in order to know the culture or local tradition of the community. Indigenous knowledge of the community can also be revealed by doing this process. By asking the community about the new houses that they have in mind, their needs and expectations can be explored. Flexibility in design also needs to be considered.

Moreover, in earthquake threatened areas, promoting earthquake resistant houses can be very challenging, because it might involve changes in tradition or habit on housing construction practices. As a result, careful persuasion of the community is required. This is not achieved by directing blame on what is wrong, but by explaining why their house is has collapsed with the earthquake. INT6 explained how he persuaded community by saying:

"The house has to be earthquake resistant. The previous house collapsed because it was not earthquake resistant; the builder built it carelessly, till that detail."

5.6.4.1.3 Construction

Community participation during the construction stage will vary and the community can perform different roles. The way a community participates is contextual, depending on the willingness of the beneficiaries and their capacity. During this stage, they can act as an owner, a supervisor or a builder of their own reconstruction project. The variety of the community's roles is expressed by INT3, INT6 and INT8. INT3 said:

"It varies, they can be an owner, can hire labour, or become a labourer… a lot of possibilities. The best one is very contextual, depend on the condition. Ideally, they should be involved."

INT8 added:

> *"It varies… But a programme from one International NGO is good. They didn't ask beneficiaries to work (as labourers) in the construction stage, but required beneficiaries to be involved for at least three hours a day."*

In case a community cannot participate in the construction process, they can delegate their responsibility to a charitable community construction team. This method was implemented by INT6. He said:

> *"Based on our experiences in Aceh, the whole community participated. For example, if I don't have any family left, I can't do the reconstruction myself. Or if I am a very old man. Actually, in our (organisation) concept, the community should build their own houses. For such cases, we form TPK (a type of village construction team), it consists of three members, head of team, supervisor and secretary. This team is responsible for coordinating 10 houses in their nearest area. Their neighbours appointed this team. So, for those who can't do the construction, TPK will be the one that will helps"*

Moreover, according to INT6, the best way for a community to participate in CPHRP is by becoming a builder of their own house. This method is performed faster, costs less and can produce higher quality houses compared to a situation where the community only acts as an owner or a supervisor.

5.6.4.2 The government's role

There are several governmental roles in CPHRP as perceived by interviewees. The most notable role perceived by INT2, INT8, INT12, and INT15 is as a policy maker and providing clear guidelines for all stakeholders. INT2 and INT8 highlighted that the government should have a firm guideline, especially in dealing with NGOs. INT2 said:

> *"The government has to have a strong policy, ready to be used when disaster takes place, and secondly on how the government can tackle organisations involved in reconstruction, especially in dealing with international organisations... 'your organisation goes here and you do the intervention in line with our policy'… This firmness maybe has to be increased. In the case of Padang, for example, because the government appears to be in a learning process, not all organisations follow the ethics. In Yogya, the government is very strong… 'you come here, then follow our rules'. "*

Further, INT8 added:

> *"Although the government does not repress organisations to do this and that, certain guidelines have to be established and followed by NGOs or other organisations".*

Another role of government is to give full support for CPHRP, because the process of CPHRP can bring many advantages. INT1 said:

> *"Government should support heavily this programme (CPHRP), they want to see the housing reconstruction only as a final product or a process or tools for community learning"*

INT6 does not suggest that government should be the implementer of CPHRP, constructing the house, but highlights their role as a coordinator. In addition, INT3 underlined the government's role to carry out the transparent process of CPHRP. He said:

> *"The role of government is to administer the process carefully, transparently. And to make sure that minimum requirement for earthquake resistant houses is achieved."*

5.6.4.3 Donor

Inevitably, the most important role of the donor is to provide funding for CPHRP. Instead of focusing solely on the funding, the donor should also use their influence to promote the concept of community empowerment in disaster reconstruction. As perceived by INT1:

> *"Community is the centre. So the programme is not focusing on government but focusing on community. We want the government to learn that community empowerment is important."*

Normally, a donor perceives the parameter of success in a housing reconstruction project by how many houses can be built with the given assistance. This way of thinking should be shifted from focusing on the output to the process, because the advantage of the process of CPHRP is very great. INT2 said:

> *"A donor needs to be told why this process (community-based) is carried out, why not directly given to housing construction… if at the end the goal is that the house*

should be occupied, not how many houses are built, this way (community-based) is better."

Flexibility of donors is also necessary. Donors are urged to understand the local context and to be flexible with their partners in the disaster-affected area. Fitting donor objectives into the local context is very important. INT6 said:

"(The donor's role) should not solely be about money. In disaster circumstances, the issue is very complex. Sometimes donors already have their patterns, already have A, B, C or D. But, many donors did not see the context. Depending on the condition of the survivors, many earlier processes are ignored. For example, Aceh is different from Yogya or Padang. "

From the above discussion, it can be analysed that the donor can extend their role in housing reconstruction, from only providing funding to the housing reconstruction effort, to having the sensibility and flexibility to adapt to the local context. The donor should also see that the process by which a community builds their houses is as important as the final product.

5.6.4.4 Implementer

The implementer's role in CPHRP is to make sure that the community-based programme can meet its objectives. It can be done by carrying out the principle of the community-based approach, such as: involving the community in all stages of the reconstruction process, fulfil the needs and expectations of community, and implementing a "building back better" principle.

5.6.5 Risk management

As previously explained the interviews intend to capture the risk involved in the CPHRP. During the interview, the term 'risk' is changed to 'problem'. This is because the risk terminology is not very familiar among most of the respondents. As a result, instead of asking 'what is the risk?' the question is transformed into 'what is the (possible) problem?'

Questions are grouped based on the stages of CPHRP, starting from the risk in the policy setting, followed by the risk in building assessment, beneficiaries identification, facilitators recruitment, programme socialisation, establishing community organisation, community training, housing design, and finally in financing. The questions given to respondents depend on what stages of CPHRP respondents were involved in.

5.6.5.1 Risk experience

The coding structure for interviewee experience and their opinion on the comparison between risk in pre-construction stage and construction stage is presented in Figure 5.19.

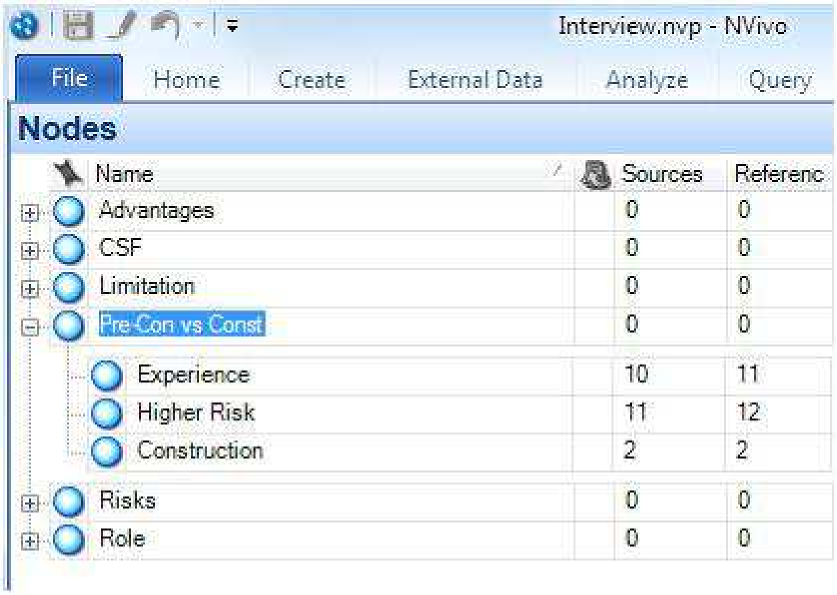


Figure 5.19 Coding structure for interviewee experience

The interview analysis reveals that the application of a risk management process in housing reconstruction is not a common activity and many stakeholders are still not familiar with risk management terminology. INT6, INT10, and INT12 said that they were not familiar with this method. INT6 said:

> *"I am not familiar (with Risk Management)".*

Moreover, for some stakeholders, the implementation of a community-based approach was their first experience, so during their project, they had never analysed the possible risk and its impacts. INT9 said:

> *"In Aceh, we just know this method (community-based). We never thought, what problems might arise in the future".*

INT6 also admitted that he has never implemented the risk management process during CPHRP and he is not familiar with the terminology. He said:

> *"What we have done actually is something that we learned from the process…. At the beginning, nobody ever imagines what they are going to do in Aceh, we do it with trial and error. First time I went there, what I saw was dead bodies everywhere. Some were going back, stressed. The place is really devastated, chaotic, smelly, dark. That's only the beginning because the devastation was really severe. After Aceh, with that big disaster (reconstruction) experience, when we came to Yogyakarta and Padang, we knew the steps (of community-based), what to do, just clicks."*

Further, INT14 shared his experience on the absence of risk management process in West Sumatra reconstruction. He said:

> *"There is no risk management in this programme. This programme is a pilot project, still a trial which needs evaluation. Results will be written in a report. Means, that so far there is no risk management (process) taking place".*

The testimonies of INT9, INT6 and INT14 indicate that many stakeholders implemented the CPHRP by trial and error, many of them for the first time. As a result they did not really know the particular problems they would have to encounter during the process.

Some interviewees, such as INT8, INT17 and INT3, already have had experience of the risk management process. However, they never came across any risk management document during post-disaster reconstruction. INT8 said:

> *"I have never seen project risk management in post-disaster housing reconstruction".*

INT3 added:

> *"I have never seen it. It is not something that usual. Risk management is normally applied in big projects. But for the donor, normally in the project proposal, there is a risk assumption, but not in detail".*

Despite the lack of implementation of risk management in CPHRP, INT1 and INT2 said that in their organisation they have started implementing it, although the application is still during the project appraisal. INT1 said that risk management is part of their project, while INT2 said that in his experience, the application of risk management was still in very generic form. He said:

"When we structuring the project note, project brief, and project document, we have identified all possible risks, from political, economic, environmental ….. but it's still very limited, still very generic".

The above discussion proves that the application of risk management in post-disaster housing reconstruction is rare. As a result, its implementation in CPHRP will introduce many advantages for all stakeholders. Asking about the possibility of the implementation of a risk management process in CPHRP, INT 6 really appreciated it. He said:

"It will be really good, because many only do it by trial and error"

5.6.5.2 Higher risk in pre-construction stage

In this part of the analysis, interviewees were asked in which stage of CPHRP risk is higher, in the pre-construction stage or in the construction stage. Interviewees predominantly agree that the pre-construction stage carries more risk compared to the construction stage. As INT6 simply said:

"More risk in pre- construction stage"

Interviewees point out some reasons why risk in the pre-construction stage is higher than in the construction stage. INT3 related the higher risk of CPHRP in pre-construction to the risk management theory. He said:

"Theoretically, it is like that. Linking it with uncertainty, and there is not enough information, risk at the beginning is high. But in practical terms, I don't know."

Based on his experience INT8 confirmed the uncertainty theory during pre-construction stage pointed out by INT3. He said:

"Risk is higher in the pre-construction stage. In pre-construction we can only guess, although we have an experience in A, B or C, every area has its own characteristics."

According to INT11 and INT15, higher risk in the pre-construction stage is due to more activities being carried out during this stage. INT11 said:

"(Risk is higher) In the pre-construction stage. For the housing sector, first we have to appoint facilitators. They will validate data, then establish community

organisation, helping with drawings and bills of quantity, so that the money can go to community"

Adding to this reason, INT15 raised the issue of the lack of understanding of CPHRP by stakeholders. He said:

> *"Of course (Risk is higher) in pre-construction. Because we have to do socialisation, everything. Means, community is still not aware about the mechanism and everything. Government also do not really understand about what to do. So far, they use (contractor-based) project approach, using tender. And this programme involve a lot of activities, complicated, involve many heads, there are also many constraints."*

Other perspectives arise from INT17, INT5 and INT2, suggesting the problems in the pre-construction stage are more complex than in the construction stage. In other words, the problems in the construction stage are simpler and are normal problems that have to be faced while undertaking normal construction projects. INT17 said:

> *"In pre-construction, because there are a lot of interests. In construction is simple. The problem like issue and conflict, are likely in pre-construction."*

INT5 added:

> *"Risk in pre-construction is higher. If already in construction stage, we can carry on, it looks like we're doing a normal construction project. But in pre-construction stage, there are so many variations, variations in term of area, needs, so many."*

INT2 expressed:

> *"Yes, I see it like that. In the context of housing reconstruction, anticipating the risk from the beginning is important because we want to make sure that the results will be useful. If we compare it with the construction stage, the risk will be limited to weather, material supply."*

Moreover, according to INT1 the risk at the pre-construction stage is high compared to at the construction stage because in the pre-construction implementer also deals with the psychological aspect. He said:

> *"Pre-construction is critical. We are not only dealing with technical aspects, but also community feeling. Ability to organise is very important in this pre-construction"*

Bureaucracy is another reason for high risk in the community-based approach as seen by INT12:

> *"Risk before the construction stage is higher, there are many bureaucratic processes. The community organisation has to be legally approved by the major/district leader, the problem is the major/district leader is too busy during local elections. So only to sign the decree can take a long time."*

A different view is proposed by INT14. He regards it as higher by analysing the importance of pre-construction stage. According to him:

> *"I think in the pre-construction stage, because we also minimise risk that might happen in the construction stage."*

Although many interviewees agreed that risk in pre-construction stage is high, INT9 and INT10 perceive the reverse.

INT9 said:

> *"I think in the construction stage. In pre-construction, the community really appreciated us, followed the rules. Principally, follow the rules or there'll be no assistance. In construction, there are many processes that make them not happy. In pre-construction, if they don't want, then we stop."*

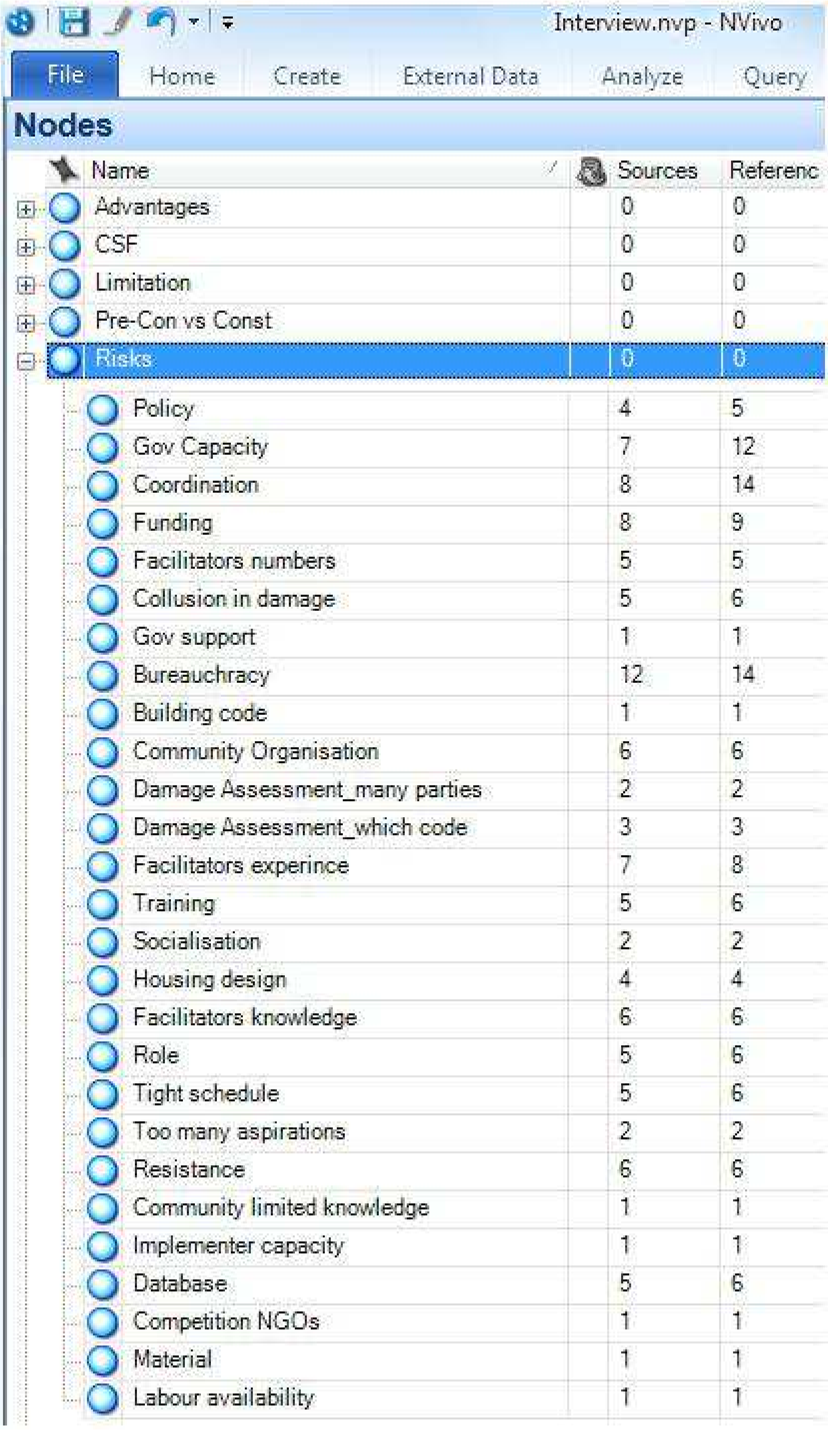
INT10 added:

> *"The risk (in pre-construction) is not as high as in the construction stage. In the construction stage, we have to deal with labour, materials quality has to be good."*

The above discussion shows us that most of the interviewees extrapolated that pre-construction carries more risk than construction stage. The reason behind it is the uncertainty embedded in the earlier process, the complexity of activities and problems in the pre-construction stage, the simplicity or the normal risk in the construction stage, the psychological aspect that has to be faced, and the bureaucratic issues.

5.6.6 Risk Identification

This section is the analysis of the interviews which intends to capture the risk of CPHRP. It is divided based on the general stages of CPHRP, which is initiation stages, training for facilitators and community, damage assessment and beneficiaries identification, programme socialisation and forming community organisation, and finally the housing design. Coding structure for risk identification is presented in Figure 5.20.



Name	Sources	Referenc
Advantages	0	0
CSF	0	0
Limitation	0	0
Pre-Con vs Const	0	0
Risks	0	0
Policy	4	5
Gov Capacity	7	12
Coordination	8	14
Funding	8	9
Facilitators numbers	5	5
Collusion in damage	5	6
Gov support	1	1
Bureauchracy	12	14
Building code	1	1
Community Organisation	6	6
Damage Assessment_many parties	2	2
Damage Assessment_which code	3	3
Facilitators experince	7	8
Training	5	6
Socialisation	2	2
Housing design	4	4
Facilitators knowledge	6	6
Role	5	6
Tight schedule	5	6
Too many aspirations	2	2
Resistance	6	6
Community limited knowledge	1	1
Implementer capacity	1	1
Database	5	6
Competition NGOs	1	1
Material	1	1
Labour availability	1	1

Figure 5.20 Coding structure for risk identification

5.6.6.1 Initiation stages

The initiation stage in a reconstruction programme is very important. The success or failure might depend on the quality of the reconstruction strategy produced at this stage. Which policy to be followed, organisation structure, roles and responsibility of each stakeholder, coordination and communication procedure, and budgeting plan are some activities that have to be discussed and established within this stage. As a result, high government capacity is imperative. However, in Indonesia this ideal condition has not yet been achieved. Below are some problems in the initiation stage that affected the CPHRP.

5.6.6.1.1 Policy Setting

The first problem regards the policy setting. Strong criticism was given by INT3 of Aceh the reconstruction programme. He said:

> *"If we learnt from the Aceh case, in policy setting, the policy is no policy. So NGO can freely build, with their own method, own model, as a result different model of houses are emerged, no supervision or design feasibility. So that's the weakness in the Aceh case"*

Further, when the researcher asked whether this problem was related to the massive scale of destruction to the point where the government did not have a clear policy, INT3 answered:

> *"Actually it (the disaster) has been several times. But the habit, we never documented it, learnt from past experience. Every time disaster happened, we start from zero."*

The above statement indicated that the policy applied by government in Aceh was too loose. There was no strong regulation on how NGOs should carry out the housing reconstruction programme. NGOs were free to choose the method they wanted, whether contractor-based or community-based. The extent of beneficiaries' participation in the housing reconstruction programme would depend on the NGOs' programme. As a result, there was no guarantee that the housing reconstruction could meet the beneficiaries' needs and expectations. Control and monitoring from government was also insufficient. Moreover, it suggests that the lesson learnt from the previous post-disaster reconstruction should be documented.

In a broader context, INT3 also criticised the fact that the policy for post-disaster reconstruction established by the government still merely focuses on rehabilitation and reconstruction, not yet discussing human networks or livelihood. Thus, special attention must be given to this aspect.

According to INT13, the policy in West Sumatra was also unclear. He addressed the lack of understanding of the community-based method by the government and pointed out that the social aspect of the reconstruction had been forgotten. He said:

> *"In practice, this programme is only a theory. The implementation is not going into what it is intended. We can see this, a community-based (programme) is supposed to have a lot of discussion among the community, and the community is supposed to be a decision maker. It happens because the policy is set by technical people, and can be done in a technical way, as a result almost no empowerment exists. For example, in a community organisation meeting, the community should be involved in the housing design, but they were not, because of limited time. In community empowerment, we should stress on the process not on the output."*

Similar to INT13, INT15 also argued that there was a lack of understanding of the community-based approach by the government. He said:

> *"This is the first time we implemented it in West Sumatra. I suggested the governor adopt the Yogya's model. Then, because this concept is new, many local governments do not understand the concept of the community-based approach. I explained it to them, there would be facilitators, establishment of community organisations, etc. At the beginning they agreed, they asked us to make the proposal. A proposal was submitted, and the governor agreed Andalas University to provide the concept. Well, after the funding is ready, stage 1, PU (Department of public work) is not ready to let it to be done by Andalas University."*

The lack of understanding of the community-based approach has created some basic errors on how CPHRP should be implemented. For example, the government did not carry out the training of facilitators, which is very important in CPHRP. Thus, it created confusion among facilitators on what exactly they should be doing in the field. As noted by INT20:

> *"The programme is not very clear. First time we meet the community, we don't know what to do. Because we did not get any training. What should we do, what the reports look like. What we know, we must establish community organisation. Then that's all we did."*

Further, INT15 also stressed that lack of understanding of the community-based method can also lead to coordination problems. He said:

> *"Problems in coordination happen because they do not understand the community-based method."*

It is not only the government that is affected by the lack of understanding of the community-based method, NGOs in Aceh were also affected by this problem. In Aceh, many organisations failed in housing reconstruction because they did not have the capacity or experience in housing reconstruction. As INT6 said:

> *"… many only do trial and error… They don't have any experience in housing, they don't want to learn, they don't want to recruit a person who has expertise in housing, who has competency…. If only they want to learn, the failure can be minimised."*

The above analysis shows that there are some challenges in carrying out the successful CPHRP. First, the lack of government capacity in carrying out CPHRP, resulting in unclear reconstruction policy, which is in turn exacerbated by the lack of knowledge of the implementer.

5.6.6.1.2 Coordination

Coordination is another important factor in reconstruction programme. As stated by INT8:

> *"Coordination is clearly number one, many problems emerged because of this (coordination problem)."*

INT15 agreed with INT8 that coordination problems can create other problems, commenting:

> *"Many activities are disrupted because of communication problem."*

Nevertheless, this important factor seems to be always a big problem in reconstruction projects, including CPHRP. Strong evidence of coordination and communication problems was revealed during the interviews. INT6 based on his experience in Aceh said:

"The problem is only in coordination. The rules set up by government are sometimes not in line (with NGOs), because they were made using a top down approach. Sometimes it contradicts with the principles of the community-based method which is developed together and pushes to the top."

He gave a further example of how some houses that had already been built by a community had to be demolished because of coordination and communication problems. He said:

"The government set up a master plan for Banda Aceh, where there is a big road project. It's (conducted) after our houses is constructed, after we established a master plan for villages. So there are some houses that have to be destroyed because of that road. So, from this case we can see that there is lack of coordination. They (the government) came late, we always coordinated with them, always reporting them, our map. If from the beginning we had the information, of course we wouldn't have built there."

Commenting on West Sumatra reconstruction, INT14 said:

"I think the biggest problem at the moment is coordination and communication between organisations involved in this (reconstruction) programme."

The coordination problem happened between almost all stakeholders, for example between central government and local government, or between government and NGOs. Some respondents below highlighted the coordination problem between central government and local government. INT19 said:

"Especially for the housing (sector), most of the risk is in coordination, between city/district government and provincial government. This slows down the housing process."

INT2 agreed by saying:

"Other problem is coordination between central government and local government, it is related to the issue of decentralisation. "

Although INT4 claimed that there was no coordination problem in West Sumatra reconstruction, he admitted that there was a problem with local government. He said:

"There is no problem in coordination. We have regular meetings, monthly meetings and weekly meetings. We coordinate 95 INGOs, everything is fine. But with local government, yes there's a problem".

Moreover, the coordination problem is not the only issue between central and local government, but also coordination between local governments, for example between provincial government and local government. As expressed by INT13:

> *"What also disrupts the programme implementation is conflict between the stakeholders who decided the policy, because of the egocentricity of each department. For example, the district government is jealous of the provincial government, because the district government feel that they are not being involved in the reconstruction programme."*

Moreover, INT13 expressed the problem between government and NGOs. He said:

> *"Coordination with NGOs also has to be improved. Sometimes it overlapped with our (government) job."*

INT8 added:

> *"Government and NGOs should have an open mind, be willing to receive input. Right now in Padang, the government don't want to come to NGOs meetings and NGOs also don't want to come to government's meeting.... I think openness of government (is needed). It affects coordination and cooperation with NGOs. Only in the last two months they welcomed NGOs"*

The above information also indicates that there is a failure in managing stakeholders. The coordination did not go smoothly. As coordination and communication between stakeholders are mainly the responsibility of government, some interviewees agreed that the government is to blame if these problems occur. INT8 said that it is because of the lack of resources in government organisation, while INT15 added that it is because the government does not understand the community-based method. Thus, it may say that the problem of coordination and communication discussed above emerged because of the lack of capacity of the government.

5.6.6.1.3 Roles and responsibilities

Roles and responsibilities of each stakeholder in CPHRP are of great importance. It has to be clearly defined at the very beginning of the reconstruction effort in order to avoid issues such as coordination problems. As noted by INT14:

> *"So far it (coordination) is still not good. This is because the job description of each stakeholder is unclear, as a result coordination problems (happened)".*

However, setting up the roles and responsibilities of each stakeholder is not an easy task. INT3 said:

> *"It (the difficulty) related to the role of each stakeholder, sharing of resources, sharing of power and the bureaucratic mechanism…that's where the problem is."*

As a result, it has to be negotiated between stakeholders involved in the reconstruction process. INT15 said:

> *"TPT's role, local government's role, KMP and KMK's role, are not very clear in the Juknis (project technical guidelines). In preparing the Juknis, there is a pull of interests (between parties). As a result, the links between these organisations are not very clear. The money is in KPA, planning is in TPT, that's the way it should be. The reality is, sometimes TPT's policies are not approved by the one who has the money. The one who holds the money has more power. This is what had happened."*

In his statement above, INT15 also indicated that unclear roles of stakeholders can also lead to problems in structuring the reconstruction organisation. INT13 corroborated the problem of organisation structure:

> *"I suggest that organisation structure and responsibilities have to be very clear"*

Moreover, INT3 gave a simple example about the unclear role of BRR in Aceh which affected the risk mitigation process. He said:

> *"At the beginning, BRR's role was to undertake rehabilitation and reconstruction, with no role covering mitigation, or reducing risk. (BRR said) 'Risk reduction is not my task'. At the beginning it is like that, but long time after that it is finally appreciated."*

The above example gives an indication of how a simple role which is not stated clearly in the guidelines can be misleading. BRR was the leading government organisation who managed and controlled Aceh reconstruction; thus although without stating it clearly, mitigation should automatically become their responsibility. This example shows the importance of establishing clear roles and responsibilities of each stakeholder involved in the reconstruction project, so that problems such as coordination and overlapping can be minimised.

5.6.6.2 Facilitators

In CPHRP, facilitators are the ones who directly work with the community to implement the housing reconstruction project. Their role includes undertaking housing assessment and beneficiaries identification, working together with the community in planning the reconstruction, helping the community in forming a community organisation, designing houses and budgeting plan, helping with the administration process, and most importantly, making sure that the houses to be built can withstand future disasters (meet earthquake resistant house code). As a result, the facilitator's role is very important in CPHRP and it can be said that facilitator is one of the main actors in CPHRP. The success or failure of CPHRP will depend on their performance in the reconstruction process.

Facilitators can be grouped into two, technical and non-technical. In this research, we focusing on technical facilitators as their function is more closely related to the built environment and their function is more important compared to non-technical facilitators. Sometimes their work is not only related to the technical aspect, since they also work together with non-technical facilitators on the social aspect of the reconstruction.

From the analysis, it can summarised that there are two main problems hampering the function of facilitators, first is limited facilitator availability, and second is their lack of knowledge and experience.

5.6.6.2.1 Facilitator shortages

INT6, INT8, INT12, INT14, and ITN 15 confirmed that there was a lack of facilitator availability during Aceh and West Sumatra reconstruction. During the time of the interviews in July 2010, INT8 said:

> *"They (the government) need around 2800 facilitators, so far only about 1000 (facilitators) recruited. So there's problem in recruitment".*

If we analyse the above statements, the shortage was nearly 65%, a huge shortage. Factors contributing to the shortage of facilitators may include the intention to recruit bachelors of civil engineering, whereas the number of universities that have civil engineering as a subject in West Sumatra is very limited. INT 12, who said that in West Sumatra there are only three universities that produce civil engineers, noted this problem. This is a very different situation compared to that in Yogyakarta reconstruction. In Yogyakarta, facilitator shortages were not a big issue during reconstruction.

5.6.6.2.2 Knowledge and experience

The problem of facilitators was also about the lack of their knowledge and experience. Lack of knowledge was stated by INT15. He said that many of the recruited facilitators were not positioned according to their expertise. He gave an example:

> *"…because we need a lot of civil engineers, their availability becomes very limited. What's the consequence? We recruited people from outside civil engineering (background), minimum it is related, such as architect. Can't find more architect, we recruited people from engineering background. We trained them. Basically, we explain the basic principle and let them make use of their logic. Minimum on how to build earthquake resistance houses, what to be controlled, we explained all to them. So, we are really lack of facilitator that has capacity."*

The lack of facilitator experience is expressed by INT1, INT7, INT8, and INT17. INT7 and INT17 said that most facilitators involved in CPHRP were still freshly graduated and as a result, they do not have any work experience, not least experience in post-disaster housing reconstruction. INT17 claimed:

> *"Facilitators that we have clearly, on average, 75% of them don't have any experience."*

According to INT1, one factor contributing to this is that the community-based method is still a new programme. CPHRP only gained attention after the success of its implementation in Aceh housing reconstruction by some NGOs. It was then adopted by GOI for Yogyakarta and West Sumatra reconstruction. As a result, it is not surprising that it is hard to find facilitators with an experience in CPHRP.

The availability of facilitators with good knowledge, capacity and experience is immensely important if CPHRP is to be applied. There are some reasons why it is imperative. First, facilitators need to be able to adapt to the field. The circumstances of working in normal construction projects are very different compared to working in a post-disaster environment. Facilitators are urged to have social sensitivity. INT6 gave an example of the lack social sensitivity of facilitators by stating:

> *"… My friends, architects, they like to draw behind the desk using Autocad. It won't work out when we brought it to the village, disaster area… community won't understand it… we have to use communicative media. Also the way in communicating it (with community). We have to listen more. We usually see ourselves smarter (than community), that's where the problem can appear. So it has to be the other way round, we have to listen more."*

Moreover, facilitators need to communicate well with survivors. Although facilitators already have adequate knowledge, their communication skills are also essential. INT17 said:

> *"The problem with fresh graduates is they can't communicate well with the community. No problem with their (technical) skill, but we can convince the community only with good communication, so they lack of soft skills."*

Good communication skill is also necessary when facilitators have to solve any dispute or conflict that might emerge within the community. INT10 said:

> *"Facilitators in this (conflict) situation try to neutralise the situation, until there is no conflict which can affect the reconstruction progress"*

According INT9 and INT13, arrogance, lack of patience, and broken promises have to be avoided when communicating with a community. Failure to do so can make a community lose their respect trust in the facilitator.

INT3 and INT17 pointed out the necessity of facilitator knowledge and experience during building assessment. INT3 said that in order to do a proper building assessment, the facilitator should to understand fully the guidelines for defining damage categories. INT17 has witnessed a facilitator only checking the house condition from the outside, without going inside, then putting the sticker on to mark the house condition. Failure in determining the correct damage category can lead to dissatisfaction among community.

5.6.6.3 Training

5.6.6.3.1 Facilitators training

As discussed in section 5.6.6.2.2, facilitators have limited knowledge and experience on CPHRP. As a result, training is urgently needed to provide them with a good understanding of a community-based programme. However, due to the lack of experience of facilitators, more effort is needed compared to facilitators that already have an experience, particularly the ones who have worked in the construction sector. INT1 and INT8 noticed that it is difficult to train them. INT1 added that more time was also required to train them.

The other problem exposed by interviewees regarding training is the capacity of the trainer. INT12 said there are worries about the quality of the trainer, because some of them do not have any previous experience of community-based programmes. She said:

> *"The trainer did not understand with what they taught"*

INT16 added that due to time limitation, a technical trainer from an engineering background was pushed to give a presentation about social interaction. He said:

> *"Because the time is very limited, only 3 days, preparation time is very tight. So there's no time to discuss it with people from social background. Ideally it should be given by social people, because it relates to the way to get into the community."*

In broader view, INT8 said that the training becomes difficult because the government does not have enough resources to carry out the training programme. Inadequate training materials and training objectives were also highlighted.

Moreover, there is a lack of understanding about training from the government. In the West Sumatra case, at the first stage of housing reconstruction, training was given to facilitators after they go into the community, rather than before. As explained by INT17:

> *"The training is different. After two months in the field, then the training is carried out. Not at the beginning. The assumption is, let them go into the field first, after they have had some experience, then we train them."*

Furthermore, INT17 admitted that this policy might be wrong, and for the second stage of reconstruction, the government planned to do the training before facilitators go into the community. The above analysis indicates that the government has a limited understanding of CPHRP. Training has not been seen as an essential part of the project process before facilitators have interacted with the community.

5.6.6.3.2 Community training

Community (beneficiaries) training is not as important as facilitator training. It will depend on the willingness of the community, whether they want to take part as builders of their own houses or not. For builders working on CPHRP, the training is important, particularly in giving practical training on how to construct houses that meet earthquake resistant building code.

Many builders in Indonesia have no formal education. They learn how to build a house from other senior builders. It is simply a process of learning by doing, taught from one generation to another. Many of them have never known about a building code, particularly for earthquake resistant housing. As a result, finding skilled labourers that know the principle of earthquake resistant housing is very difficult. Not only in terms of capacity, but also due to high demand for housing reconstruction there is also a shortage of labour availability. INT15 and INT16 confirmed this situation. INT15 said:

> *"In a community, the limitation is the availability of labour. Labourers who have high skill are very limited; the ones who understand the basics of earthquake resistant housing are very limited "*

Giving new knowledge to the community and changing the way they normally build a house is also very challenging. It can be because of their culture, habit, or long experience in building houses a certain way. Asking about how difficult it is to change the behaviour of the community in building their house, INT6 commented:

> *"It's difficult, because of culture and style. The community already has experience of building their own houses, from generation to generation, no government's rule, no standard, no intervention. Although the standard is there, they don't*

know. We tried to turn this, it's difficult. At the beginning, many don't want to follow. When we suggest a full brick (for wall) house, normally it's half brick. Nobody wants to do that. That's a simple example."

Thus, the facilitators' capacity for explaining the importance of earthquake resistant housing and for encouraging understanding within the community is highly necessary.

5.6.6.4 Damage assessment and beneficiaries identification

The objective of damage assessment is mainly to observe into which category the level of destruction the house fell. The damaged category is divided into three groups: heavy damage, medium damage, and light damage. This activity is sometimes carried out simultaneously with beneficiaries' identification.

The damage assessment at Aceh was not as hard as at Yogyakarta or West Sumatra. In Aceh, most of the houses were swept away by tsunami, as a result, most of the houses can be clearly categorised as heavily damaged or destroyed. However, the Aceh reconstruction had more difficulties in defining beneficiaries and landowners because many families lost all the family members and the marking for land tenure was also swept away by the tsunami.

5.6.6.4.1 Database

The first problem in identifying the damage category or beneficiaries' identification is the lack of housing database. It is hard to have the precise number of the existing houses and their owners. This is the initial data that is going to be used by facilitators when going into the community to check the damaged category.

Further, the system in combining and compiling all data gathered from the field is not well organised. As explained by INT19, in the West Sumatra reconstruction, a project intended to build a software system for a database failed. The non-uniform standard method of assessment and too many parties being involved during the damage assessment exacerbated. As a result, there was also an overlap and confusion created when compiling the database. As noted INT14:

"before we validated the data, we received data from major/district head and department of public work, but there were differences. We didn't know which standard they used."

A similar opinion was raised by INT11:

> *"We (Regional Development Planning Agency) together with all local governments, Department of Civil Work, collect all data, including housing sector. We also asked help from central government..... (but) the data is always changing. Actually, we already have a standard, but data from day to day is always changing."*

The problem regarding the database in West Sumatra reconstruction was also admitted by INT8:

> *"In Padang (West Sumatra), data for validation is a bit messy."*

INT17 added:

> *"The address of the house is also not complete."*

From the above discussion it appears that the problem of databases, from the availability of the initial data to the way it is compiled needed to be considered during the housing reconstruction process. This problem can be avoided by creating a housing database system. A map with embedded geographical information system (GIS) technology would be very helpful in tackling this problem.

5.6.6.4.2 Many parties and assessment standard

Many organisations/institutions were involved in damage assessment activity. The implication was that when many organisations are involved in damage assessment they might bring their own assessment methods and make coordination more difficult. INT1 and INT2 pointed out this possible problem. According to INT1, when many organisations are involved in building assessment, it will be more difficult to decide which method of assessment to apply. INT2 agreed that there is a risk of non-standard building assessment by commenting:

> *"Actually it depends on the standard. There was an assessment team from Japan, and one from New Zealand. They brought their own standard, which they think is the right standard. Implied to say that Indonesia does not have any standard, than easily labelling the house. I argued them, not just brainstorming. I told to one of them 'it seems that you come here, bringing your standard, to be implemented by the government. Oops, wait a minute, we also have a standard, it's from our government.' I showed them the softcopy. 'Never think that Indonesia has no standard'*

He continued by suggesting that in order to have a uniform standard method of assessment, strong government policy is needed. He said:

> *"So, in this point government should emphasise, first we have a standard, and second follow our standard. I think in this where we are still weak. (It) Needs support to boost the confidence level."*

The declaration of which standard to use should be announced soon after the emergency period. It would also be better if the standard for assessment method was already established before the disaster took place.

Having a standard for damage assessment cannot guarantee that the damage assessment will be free from problems. Although it has been established, the understanding of the standard will be different from one facilitator to another, which will depend on their knowledge and experience. As pointed out by INT3:

> *"…although the guidelines are already available, but it is not very well disseminated, not very well understood."*

INT8 confirmed:

> *"Although the standard for damage category has been established, in implementation it can be different."*

5.6.6.4.3 Collusion

There is also a possibility of collusion in defining damage category and beneficiaries identification. This is because the damage category has a direct implication on how much money beneficiaries can get. As a result, according to INT3 there is a trend to do a mark up in classifying the damage category. INT19 confirmed the situation by saying:

> *"Communities want to change damage category, from light to moderate, or moderate to heavy. This is the main factor."*

The collusion in defining damage category and beneficiaries identification can occur because there is a family relationship between members of the community. INT9 said:

> *"one of them (problem) is collusion, (because of) family relationship"*

INT18 supported:

> *"When we arrive at the affected area, we have to check again the damage category data. Because sometimes the lightly damaged house is categorised as heavily damaged. Because many people in one community organisation have family relationship".*

INT17 added that there is also pressure from the community to increase the damage category. He said:

> *"There is also pressure from community, from green to red (from safe to heavily damaged), this the constraint."*

The collusion in defining damage category or beneficiaries identification can be avoided by doing it transparently and announcing it to the public. As noted by INT9:

> *"Beneficiaries selection should be done as transparently as possible. Community do the verification, we (facilitator) also do it. That we announced publicly. This is the eligible person. It is posted for three or five days. Any complaint, please report directly".*

5.6.6.5 Socialisation and community organisation

Socialisation is one activity in CPHRP that is intended to disseminate the detailed programme of CPHRP to the community, including explaining the plan, the method of assistance, and procedures. The socialisation programme was also an opportunity for the facilitators to introduce themselves to the community. In Aceh, the NGO's facilitator carried it out, while in West Sumatra and Yogyakarta facilitators sometimes accompanied by government officials carried it out.

Explaining the community-based method to the community is not an easy task, because this programme is still relatively new and the community do not really understand it. Thus, more effort is needed from the facilitators. As commented by INT1:

> *"The community does not understand this method (community-based)…as a result, the facilitator is needed to explain this to the community"*

INT13 criticised the socialisation programme in West Sumatra reconstruction, by commenting:

"If we look at the programme, socialisation is only given in district level. In village level, there isn't. This is very regrettable. This problem also arises because the facilitator can't socialise it very well. Because of lack of socialisation at community level, it sometimes creates conflict."

The above statement by INT13 indicates that there is a problem in designing how the socialisation should be carried out at policy level. Socialisation of CPHRP should reach the lowest level and the most important stakeholders, the community. Relying for the socialisation only on the facilitators is not sufficient, since most of them still lack experience in communicating with communities, thus support from the government is also needed.

Moreover, programme socialisation also needs enough time to be carried out. Setting only one occasion for programme socialisation is not an appropriate way of implementing CPHRP; enough time should be allocated for this activity. As criticised by INT17 and INT14, INT17 said:

"I think the socialisation is not just enough one time. Maybe for a 4 months project, it should be 4 times."

INT4 added:

"Because of time (limitation), socialisation is a bit pushed"

Pushing socialisation to be carried out in short time can prevent the intended information from being delivered to the community. This can create confusion in the community and in the worst case, the programme can be abandoned as the community can refuse the assistance.

Competition between donors also affected the socialisation process. This problem particularly happened in Aceh housing reconstruction because the donor seemed actively to offer their assistance to the community. This problem was noted by INT6 and INT8. INT8 said:

"(socialisation) becomes more difficult if the programme overlaps with other organisations"

After programme socialisation, the next step of CPHRP is to establish community organisation. One community organisation normally consists of 10 to 20 households.

Community organisation is needed in order for the community to discuss their needs and expectations, and to plan their reconstruction programme. The process of grouping the community into one organisation is not an easy task as it will involve the interest of the community. INT1 and INT6 admitted this is a hard process. According to INT6 it is the activity that really takes time. He said:

> *"The one that takes time is to establish a community organisation, to organise them… once this is done, they (the community) will become solid, and the next step will be easy…"*

In Aceh, where the devastation was massive and many people lost their family members, forming a community organisation took a lot of time. Based on his experience in Aceh, INT6 said:

> *"By our experience, in Aceh with all huge constraints, it takes about 5 months to organise the community"*

In the aftermath of disaster, survivors tend to be suspicious of people coming from outside their community. There is a concern that they will be manipulated or be used by the external organisation. This situation is noted by INT6, INT10, and INT9. INT9 said:

> *"Many (community members) are suspicious. It's normal in a community, especially when somebody from outside is coming in. But relatively, survivors, when we help them, they are happy"*

The resistance of a community can be generated by the origins of the organisation/people coming to them, such as ethnicity, religious factors, or organisation origin. INT6 once experienced resistance from a community because he is Javanese. He shared his experience in Aceh by saying:

> *"Regarding the resistance, first is (their) suspicion. (the community said) 'Who are you?' Particularly in Aceh, where problems with Javanese and non -Javanese are huge. They (Acehnese) already felt they were occupied by Javanese. (The community said) 'Are you going to occupy us again?'"*

More interestingly, according to INT10, he has experiencing being rejected by the community, and at the same time was being very much welcomed by the community. According to him, the suspicion of the community is less when we come bringing the name of a well-known organisation, such as the United Nations, but is very sensitive when we bring in a religious organisation. He said:

> *"My experience, if we come from a UN organisation, they are very welcome. But if not, community is a bit suspicious. They will ask in detail, what's the objective, from where, who is the donor… I was even rejected to come into one area because I brought a catholic organisation (as the majority of the community is Muslim)."*

Moreover to INT6, this problem can be minimised by the way we come to the community, the way we approach the community. We have to listen more and work together with them. INT6 said:

> *"Our concept is to work together. There were organisations that already positioned themselves as somebody who will give something. We are not. We came there to work together, listen to their problems, try to find the solution together, not only in our perspective. That's the community-based approach".*

The other problem in forming community organisation is the lack of community enthusiasm. As noted INT6 said:

> *"In the beginning, we hope the community participation will be high. But it isn't, (they are) not cooperative"*

INT12 confirmed this problem by commenting:

> *"the most difficult one is to engage community, to participate community to form community organisation."*

The difficulties in engaging community could be due to the short time available. INT13 said:

> *"…the small community participation is because of this programme is done hurriedly"*

There is sometimes also conflict in the community in forming a community organisation. Suspicion between community members can arise. As expressed by INT20:

> *"There is argument (between community members), pro and contra, distrust. For example, 'don't choose him, he is corrupt'. But we (facilitator) only facilitate, the decision is by the community."*

The time needed to form a community organisation in Aceh is a very different compared to Yogyakarta or West Sumatra reconstruction. In West Sumatra reconstruction, the process of forming a community organisation did not take a long time. According to INT20 it only took one day to establish community organisation. She said:

> *"The process (forming community organisation) did not take a long time. On average just in one meeting, one community organisation is formed. At that time we were in a hurry, data has to be submitted, about community organisation."*

Too dominant a community leader is another obstacle in forming a community organisation. If the leader is too dominant, he or she will control the process and another community member will be overshadowed his or her dominance. As a result, the true aspirations of the community cannot be obtained. INT9 experienced this situation. He said:

> *"In Pidie (Aceh), the most dominant is a geuchik (community leader)….He is highly respected in that area. He has some close friends, which he can control. Some community won't like it, there's a gap. In the forum, they will not argue. But outside, they try to topple each other."*

Similar to the above problem where the aspiration of the community did not emerge, INT6 said that the community also can be manipulated by other parties. It can come from a member of the community itself or people/organisations from outside the community that intend to take advantage.

5.6.6.6 Housing design

In producing good quality housing design, facilitators' knowledge and experience are significantly necessary. As the main goal for housing reconstruction is to built back better, following the specification for earthquake resistant houses is necessary. The facilitator will help the community in providing the design. However, in post-disaster reconstruction sometimes there were different building codes available within the community, brought, for example, by organisations that help the reconstruction process and want their building code to be implemented for the housing design. This creates confusion, not only at community level, but also at policy level. INT14 and INT19 raised this kind of problem. INT19 said:

> *"There's also problem in housing design. There are many guidelines available. We use a book from Teddy Boen, later there is also a book from JICA, or UN-Habitat. They proposed their books, and they have people in government who have strong positions. This affects the policy at provincial level."*

Moreover, housing design should reflect the need and expectation of the community, and absorb the cultural value of the disaster-affected area. As a result, intense communication with the community in exploring their needs and expectations is necessary. According to INT6, consultation with the community will produce many considerations and variations. However, it must not breach the principle of the earthquake resistant house. In narrowing community expectation, INT1 and INT6 suggested that consensus among the community has to be achieved. This process will be considerably time-consuming, in contrast to the tight schedule normally available for reconstruction efforts.

INT8 stated that housing design was also affected by the soaring price of materials and the limitation of its availability. In the example of Aceh, due to difficulties in finding timber, many organisations chose material that was available or could be produced by the community organisation. The community in INT6's area for example, produced their own bricks for housing materials.

In addition, flexibility is another factor to be considered during the design. In his experience, INT9 said that a community sometimes changed the agreed design or conversely facilitators proposed a new design to the community with certain objectives in mind. He said:

> *"But sometimes we also have to be flexible with the design. For example, beneficiaries from one family have adjacent land. I persuade them to make a semi-detached house, in order to save material. They agreed. They can use the saving to buy ceramics or other materials."*

From the above discussion, it can summarised that facilitators' experience and knowledge is very important in housing design. Variations and cultural considerations about housing are normal circumstances that cannot be avoided in CPHRP, but agreement and flexibility has to be established with the community.

5.6.6.7 Funding

Limited funding is a significant obstacle in the housing reconstruction process. In West Sumatra and Yogyakarta reconstruction for example, due to the limitations of the reconstruction budget, the government cannot provide all the houses for the community. The West Sumatra case is worsened by the lack of donations from donor to government. Thus, reconstruction policy has to fit with the amount of funding available or the budget that can be afforded by the government. In Yogyakarta and West Sumatra, housing reconstruction has to be divided into stages and the form of funding provided to the community functions as a stimulant. The government can only afford to give an assistant Rp. 15 millions per household for housing reconstruction. This affects community satisfaction and is far from what they expected. INT17 said:

> *"Regarding the funding, it is not what as expected by community.... Not much can be done with Rp. 15 millions"*

INT4 added that limited funding becomes a big issue among the community:

> *"The problem that becomes a central point for the community is funding".*

The disbursement of funding from government also found a big barrier, a long complicated bureaucratic process. This problem is discussed in more detail in section 5.6.6.8.

Unlike the experience of limited funding faced by the Yogyakarta and West Sumatra reconstruction, the Aceh reconstruction had no problem with funding limitation. Many NGOs operating in the housing sector had a full backup from their donors to complete their projects. Costs escalation due to inflation, increase of material prices, labour costs or other circumstances can be overcome by proposing a new budget plan to their donors. Literally, it can be said that some of the NGOS were working with a very substantial funding.

This situation was noted by INT6, INT8, and INT9. INT6 and INT 8 expressed that during their time in Aceh reconstruction, their budgets were revised several times in order to fulfil their commitment to the beneficiaries. INT8 said:

"(we have) No problem (with funding). Our budget in Aceh was revised a few times".

INT6 also stated the same thing, explaining how his organisation dealt with cost escalation:

"No problem (in funding), we are flexible. Because our commitment with the donor at the beginning is to built houses. How many? Depends on the number of members of the community. Means, we can't rigidly refer to the budget. For example, we (initially) targeted Rp. 36 millions/house, then inflation. We proposed the donation to become Rp. 39 millions, donor understood. Then rose again to Rp. 45 millions, and finally at Rp. 49 millions. There's no problem with donor, the donor is flexible, and understood the real condition in the field… if the deal in budget, and inflation took place, number of houses (to be built) will decrease. Only we increased, from initially 3000 houses, finally 3331 houses."

From the above discussion it can be seen how funding can affect the form of assistance provided to beneficiaries which in the end can affect community satisfaction.

5.6.6.8 Bureaucracy

The CPHRP conducted by NGOs in Aceh reconstruction was not affected by bureaucratic problems. The spending disbursement for the community followed their own organisation's procedure. NGOs can make it as simple as possible without leaving the accountability. However, in Yogyakarta and West Sumatra reconstruction, where the main source of funding came from the government budget, the procedure had to follow the government bureaucracy process.

The first problem with the government's budgeting is the fiscal year. In the fiscal year system, funding that is already allocated for a particular year has to be spent in the year it is intended. If it cannot be disbursed that year, the funding has to be returned to the Ministry of Finance. This regulation particularly affected the West Sumatra reconstruction process. The earthquake disaster took place on 30 September 2009 and the budget for reconstruction was approved nearly at the end of the fiscal year. As a result, the allocated funding had to be returned to central government. As noted by INT11:

"The problem is late funding. At the end of 2009, BNPB have allocated Rp. 313 bn, but all funding from APBN has to be spent by the end of fiscal year. If we can't spend it, we have to send it back to central government. At the end, it is granted

to APBD (Local government annual budget). As a result, it can only be spent in 2010. According to BNPB, this problem slows down the process. Instead, from a state administration, it has to be like that."

Further, the long process for reconstruction budget approval in West Sumatra was also because the Revised National Annual Budget (APBN-P) had already been submitted to parliament, so it had to wait for another revision. INT11 said:

"In the month of September, the Revised National Annual Budget (APBN-P) is already processed, the president has already proposed it (to parliament) in August. So it is too late to be included in APBN-P 2009."

Asking whether Indonesia has a kind of reserve budget that can be disbursed anytime disaster takes place rather than have to wait to be allocated in national budget, INT11 said:

"Actually the government has a reserve budget in their annual budget that can be deployed in case of disaster, but it is limited. It is only enough for an emergency. But for rehabilitation and reconstruction, it has to be allocated in ministry budget."

Because of the above problems, there was no housing reconstruction process taking place until the end of 2009. The allocated budget was finally transferred to local government to be disbursed in 2010.

After the budget allocation problem, the next problem was on the disbursement procedure. INT8, INT12, INT18, INT19 and INT7 said that the procedure for funding disbursement to community is too complicated. Some comments by interviewees are as follows:

INT18:

"The mechanism for funding disbursement is really complicated"

INT12:

"What needs to be changed is the bureaucratic process, it's too complicated. It said that on the next phase, this will be changed."

INT7:

> *"The money is already in the (government) account, but to disburse it, it is a bit difficult. The procedure is slow (complicated)"*

INT19:

> *"Other problem is the bureaucratic process for funding disbursement. The process is too long."*

The complicated process of spending government money was admitted by INT4. However, according to him and INT5 this was a normal procedure in government project. The problem was because local government and community did not know about this long process. INT4 said:

> *"The problem that becomes a central point to the community is funding. The budgeting follows the Ministry of Finance system, there are stages and procedures. Well…local government and community do not understand about this procedure… the community only know that the funding has not disbursed yet."*

INT16 agreed with INT4 regarding the long process, but he also added that it was also because the disbursement procedure was not very clear. He commented:

> *"The reconstruction is very late because of the mechanism of funding disbursement to community. This people (government) are a bit afraid (breaching the rule) and because the mechanism is also not very clear."*

Some example of complicated procedure was given by INT19, INT20, and INT17.

INT19 explained:

> *"After the community organisation was established, they were asked to submit the requirements for stage 1 of funding disbursement. There are 24 forms that have to be filled in. From the name of TPM, name of community organisation, contract letter, BoQ for stage 1, what materials to buy, BoQ for stage 2, what materials to buy, until 24 forms are completed. They submit it to KMK, KMK to KPA. From KPA to treasurer. From treasurer to funding department, then to Bank. (after that Bank to community account). Well…on this process, say data submitted is 50 community organisations, from KMK to KPA full 50, but from KPAS to treasure maybe less than 50, because many must be signed etc, maybe is cut into 30, because KPA is busy. From treasurer to funding department decrease again. This is the process that creates lateness of funding disbursement. This*

bureaucracy can't be cut. So the process from Pokmas to bank can take about a month."

INT20 also added that the complicated process of funding disbursement is not strictly necessary. She said in the requirement stated that the head of the community organisation also has to go to Padang (the capital) to hand in the forms (administrative requirement) for funding disbursement. Another example is about the IMB (building permit). INT17 said that in the initial process, an IMB has to be submitted by the community together with all administrative requirements. According to him, this policy is not good, since getting approval for an IMB certificate can take a long time. He argued that it should not be until the community submits all documents for an IMB. He said:

"What we stress is only until they submit the requirement. Give the community letter of concern stated that this community has already submitted building permit. This letter will be attached as one of the requirement for funding disbursement."

The above analysis shows how complicated the bureaucracy can be in a government organisation. Inevitably, this process can mainly affect the time needed and satisfaction of the community.

5.6.7 Critical success factors

The question about CSFs of CPHRP is the final part of the semi-structured interviews. In this section, interviewees were asked about factors that contribute to the success of CPHRP. Below is the analysis of some CSFs as perceived by respondents. The coding structure is presented in Figure 5.21.

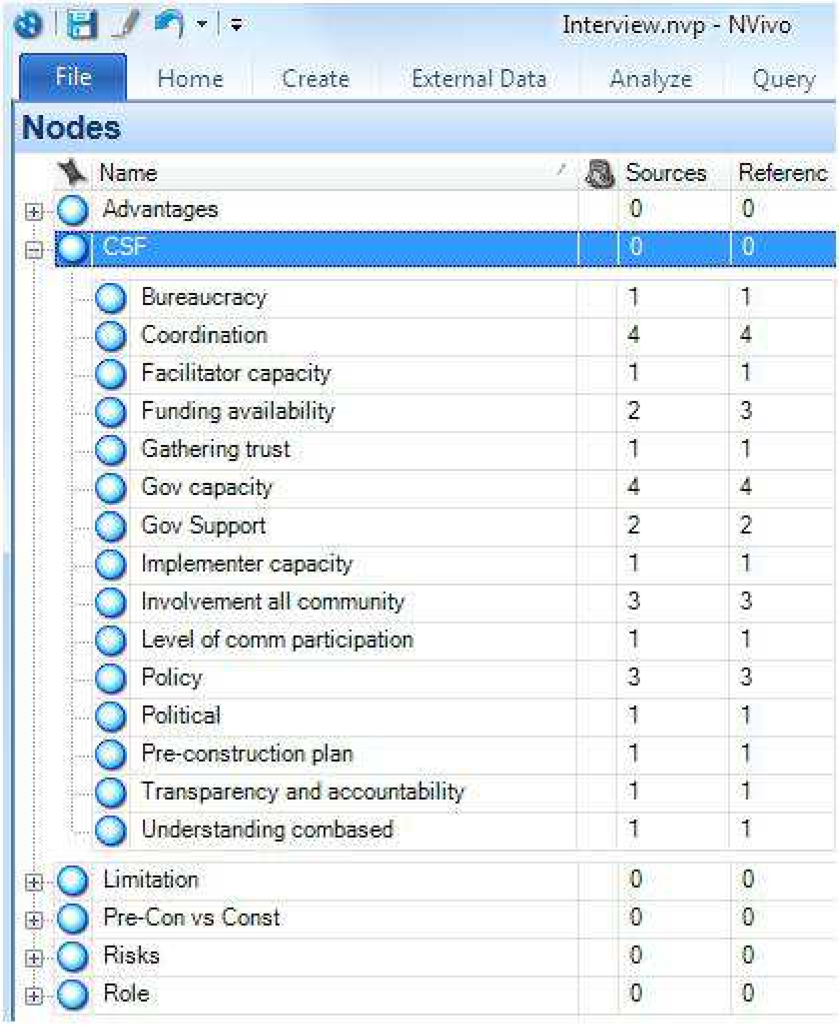


Figure 5.21 Coding structure for CSFs

Appropriate reconstruction policy is a factor perceived by INT2 and INT12 as one the CSFs of CPHRP. According to INT2, a strong policy is required for the success of CPHRP. INT12 added that the concept and strategy have to be good. According to her, the problem at CPHRP is many activities are performed by trial and error. An appropriate policy can also relate to the timescale of reconstruction. As CPHRP needed more time at the beginning, and it is a long process, a more realistic plan has to be considered by the implementer. As noted by INT3:

> *"(The implementer has) to make a realistic plan, because it (CPHRP) involves a long process"*

The next CSF perceived by respondents is good coordination and communication between stakeholders. INT17 said that the coordination is very important in order to achieve successful CPHRP. INT3, INT12 and INT11 also have the same opinion. According to INT3, non-harmonious communication between national and regional levels can be a disturbance and can affect the CPHRP. INT11 also added that lack of coordination between local government and ministry (central government) can also affect the funding allocated to the reconstruction programme.

Sufficient funding availability is a very important factor in achieving successful CPHRP, particularly on the condition of a limited commitment from donors. INT11 said:

> *"First is funding…. Because local government budget is limited, we rely on central government."*

INT2 shares a similar opinion. Even for NGOs who implement CPHRP, funding is the important factor. As discussed in section 5.6.6.7, without sufficient funding, providing a full scale house for beneficiaries in circumstances where material price and labour cost rise significantly is almost impossible. Consequently, funding availability is a very important factor.

Another CSF perceived by INT8 is transparency. He said:

> *"Transparency, that's a must. Both for community and government. For example in our organisation, it is very transparent. How the mechanism, to whom is it was given, how the supervision. From community also like that, reporting system has to be transparent, publicly announced. So there's no suspicion between them"*

The above statement indicates that transparency and accountability are not only needed from the institutions that carry out the CPHRP, but transparency and accountability from the beneficiaries is also needed.

According to INT17, government capacity is most important, particularly at the lowest level of government structure, at sub-district or village level. He explained:

> *"The spearhead is actually at the village level. At sub-district or village level, it should already have the person involved in this kind of empowerment project. This is what we don't have."*

In more general conditions, INT10 and INT15 claimed that availability of good human resources is important in CPHRP. INT15 said:

"We must have high quality human resources. If we have it, people who can understand the mechanism and system, it will be easy"

INT10 corroborated:

"We have to have good human resources, facilitators needed is the good one, a community that is also willing to work together."

There is a gap in the level of understanding of CPHRP in government organisation, not only between central and local government, but also between local governments. As INT1 said:

"Government understanding is not the same, between one province and another. So we need to synchronise them."

Community capacity also needs to be raised. INT4 stated:

"Increase community capacity, by providing training programmes. Because it is empowerment, so community has to be educated to make them understand, know, and be able."

Thus, by increasing the capacity of stakeholders involved in CPHRP, it is hoped that successful CPHRP can be delivered.

INT2 and INT4 perceived that the support from government on CPHRP is one of the CSFs in CPHRP. INT2 said:

"after having a strong policy, we need a support from government, to support the implementation process, most importantly to support the local planning and budgeting … and political will."

According to INT14, government also needs to be sensitive into the aspirations of the community. He said:

"Government should accommodate what the community want, listen to what they want, the mechanism of funding disbursement, the prioritising, and transparency"

According to INT3, gathering trust from the community is necessary in CPHRP. The community-based approach will not work if it is being pushed. It should be on the condition that the community put their trust in the external institution coming to them and that they are willing to work with them. Thus, the acceptance by the community is very important.

Another CSFs of CPHRP is involvement of all community members in the reconstruction process, and to what extent their contribution to it is. INT12 agreed:

> *"I think (the CSF is) the participation of all community members"*

INT6 added:

> *"The success factor is community participation. It will emerge if we accompany them intensively."*

Having a pre-construction plan is essential for the success of CPHRP. As organising community to become a solid organisation can take a long time, creating it before the disaster took place would be an advantage. As noted by INT3:

> *"I think, actually the community-based method has to be implemented before the disaster takes place"*

The above analysis has reveals CSFs that are captured during the interview process. CSFs can also be the high risk that must be controlled or avoided during CPHRP programme. Based on the discussion in section 5.6.6 about risk identification, CSFs such as appropriate reconstruction organisation, facilitator availability and capacity, minimising bureaucracy, access to affected community, and good written contract between community and implementer can be added. Furthermore, it is compounded with the success of stages of CPHRP: success on forming community organisation, successful damage assessment and beneficiaries identification, successful land tenure identification, successful community training, design flexibility, and material availability.

The CSFs also included the general CSFs of the construction project such as project duration, project size, and project location. Factors such as conducive political environment, economical environment, social environment, and physical environment are also included in the CSFs (Chan *et al.*, 2004).

5.7 Summary of Part 2

Twenty semi-structured interviews were conducted in the first stage of data collection. The data was analysed using content analysis. Some advantages, limitations, risks, and CSFs of CPHRP were revealed during this process. Some respondents highlighted the non-physical advantages of CPHRP that cannot be delivered using the community-based approach. Two limitations hinder the implementation of CPHRP, the long initial process and the low capacity of stakeholders to conduct it. Bureaucracy, limited funding, coordination problems, low capacity facilitators and availability are the most common risks raised by the interviewees. For CSFs, interviewees highlighted the availability of good coordination and government capacity. It was also found that the implementation of project risk management in reconstruction projects is uncommon. Many of the interviewees were not familiar with project risk management terminology.

Part 2 successfully identifies the advantages and limitations of CPHRP. It also reveals that the implementation of project risk management process in CPHRP was rare, even the terminology of project risk management itself is not familiar to respondents. Some risks and key success factors during the pre-construction stage of CPHRP have also been identified. The results of the semi-structured interviews in Part 2 were then used by the researcher to develop the questionnaires. The next section (Part 3) presents the analysis and discussions of the questionnaire survey.

Part 3: Quantitative data analysis

5.8 Questionnaire surveys

5.8.1 Introduction

The questionnaire survey was the second stage of data collection, which aims to reveal the degree of advantages of CPHRP, to quantify the occurrence of risk probability and their impacts on project objectives, and to quantify the CSFs (see section 3.9.1.3 for details). The questionnaire survey was conducted between December 2011 and February 2012. The questionnaire was sent to 92 potential respondents and 73 questionnaires were received back by the researcher. Among the 73 questionnaires, 65 questionnaires were categorized as valid. The validity as explained in section 3.9.1 is based on two factors, the experience and the location of CPHRP. The number of respondents for each case study is as follows: 25 respondents for case study 1, 20 respondents for case study 2, and 20 respondents for case study 3. The experience of respondents in the case study location is shown in Figure 5.22.

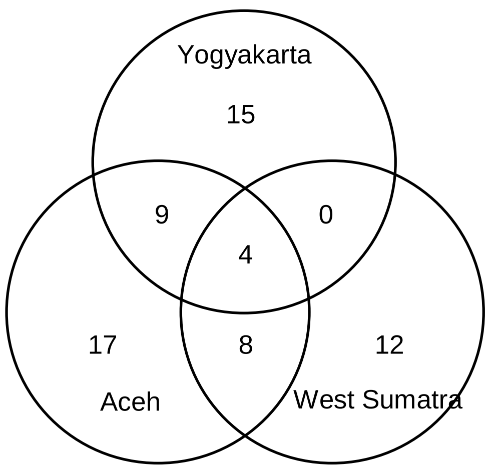


Figure 5.22 Number of respondents based on project location in Indonesia

5.8.2 Respondents data

This section shows the detailed data of respondents. In the questionnaire (Appendix C), respondents were asked in which organisation they best fitted, the duration of their working experience and their role in CPHRP. Figure 5.23 shows the nature of the respondents' organisations and the length of their working experience. Figure 5.23.a illustrates that most of the respondents' demographic background comes from international NGOs, followed by consultancy and academia. Analysing the respondents' experience in terms of duration, Figure 5.23.b shows that most of the respondents had been working for more than six years (80%), whilst their working experience in reconstruction had been less than six years (75%). This implies that most post-disaster reconstruction projects are a recent phenomenon in Indonesia. Moreover, respondents were working in various positions during the CPHRP, ranging from facilitators (29%) to consultants (29%), advisors (28%), project staff (23%) and project managers (20%).

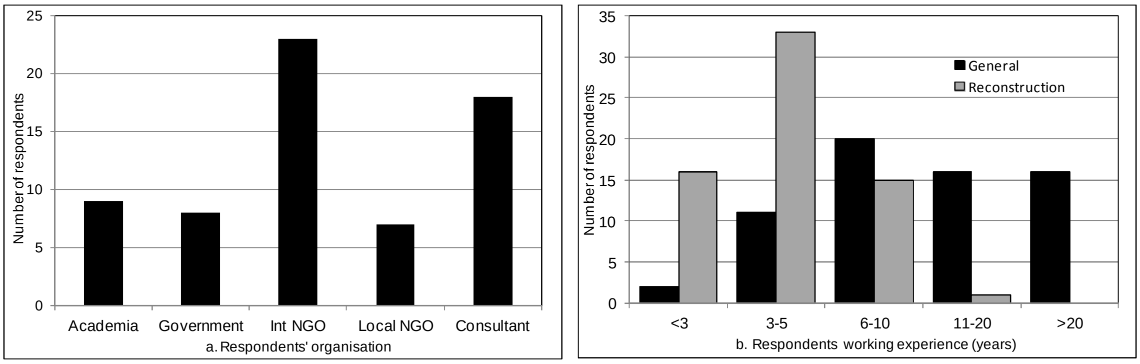


Figure 5.23 Respondents' organisations and working experience (general and post-disaster reconstruction)

The questionnaires also asked respondents whether they had implemented a project risk management process in their working experince, whether they had implemented in CPHRP, and finally whether they agree that the pre-construction stage carries more risk than the construction stage. The results are shown in Figure 5.24.

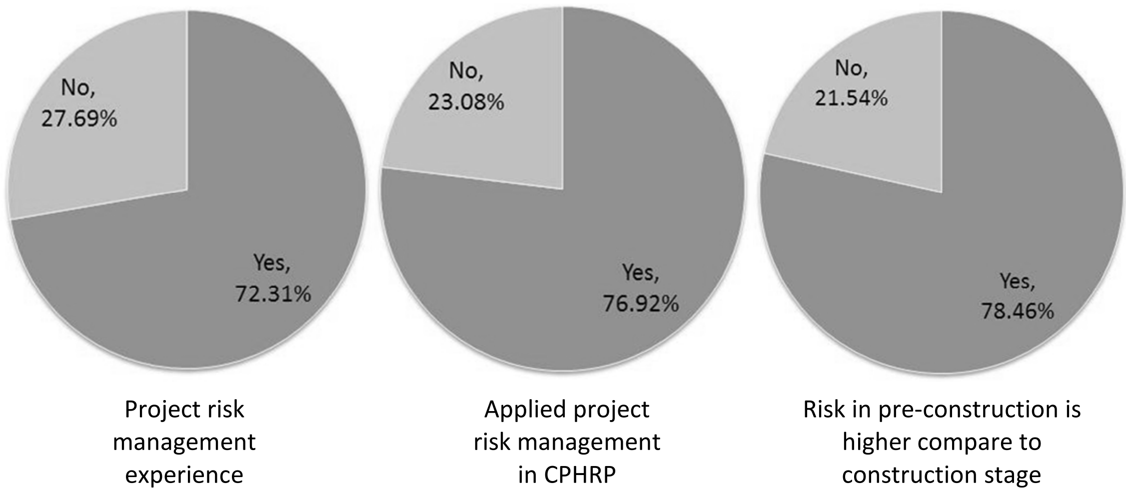


Figure 5.24 Respondents' experience on the application of project risk management

Figure 5.24 shows that 72% of respondents have at some point implemented a project risk management process in their working project. Particularly for its implementation in CPHRP, nearly 77% respondents said they had. Comparing these two findings, it seems strange that the percentage of implementation in general projects was less that the implementation on specific projects (CPHRP). Moreover, comparing it with the result in qualitative analysis (see section 5.6.5.1), a contradictory finding emerges. While the analysis of the questionnaire survey reveals that more than 70% of respondents have applied project risk management processes in their working experiences, the interview findings show that the majority of respondents have never implemented it in CPHRP, and it is rare even for a general project. These contradictive results might be due to the social desirability response bias. As noted by Pedregon *et al*. (2012), respondents tend to rate themselves at high social desirability when come to a personality question. In this kind of bias, there is a tendency for respondents to choose the more favourable answer. Thus, when the researcher asked about whether they have implemented project risk management (which is a good method for ensuring the success of CPHRP), they tend to say 'yes' rather than 'no'. Accordingly, the researcher assumes that the findings from the interviews were more accurate, that is the implementation of project risk management in CPHRP was rare.

The next three sub-sections analyse the advantages, risks and CSFs for each of the case study locations, starting from Aceh, Yogyakarta, and finally to West Sumatra.

5.8.3 Case study 1: Aceh reconstruction

This section analyses the results of the questionnaire survey from the implementation of CPHRP in Aceh reconstruction. It consists of details of how respondents perceived the advantages, the probability and impact of events, and the critical success factor of CPHRP.

5.8.3.1 Advantages

The significance of advantages of CPHRP in Aceh reconstruction is shown in Table 5.10. The low standard deviation suggests that there is not much variability between the sample and the population mean, and the results of the *t*-test also indicate that all advantages are statistically significant as the significant value is very high (0.00).

The analysis reveals that there are eight advantages that can be categorized as very significant in Aceh reconstruction as their mean value is higher than or equal to four. The most significant advantage of CPHRP perceived by respondents is 'creating sense of ownership' at a mean value of 4.64, followed by 'build beneficiaries' confidence' at a mean value of 4.24. It can be seen that there is a wide mean value gap between the first two significant advantages. It suggests that creating a sense of ownership for the beneficiaries is the most significant advantage of CPHRP. The third advantage is that houses produced by the implementation of CPHRP are appropriate to the local culture of the Acehnese. In fact, the second and third advantages have the same mean value, but the latter has a higher standard deviation.

Table 5.10 Advantages of CPHRP in Aceh reconstruction.

Rank	Advantages	Mean	Std. Dev.	Test Value = 0			
				t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
1	Create sense of ownership	4.6400	0.5686	40.8000	0.0000	4.4053	4.8747
2	Build beneficiaries' confidence	4.2400	0.6633	31.9600	0.0000	3.9662	4.5138
3	Fit to local culture/customs/wisdom	4.2400	0.8794	24.1080	0.0000	3.8770	4.6030
4	Minimize corruption	4.1600	1.1790	17.6420	0.0000	3.6733	4.6467
5	Create jobs for beneficiaries' so they can get income	4.0800	1.0770	18.9410	0.0000	3.6354	4.5246
6	Meet beneficiaries needs and expectations	4.0000	0.9574	20.8890	0.0000	3.6048	4.3952
7	Involve vulnerable group	4.0000	1.0408	19.2150	0.0000	3.5704	4.4296
8	High accountability	4.0000	1.0408	19.2150	0.0000	3.5704	4.4296
9	Create pride among beneficiaries	3.9600	0.7349	26.9440	0.0000	3.6567	4.2633
10	It is well accepted	3.8400	0.9866	19.4610	0.0000	3.4328	4.2472
11	Rebuild community networking	3.8000	0.9574	19.8450	0.0000	3.4048	4.1952
12	Strengthen community organisation/institution	3.8000	0.9574	19.8450	0.0000	3.4048	4.1952
13	Better quality	3.6800	1.2819	14.3530	0.0000	3.1508	4.2092
14	Re-establish trust between community	3.6400	1.0360	17.5670	0.0000	3.2124	4.0676
15	High satisfaction	3.6400	0.9074	20.0580	0.0000	3.2655	4.0145
16	Rebuild norms in community	3.5200	1.0050	17.5130	0.0000	3.1052	3.9348
17	Ease beneficiaries' trauma	3.4800	1.2623	13.7850	0.0000	2.9590	4.0010
18	More funding goes to community	3.3200	1.3760	12.0640	0.0000	2.7520	3.8880
19	Implementer can get good impressions	3.3200	1.2490	13.2910	0.0000	2.8044	3.8356
20	Cheaper reconstruction	3.0800	1.3204	11.6640	0.0000	2.5350	3.6250
21	Fewer problems	3.0800	1.3204	11.6640	0.0000	2.5350	3.6250
22	Faster reconstruction	2.7200	1.2083	11.2550	0.0000	2.2212	3.2188

Other highly significant benefits of the implementation of CPHRP in Aceh are that it can reduce corruption by delivering a project with high accountability. Respondents see this advantage as significant possibly because corruption is a highly sensitive issue in post-disaster reconstruction. By fighting corruption during the CPHRP, the implementer can gain trust from beneficiaries while reducing conflict between them.

From an economic aspect, CPHRP can deliver economic benefit for beneficiaries. The tsunami has taken many sources of income away from the Acehnese, for example, farmers have lost their productive agricultural land, and fishermen no longer have their boats. Thus, with the implementation of CPHRP they can find a new source of income. The community can participate as labourers in their own project or they can sell materials for housing reconstruction.

The active participation of the community together with a certainty of involvement of vulnerable groups, such as woman, orphans, and disabled people, has also meant that housing built using CPHRP can meet beneficiaries' needs and expectations.

However, two of the traditional objectives of a construction project, cheaper and faster reconstruction, have been considered less significant than other advantages. These two factor lie in the bottom three of the advantages of CPHRP in Aceh reconstruction.

5.8.3.2 Risks probability and impact

This section presents the probability of events to happen, and their impact on time, cost, quality, and satisfaction based on the experience of respondents in Aceh reconstruction. Two events, transportation or access problems to the disaster-affected community, and the increase of material prices, are seen by respondents as the most likely events to take place during housing reconstruction. The mean probability values of these events are 0.7080 and 0.7320 respectively. Moreover, the majority of the probability of other events happening is classified as moderate, as 82% of events have the probability value more than 0.5.

The number of events that have a high impact (mean value ≥ 0.4) on time, cost, and quality are eight, five, and one respectively. No events perceived by respondents have a high impact on satisfaction, but all events were categorised as moderate. The highest impact on time took place where there is problem with transportation access. This finding is not a surprise since the tsunami in Aceh destroyed 2,618 km of road and 119 of bridges, so, respondents perceived that this event had significant negative impact on the time taken to complete CPHRP. Whilst the high material cost inevitably has a high impact on the cost of the project, its impact value is 0.490, and respondents perceived this event as the highest impact event on time completion. Limited labour knowledge on how to construct earthquake resistant houses was perceived by respondents as the highest impact event to affect the quality of the house. Details of events probability and their impact on project objectives can be found in Table 5.11.

Table 5.11 Risk probability and impact in Aceh reconstruction

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**					
1	Lack of central government capacity	0.5880	0.3240	0.2640	0.2140	0.2620
2	Lack of local government capacity	0.6440	0.3600	0.2540	0.2240	0.2900
3	Unclear reconstruction policy	0.5080	0.3260	0.3020	0.2480	0.3000
4	Lack of implementers/NGOs reconstruction knowledge	0.5080	0.3500	0.3240	0.2860	0.2700
5	Lack of implementers/NGOs community based knowledge	0.4920	0.3500	0.3200	0.2560	0.2700
6	Failure to manage stakeholders	0.5400	0.3720	0.3240	0.2860	0.2960
7	Problems of communication and coordination	0.6520	0.3840	0.3320	0.2780	0.3140
8	Unclear roles and responsibilities of stakeholders	0.5960	0.3300	0.3020	0.2560	0.2640
9	Inappropriate reconstruction organisations	0.5560	0.3260	0.3360	0.2940	0.3100
10	Lack of government support	0.5400	0.2940	0.2660	0.2400	0.2240
11	Insufficient funding	0.5240	0.2960	0.2660	0.2400	0.2440
12	Tight schedule	0.6040	0.3320	0.3280	0.3240	0.3340
B	**FACILITATORS RECRUITMENT AND TRAINING**					
1	Shortage of facilitators	0.5320	0.3120	0.2560	0.2680	0.2560
2	Lack of facilitators' knowledge and experience	0.5960	0.3420	0.3020	0.3540	0.3300
3	Lack of trainers' knowledge and experience	0.5080	0.2640	0.2580	0.2660	0.2420
4	Insufficient training materials and unclear outcomes	0.4360	0.2280	0.1840	0.2380	0.2380
5	Tight schedule	0.5960	0.2800	0.2580	0.2680	0.2640
C	**HOUSING DAMAGE ASSESSMENT**					
1	Lack of housing database	0.6520	0.4280	0.3480	0.3180	0.3220
2	Too many parties involved	0.6120	0.3760	0.3900	0.2840	0.2760
3	Non-uniform assessment method	0.5960	0.3040	0.2900	0.2800	0.3120
4	Coordination problems	0.6360	0.3840	0.2780	0.2760	0.3200
5	Insufficient numbers of surveyors/facilitators	0.5640	0.3180	0.2680	0.2800	0.2600
6	Inexperienced surveyors/facilitators	0.5480	0.3180	0.2760	0.3240	0.3000
7	Transportation/access problems	0.7080	0.5360	0.4900	0.2880	0.3120
8	Collusion in defining damage category	0.5880	0.3520	0.2960	0.3040	0.3460
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**					
1	Lack of beneficiaries databases	0.6680	0.4560	0.3440	0.2380	0.3280
2	Insufficient numbers of surveyors/facilitators	0.5480	0.3340	0.2380	0.2220	0.2420
3	Inexperienced surveyors/facilitators	0.5880	0.3500	0.2860	0.2880	0.3240
4	Transportation/access problems	0.6600	0.4620	0.4640	0.2760	0.3000

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
5	Collusion in deciding beneficiaries’	0.6040	0.3580	0.3320	0.2660	0.3300
6	Problems with land tenure/rights	0.6840	0.4760	0.3740	0.2540	0.3200
7	Validation problems	0.6440	0.4060	0.3380	0.2640	0.2960
E	**PROGRAMME SOCIALISATION**					
1	Shortage of facilitators	0.5320	0.3140	0.2520	0.2440	0.2560
2	Inexperienced facilitators	0.5560	0.3140	0.2360	0.2760	0.2880
3	Lack of local government support	0.5080	0.2500	0.2060	0.1960	0.2320
4	Competition between donors/implementers/NGOs	0.5480	0.2420	0.2340	0.2620	0.2440
5	Community resistance	0.5320	0.3260	0.2980	0.2680	0.2740
6	Failures in community meetings	0.5080	0.2940	0.2740	0.2400	0.2620
7	Tight schedule	0.5880	0.3220	0.3140	0.2880	0.3160
F	**FORMING COMMUNITY ORGANISATION**					
1	Inexperienced facilitators	0.5000	0.2840	0.2120	0.2560	0.2760
2	Failure to establish community organisations	0.4600	0.3240	0.2600	0.2480	0.3160
3	Community resistance	0.4840	0.2740	0.2260	0.2740	0.3060
4	Community leader too dominant	0.5640	0.2880	0.2660	0.2600	0.2680
5	Community is manipulated by other parties	0.5560	0.3180	0.2640	0.2640	0.3060
6	Disagreement on community contract/consensus	0.4760	0.3260	0.2600	0.2500	0.2800
7	Tight schedule	0.5400	0.2700	0.2620	0.2600	0.2800
G	**Community/Labour Training**					
1	Facilitators shortages	0.5480	0.3500	0.3060	0.2920	0.2920
2	Inexperienced facilitator	0.4920	0.3220	0.2900	0.2960	0.3000
3	Labour shortages	0.6440	0.4820	0.4620	0.3280	0.3480
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.6760	0.4540	0.4220	0.4220	0.3620
5	Insufficient training materials and unclear outcomes	0.4840	0.2760	0.2340	0.2780	0.2780
H	**Housing Design AND MATERIALS**					
1	Inexperienced facilitators	0.4680	0.2860	0.2620	0.2820	0.2560
2	Lack of facilitators’ technical knowledge	0.4840	0.2560	0.2140	0.3000	0.2540
3	Unclear building code	0.5000	0.2760	0.2580	0.2740	0.2600
4	Too many variations put forward by the community	0.5640	0.3420	0.3160	0.2860	0.2840
5	Too many cultural considerations	0.5000	0.3080	0.2900	0.2520	0.2580
6	Unconfirmed source/type of materials	0.5080	0.3380	0.3540	0.2560	0.2760
7	Material price increases	0.7320	0.3920	0.4940	0.3060	0.3040
8	Tight schedule	0.5640	0.3060	0.3200	0.2860	0.2800
9	Limited budget	0.5240	0.2480	0.2600	0.2460	0.2560
10	Too much paperwork prior to initial payment at start of construction work	0.5720	0.3460	0.2180	0.2180	0.2560

5.8.3.3 Probability impact factor

The probability impact factor of Aceh reconstruction is presented in Table 5.12. It shows that the highest risk events affecting time completion are transportation problems during housing damage assessment. The risk value stands at 0.4096. For project cost, the highest risk event is the increase of material price. Furthermore, limited labour knowledge about earthquake resistant housing scored as the highest risk on quality and beneficiaries' satisfaction.

Further analysis on the number of events and their impact on project objectives reveals that time completion is the most affected by risk events, should they occur. The number of high-risk events that affect time completion is 31 events, about 50% of identified events during the pre-construction of CPHRP. This is followed by beneficiaries' satisfaction at 19 events, and project cost at 17 events. The least affected is project quality at only seven events. This finding is in line with the risk management theory that in the pre-construction stage, risk affects more on project time completion.

Table 5.12 Risk probability-impact factor in Aceh reconstruction

No	Risk	Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**				
1	Lack of central government capacity	0.2032	0.1548	0.1318	0.1630
2	Lack of local government capacity	0.2472	0.1714	0.1608	0.2058
3	Unclear reconstruction policy	0.1926	0.1758	0.1412	0.1744
4	Lack of implementers/NGOs reconstruction knowledge	0.2142	0.1976	0.1778	0.1698
5	Lack of implementers/NGOs community based knowledge	0.2094	0.1940	0.1612	0.1690
6	Failure to manage stakeholders	0.2236	0.1900	0.1818	0.1856
7	Problems of communication and coordination	0.2656	0.2364	0.1958	0.2218
8	Unclear roles and responsibilities of stakeholders	0.2054	0.1874	0.1608	0.1664
9	Inappropriate reconstruction organisations	0.2030	0.2152	0.1826	0.1906
10	Lack of government support	0.1794	0.1590	0.1508	0.1412
11	Insufficient funding	0.1900	0.1646	0.1528	0.1516
12	Tight schedule	0.2192	0.2192	0.2188	0.2274
B	**FACILITATORS RECRUITMENT AND TRAINING**				
1	Shortage of facilitators	0.1872	0.1480	0.1656	0.1572
2	Lack of facilitators' knowledge and experience	0.2122	0.1826	0.2230	0.2134
3	Lack of trainers' knowledge and experience	0.1512	0.1450	0.1470	0.1366
4	Insufficient training materials and unclear outcomes	0.1124	0.0848	0.1242	0.1266
5	Tight schedule	0.1812	0.1730	0.1804	0.1784

No	Risk	Time	Cost	Quality	Satisfac-tion
C	**HOUSING DAMAGE ASSESSMENT**				
1	Lack of housing database	0.2980	0.2436	0.2230	0.2258
2	Too many parties involved	0.2480	0.2542	0.1924	0.1860
3	Non-uniform assessment method	0.1944	0.1906	0.1864	0.2056
4	Coordination problems	0.2576	0.1858	0.1928	0.2204
5	Insufficient numbers of surveyors/facilitators	0.2042	0.1724	0.1788	0.1728
6	Inexperienced surveyors/facilitators	0.1930	0.1684	0.1996	0.1892
7	Transportation/access problems	0.4096	0.3774	0.2196	0.2348
8	Collusion in defining damage category	0.2304	0.1936	0.1976	0.2210
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**				
1	Lack of beneficiaries databases	0.3288	0.2360	0.1698	0.2316
2	Insufficient numbers of surveyors/facilitators	0.2090	0.1418	0.1394	0.1494
3	Inexperienced surveyors/facilitators	0.2202	0.1750	0.1848	0.2052
4	Transportation/access problems	0.3426	0.3440	0.1936	0.2120
5	Collusion in deciding beneficiaries’	0.2490	0.2316	0.1822	0.2206
6	Problems with land tenure/rights	0.3668	0.2898	0.1874	0.2352
7	Validation problems	0.2906	0.2358	0.1848	0.2048
E	**PROGRAMME SOCIALISATION**				
1	Shortage of facilitators	0.1902	0.1548	0.1512	0.1572
2	Inexperienced facilitators	0.1874	0.1376	0.1648	0.1732
3	Lack of local government support	0.1506	0.1154	0.1164	0.1372
4	Competition between donors/implementers/NGOs	0.1570	0.1426	0.1714	0.1572
5	Community resistance	0.1882	0.1726	0.1640	0.1714
6	Failures in community meetings	0.1818	0.1674	0.1452	0.1590
7	Tight schedule	0.2138	0.2202	0.1940	0.2112
F	**FORMING COMMUNITY ORGANISATION**				
1	Inexperienced facilitators	0.1556	0.1124	0.1384	0.1516
2	Failure to establish community organisations	0.1676	0.1308	0.1392	0.1620
3	Community resistance	0.1566	0.1226	0.1534	0.1694
4	Community leader too dominant	0.1832	0.1602	0.1676	0.1716
5	Community is manipulated by other parties	0.1978	0.1632	0.1604	0.1842
6	Disagreement on community contract/consensus	0.1862	0.1468	0.1434	0.1616
7	Tight schedule	0.1618	0.1690	0.1580	0.1712
G	**Community/Labour Training**				
1	Facilitators shortages	0.2074	0.1782	0.1664	0.1664
2	Inexperienced facilitator	0.1702	0.1526	0.1576	0.1604
3	Labour shortages	0.3314	0.3110	0.2244	0.2312
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.3250	0.3026	0.2954	0.2478
5	Insufficient training materials and unclear outcomes	0.1496	0.1266	0.1534	0.1518
H	**Housing Design AND MATERIALS**				
1	Inexperienced facilitators	0.1506	0.1290	0.1486	0.1404
2	Lack of facilitators’ technical knowledge	0.1400	0.1074	0.1588	0.1402
3	Unclear building code	0.1516	0.1446	0.1558	0.1456

No	Risk	Time	Cost	Quality	Satisfac-tion
4	Too many variations put forward by the community	0.2114	0.1956	0.1758	0.1784
5	Too many cultural considerations	0.1800	0.1714	0.1476	0.1542
6	Unconfirmed source/type of materials	0.1986	0.2034	0.1448	0.1620
7	Material price increases	0.2976	0.3874	0.2334	0.2308
8	Tight schedule	0.2046	0.2228	0.1886	0.1904
9	Limited budget	0.1492	0.1640	0.1466	0.1456
10	Too much paperwork prior to initial payment at start of construction work	0.2238	0.1286	0.1366	0.1552

5.8.3.4 Critical success factors

The questionnaire survey reveals that 17 factors can be classified as CSFs in Aceh reconstruction (see Table 5.13). The highest mean value of CSFs is scored by two factors, ‘appropriate reconstruction strategy’ and ‘implementer capacity’ at 4.48. However, because appropriate reconstruction has a lower standard deviation than implementer capacity, the first was selected as the most important factor in the success of Aceh reconstruction. It indicates that the strategy adopted by BRR in housing reconstruction contributed greatly to the success of housing reconstruction in Aceh. The most significant policy made by BRR is adopting the community-based approach as a general strategy for reconstruction. This has allowed many NGOs to implement a community-based approach for housing reconstruction in their programme. The strategy implemented also indicates good project organisation and reflects on how well coordination and communication were managed.

Inevitably, implementer capacity positively contributed to the success of CPHRP. Without adequate capacity in implementing the community-based approach, the application of a true community-based approach will be hard to achieve. It relates to the understanding of what the community-based approach actually is. This is because a form of community participation in lowest level such as ‘manipulate’ or ‘inform’ can be easily labelled as community-based. In other words, the implementer should know that collaboration is the lowest level of community participation in order that a programme can be referred to as having a community-based approach. The facilitator, who is part of the implementer staff, should also have an adequate capacity.

Table 5.13 CSFs in Aceh reconstruction

Rank	Selected Success Factors	Mean	Std. Dev.	Test Value = 0			
				t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
1	Appropriate reconstruction policy/strategy	4.4800	0.5860	38.2290	0.0000	4.2381	4.7219
2	Implementer capacity	4.4800	0.6532	34.2930	0.0000	4.2104	4.7496
3	Transparency and accountability	4.4400	0.7681	28.9020	0.0000	4.1229	4.7571
4	Sufficient funding availability	4.4000	0.7638	28.8050	0.0000	4.0847	4.7153
5	Understanding on community based method	4.3600	0.7000	31.1430	0.0000	4.0711	4.6489
6	Gathering trust from community	4.3600	0.7572	28.7910	0.0000	4.0474	4.6726
7	Good coordination and communication	4.3600	0.8602	25.3420	0.0000	4.0049	4.7151
8	Facilitator capacity	4.3600	0.8602	25.3420	0.0000	4.0049	4.7151
9	Good written contract between community and implementer	4.2000	0.9129	23.0040	0.0000	3.8232	4.5768
10	Significant level of community participation/control	4.2000	0.9574	21.9340	0.0000	3.8048	4.5952
11	Minimising bureaucracy	4.1200	0.9274	22.2140	0.0000	3.7372	4.5028
12	Appropriate project organisation	4.0800	0.7594	26.8640	0.0000	3.7665	4.3935
13	Successful beneficiaries identification	4.0800	0.9092	22.4370	0.0000	3.7047	4.4553
14	Successful land tenure identification	4.0800	0.9092	22.4370	0.0000	3.7047	4.4553
15	Materials availability	4.0400	0.8406	24.0290	0.0000	3.6930	4.3870
16	Successful community training	4.0000	0.8165	24.4950	0.0000	3.6630	4.3370
17	Involvement of all community members	4.0000	0.9574	20.8890	0.0000	3.6048	4.3952
18	Success on forming community organisation	3.9200	0.8622	22.7330	0.0000	3.5641	4.2759
19	Conducive social environment	3.9200	0.8622	22.7330	0.0000	3.5641	4.2759
20	Access to affected community	3.8800	0.9713	19.9740	0.0000	3.4791	4.2809
21	Sufficient numbers of facilitators	3.8000	0.8660	21.9390	0.0000	3.4425	4.1575
22	Conducive physical environment	3.7600	0.8794	21.3780	0.0000	3.3970	4.1230
23	Government support	3.7600	0.9695	19.3910	0.0000	3.3598	4.1602
24	Project duration	3.6800	0.9000	20.4440	0.0000	3.3085	4.0515
25	Successful damage assessment	3.6400	0.9522	19.1140	0.0000	3.2470	4.0330
26	Having a pre-reconstruction plan (scenario based) before disaster	3.6400	0.9950	18.2920	0.0000	3.2293	4.0507
27	Conducive political environment	3.5600	1.0832	16.4330	0.0000	3.1129	4.0071
28	Project location	3.4800	0.9626	18.0750	0.0000	3.0826	3.8774
29	Project size	3.4400	0.9165	18.7670	0.0000	3.0617	3.8183
30	Conducive economical environment	3.4400	1.0033	17.1430	0.0000	3.0258	3.8542
31	Government capacity	3.4000	1.0408	16.3330	0.0000	2.9704	3.8296
32	Design flexibility	3.2400	0.9695	16.7090	0.0000	2.8398	3.6402

Transparency and accountability are highly necessary in post-disaster reconstruction, particularly for programmes that directly involve the community, such as CPHRP. The community want to know everything that is offered to them, not only in terms of funding, but also the objectives of the programme, the origin of the organisations, their donor, among other aspects. With this knowledge, the community can give their trust that is highly necessary in CPHRP. Further, sufficient funding availability also makes a significant contribution to Aceh reconstruction. In Aceh, many NGOs can adjust their budget in response to inflation and the increase of material prices. Therefore, they still can afford to provide full housing to the beneficiaries.

High levels of community participation are also perceived by respondents as CSFs in the implementation of CPHRP in Aceh. Project activities that related to the community such as successful beneficiaries identification, successful community training, and successful land tenure identification are also CSFs in Aceh. Particularly the latter, which was a specific activity associated with Aceh reconstruction. Many land markings in Aceh were swept away by the tsunami, thus the success in identifying the land tenure contributed to the success of CPHRP.

The above section discusses the results of questionnaire survey in case study 1. Eight significant advantages, several high-risk events that mainly affect project time completion and seventeen CSFs have been revealed in Aceh reconstruction. The next section discusses the results of the questionnaire survey from case study 2.

5.8.4 Case study 2: Yogyakarta reconstruction

5.8.4.1 Advantages

Table 5.14 shows the significant level of CPHRP's advantages in Yogyakarta reconstruction. It was found that the highest significant advantage of the implementation of CPHRP is 'create sense of ownership'. The same result is found in Aceh reconstruction although the mean value is lower. Other highly significant advantages are re-established trust between community, minimised corruption, increased beneficiaries' confidence, and strengthened community organisation.

Table 5.14 Advantages of CPHRP in Yogyakarta reconstruction

Rank	Advantages	Mean	Std. Dev.	Test Value = 0			
				t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
1	Create sense of ownership	4.1500	0.7452	24.9070	0.0000	3.8013	4.4987
2	Re-establish trust between community	4.1000	0.7182	25.5310	0.0000	3.7639	4.4361
3	Minimize corruption	4.0500	0.7592	23.8580	0.0000	3.6947	4.4053
4	Build beneficiaries' confidence	4.0000	0.7255	24.6580	0.0000	3.6605	4.3395
5	Strengthen community organisation/institution	4.0000	0.5620	31.8330	0.0000	3.7370	4.2630
6	Fit to local culture/customs/wisdom	3.9000	0.7881	22.1320	0.0000	3.5312	4.2688
7	Involve vulnerable group	3.9000	0.8522	20.4650	0.0000	3.5011	4.2989
8	Ease beneficiaries' trauma	3.8500	0.8751	19.6750	0.0000	3.4404	4.2596
9	Rebuild community networking	3.8500	0.6708	25.6670	0.0000	3.5360	4.1640
10	Rebuild norms in community	3.7500	0.9666	17.3510	0.0000	3.2976	4.2024
11	Meet beneficiaries needs and expectations	3.7500	0.7864	21.3260	0.0000	3.3820	4.1180
12	High accountability	3.7500	0.7164	23.4110	0.0000	3.4147	4.0853
13	Better quality	3.7000	1.0809	15.3080	0.0000	3.1941	4.2059
14	Create pride among beneficiaries	3.6500	1.1367	14.3600	0.0000	3.1180	4.1820
15	It is well accepted	3.6500	0.6708	24.3330	0.0000	3.3360	3.9640
16	Create jobs for beneficiaries' so they can get income	3.6000	0.9403	17.1210	0.0000	3.1599	4.0401
17	High satisfaction	3.6000	1.0955	14.6970	0.0000	3.0873	4.1127
18	More funding goes to community	3.5500	0.9987	15.8970	0.0000	3.0826	4.0174
19	Faster reconstruction	3.1500	1.1821	11.9170	0.0000	2.5968	3.7032
20	Cheaper reconstruction	3.0500	1.2763	10.6870	0.0000	2.4527	3.6473
21	Fewer problems	2.8500	0.9881	12.8990	0.0000	2.3876	3.3124
22	Implementer can get good impressions	2.8500	1.1821	10.7820	0.0000	2.2968	3.4032

There is an interesting finding in Yogyakarta's case; respondents perceive that there is a significant advantage in rebuilding the social capital of the community. It indicates two elements of social capital, which are 're-establish trust between community' and 'strengthen community organisation'. Disaster has a significant impact on the social fabric of the community, and suspicion between communities or between other people from outside the community is one clear indicator of that. The community tends not to care about their surroundings and only think about themselves. CPHRP can pave the way back to a normal situation. In CPHRP, the community is urged to plan together, work together, and share the burden. This activity can rebuild the social capital of community. Another significant advantage of CPHRP is that it can minimise corruption.

5.8.4.2 Risks probability and impact

Table 5.15 shows the probability of risks and their impact on project objectives in Yogyakarta reconstruction. The highest probability of events that might happen is the problem of the validation of beneficiaries, at the rate of 64.79%. It is followed by the problem of coordination during housing damage assessment (64.68%), and insufficient funding and tight schedule at the same value (63.57%). The lowest probability value of events is 0.4183 on disagreement over community contracts. Moreover, although there is no event that can be categorised as high probability, three quarter of events can be classified as moderate.

There is no single event perceived by respondents as having a high impact on project objectives. The majority of impacts caused by negative events are at moderate level, dominated by the impact on time and beneficiaries' satisfaction (58 events each). The highest impact events that can affect time completion are transportation problems in housing damage assessment, whilst satisfaction is mostly affected by problems in communication and coordination at the initiation stage.

Table 5.15 Risk probability and impact in Yogyakarta reconstruction

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**					
1	Lack of central government capacity	0.4830	0.3025	0.1875	0.1700	0.2600
2	Lack of local government capacity	0.5146	0.3650	0.2125	0.2275	0.2875
3	Unclear reconstruction policy	0.5827	0.3550	0.2575	0.2350	0.3400
4	Lack of implementers/NGOs reconstruction knowledge	0.4498	0.3075	0.2600	0.2525	0.2525
5	Lack of implementers/NGOs community based knowledge	0.4908	0.3075	0.2825	0.2775	0.2875
6	Failure to manage stakeholders	0.5625	0.3150	0.2475	0.2675	0.3000
7	Problems of communication and coordination	0.5454	0.3625	0.2925	0.3025	0.3575
8	Unclear roles and responsibilities of stakeholders	0.5027	0.2550	0.2375	0.2400	0.2675
9	Inappropriate reconstruction organisations	0.5313	0.2975	0.2675	0.3100	0.3200
10	Lack of government support	0.5214	0.2525	0.2325	0.2200	0.2525
11	Insufficient funding	0.6357	0.3250	0.2875	0.3025	0.3000

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
12	Tight schedule	0.6357	0.2625	0.2375	0.2650	0.2600
B	**FACILITATORS RECRUITMENT AND TRAINING**					
1	Shortage of facilitators	0.5633	0.2900	0.2150	0.2550	0.2525
2	Lack of facilitators' knowledge and experience	0.5643	0.3325	0.2575	0.2650	0.3150
3	Lack of trainers' knowledge and experience	0.4802	0.2875	0.2700	0.2600	0.2700
4	Insufficient training materials and unclear outcomes	0.5287	0.2450	0.2075	0.2500	0.2375
5	Tight schedule	0.6157	0.2575	0.2225	0.2550	0.2450
C	**HOUSING DAMAGE ASSESSMENT**					
1	Lack of housing database	0.5870	0.3275	0.2675	0.2125	0.2875
2	Too many parties involved	0.6163	0.2950	0.2375	0.2325	0.2525
3	Non-uniform assessment method	0.5948	0.3225	0.2550	0.2775	0.2850
4	Coordination problems	0.6468	0.3175	0.2500	0.2775	0.3075
5	Insufficient numbers of surveyors/facilitators	0.5124	0.3000	0.1875	0.2150	0.2300
6	Inexperienced surveyors/facilitators	0.5937	0.3175	0.2350	0.2775	0.2625
7	Transportation/access problems	0.5670	0.3650	0.3625	0.2325	0.2550
8	Collusion in defining damage category	0.5440	0.3125	0.2300	0.2475	0.2775
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**					
1	Lack of beneficiaries databases	0.6083	0.3575	0.2675	0.2625	0.2925
2	Insufficient numbers of surveyors/facilitators	0.5224	0.3000	0.2025	0.1975	0.2450
3	Inexperienced surveyors/facilitators	0.5546	0.3000	0.1975	0.2375	0.2500
4	Transportation/access problems	0.5459	0.3400	0.3225	0.2000	0.2200
5	Collusion in deciding beneficiaries'	0.5748	0.3275	0.2700	0.2500	0.3025
6	Problems with land tenure/rights	0.5870	0.3125	0.2625	0.1975	0.2675
7	Validation problems	0.6479	0.3500	0.2425	0.2025	0.2600
E	**PROGRAMME SOCIALISATION**					
1	Shortage of facilitators	0.5116	0.2900	0.1925	0.1900	0.2425
2	Inexperienced facilitators	0.5535	0.2675	0.2050	0.2325	0.2625
3	Lack of local government support	0.5208	0.2625	0.2125	0.2050	0.2650
4	Competition between donors/implementers/NGOs	0.6235	0.2775	0.2300	0.2675	0.2325
5	Community resistance	0.5110	0.3300	0.2400	0.2175	0.3050
6	Failures in community meetings	0.5211	0.3425	0.2575	0.2350	0.2975
7	Tight schedule	0.5544	0.2925	0.2425	0.2750	0.2925
F	**FORMING COMMUNITY ORGANISATION**					
1	Inexperienced facilitators	0.5322	0.3200	0.1975	0.2350	0.2700
2	Failure to establish community organisations	0.4287	0.2600	0.2275	0.2200	0.2900
3	Community resistance	0.4700	0.3325	0.2450	0.2325	0.2875
4	Community leader too dominant	0.5635	0.2650	0.1550	0.1925	0.2300
5	Community is manipulated by other parties	0.4717	0.2325	0.2100	0.2000	0.2925
6	Disagreement on community contract/consensus	0.4183	0.3200	0.2375	0.1950	0.3100
7	Tight schedule	0.5530	0.2125	0.1850	0.2025	0.2175
G	**Community/Labour Training**					
1	Facilitators shortages	0.4716	0.1925	0.1800	0.1950	0.1950
2	Inexperienced facilitator	0.5216	0.2525	0.1900	0.2325	0.2450

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
3	Labour shortages	0.4843	0.2400	0.2550	0.2175	0.2200
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.5575	0.2250	0.2050	0.2350	0.2500
5	Insufficient training materials and unclear outcomes	0.4495	0.1950	0.1650	0.1875	0.1900
H	**Housing Design AND MATERIALS**					
1	Inexperienced facilitators	0.4395	0.2025	0.1875	0.2050	0.2225
2	Lack of facilitators' technical knowledge	0.4703	0.2025	0.1925	0.2375	0.2425
3	Unclear building code	0.5102	0.2475	0.2325	0.2975	0.2775
4	Too many variations put forward by the community	0.5124	0.2400	0.1950	0.2225	0.2200
5	Too many cultural considerations	0.4894	0.2700	0.2000	0.2225	0.2400
6	Unconfirmed source/type of materials	0.4495	0.2100	0.1975	0.2150	0.1875
7	Material price increases	0.6195	0.2925	0.3275	0.2400	0.2575
8	Tight schedule	0.5530	0.1925	0.1675	0.1925	0.2050
9	Limited budget	0.5852	0.2400	0.2250	0.2175	0.2775
10	Too much paperwork prior to initial payment at start of construction work	0.5855	0.3275	0.2125	0.2050	0.3175

5.8.4.3 Probability impact factor

Table 5.16 presents the risk of events on project objectives. It can be seen that 17 risks can be categorised as high-risk. The most affected project objective is the time completion of the project, where seventeen events might obstruct the pace of CPHRP. The high number of high-risk events affecting project time is highly significant compared to other objectives; where for satisfaction, cost and quality the number of high-risk events was only five, three, and one respectively.

Table 5.16 Risk probability-impact factor in Yogyakarta reconstruction

No	Risk	Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**				
1	Lack of central government capacity	0.1655	0.1004	0.0801	0.1252
2	Lack of local government capacity	0.1893	0.1107	0.1191	0.1516
3	Unclear reconstruction policy	0.2342	0.1683	0.1406	0.2231
4	Lack of implementers/NGOs reconstruction knowledge	0.1487	0.1169	0.1092	0.1102
5	Lack of implementers/NGOs community based knowledge	0.1604	0.1451	0.1416	0.1444
6	Failure to manage stakeholders	0.1860	0.1443	0.1598	0.1755
7	Problems of communication and coordination	0.2249	0.1823	0.1843	0.2074
8	Unclear roles and responsibilities of stakeholders	0.1351	0.1273	0.1290	0.1398
9	Inappropriate reconstruction organisations	0.1808	0.1613	0.1830	0.1900
10	Lack of government support	0.1523	0.1410	0.1393	0.1493

No	Risk	Time	Cost	Quality	Satisfac-tion
11	Insufficient funding	0.2396	0.2138	0.2249	0.2153
12	Tight schedule	0.1790	0.1658	0.1836	0.1781
B	**FACILITATORS RECRUITMENT AND TRAINING**				
1	Shortage of facilitators	0.1903	0.1377	0.1608	0.1616
2	Lack of facilitators' knowledge and experience	0.2180	0.1711	0.1712	0.1952
3	Lack of trainers' knowledge and experience	0.1683	0.1631	0.1481	0.1511
4	Insufficient training materials and unclear outcomes	0.1510	0.1290	0.1475	0.1412
5	Tight schedule	0.1735	0.1478	0.1676	0.1636
C	**HOUSING DAMAGE ASSESSMENT**				
1	Lack of housing database	0.2130	0.1726	0.1311	0.1820
2	Too many parties involved	0.2105	0.1670	0.1630	0.1668
3	Non-uniform assessment method	0.2202	0.1750	0.1907	0.1899
4	Coordination problems	0.2210	0.1754	0.1886	0.2080
5	Insufficient numbers of surveyors/facilitators	0.1755	0.1122	0.1285	0.1375
6	Inexperienced surveyors/facilitators	0.2147	0.1550	0.1840	0.1712
7	Transportation/access problems	0.2363	0.2400	0.1431	0.1613
8	Collusion in defining damage category	0.2008	0.1491	0.1485	0.1733
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**				
1	Lack of beneficiaries databases	0.2256	0.1669	0.1534	0.1911
2	Insufficient numbers of surveyors/facilitators	0.1770	0.1132	0.1072	0.1465
3	Inexperienced surveyors/facilitators	0.1798	0.1132	0.1397	0.1448
4	Transportation/access problems	0.2083	0.1961	0.1122	0.1243
5	Collusion in deciding beneficiaries'	0.2077	0.1754	0.1580	0.1912
6	Problems with land tenure/rights	0.1995	0.1665	0.1196	0.1660
7	Validation problems	0.2332	0.1663	0.1313	0.1657
E	**PROGRAMME SOCIALISATION**				
1	Shortage of facilitators	0.1671	0.1036	0.1028	0.1339
2	Inexperienced facilitators	0.1641	0.1217	0.1389	0.1546
3	Lack of local government support	0.1591	0.1251	0.1167	0.1578
4	Competition between donors/implementers/NGOs	0.1770	0.1498	0.1756	0.1446
5	Community resistance	0.1944	0.1452	0.1206	0.1729
6	Failures in community meetings	0.1861	0.1420	0.1247	0.1582
7	Tight schedule	0.1870	0.1571	0.1744	0.1830
F	**FORMING COMMUNITY ORGANISATION**				
1	Inexperienced facilitators	0.1889	0.1097	0.1349	0.1539
2	Failure to establish community organisations	0.1115	0.0930	0.0927	0.1245
3	Community resistance	0.1682	0.1130	0.1093	0.1398
4	Community leader too dominant	0.1629	0.0907	0.1119	0.1354
5	Community is manipulated by other parties	0.1259	0.1198	0.1078	0.1629
6	Disagreement on community contract/consensus	0.1496	0.1089	0.0832	0.1393
7	Tight schedule	0.1165	0.1021	0.1109	0.1190
G	**Community/Labour Training**				
1	Facilitators shortages	0.1019	0.1018	0.0963	0.0956
2	Inexperienced facilitator	0.1459	0.1058	0.1306	0.1376

No	Risk	Time	Cost	Quality	Satisfac-tion
3	Labour shortages	0.1307	0.1392	0.1155	0.1137
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.1345	0.1240	0.1370	0.1405
5	Insufficient training materials and unclear outcomes	0.0893	0.0764	0.0847	0.0878
H	**Housing Design AND MATERIALS**				
1	Inexperienced facilitators	0.0996	0.0911	0.1033	0.1126
2	Lack of facilitators’ technical knowledge	0.1048	0.1018	0.1264	0.1289
3	Unclear building code	0.1403	0.1308	0.1753	0.1623
4	Too many variations put forward by the community	0.1280	0.1030	0.1187	0.1095
5	Too many cultural considerations	0.1512	0.1054	0.1156	0.1202
6	Unconfirmed source/type of materials	0.0963	0.0902	0.0988	0.0892
7	Material price increases	0.2032	0.2276	0.1644	0.1706
8	Tight schedule	0.1079	0.0958	0.1158	0.1207
9	Limited budget	0.1495	0.1410	0.1363	0.1773
10	Too much paperwork prior to initial payment at start of construction work	0.2194	0.1368	0.1317	0.2004

Events that have a high risk on community satisfaction are mostly generated by the government: unclear reconstruction policy, coordination and communication problem during initiation stage and housing damage assessment, and bureaucratic process of funding of disbursement. The highest risk event perceived by respondents is unclear reconstruction policy. Thus, it becomes clear that a strong reconstruction policy has to be made by the government and it should be efficiently disseminated to all stakeholders in order avoid confusion in coordination. Another high-risk event that affects community satisfaction is insufficient funding availability. This might be due to the limited funding availability from the government budget, where the government only can afford to give Rp. 15 million grant for heavily damaged house per household. A long bureaucratic process exacerbated this, as the funding disbursement had to follow the procedure of the government budget.

Three high-risk events that might affect the cost of CHRP are insufficient funding, transportation problems, and the increase of material prices. The last two factors clearly have a direct impact on the cost escalation of CPHRP. However, insufficient funding might be due to another factor. For example, insufficient funding can limit community ability to buy good materials, thus they buy degradable materials or reduce the specification of an earthquake resistant house. As a result, the minimum quality is not achieved and it has to be amended, which incurs an extra cost..

As noted earlier, time is the objective most affected by high-risk events in the pre-construction stage of CPHRP. Eleven out of seventeen events originate during housing damage assessment and beneficiary identification. In housing damage assessment, the only event that is not classified as high-risk is an insufficient number of facilitators. This finding is not surprising but proves that in Yogyakarta and Central Java the facilitator availability is sufficient. It might be due to the existence of universities producing many civil engineers or architects in those areas. Almost the same result occurs in the beneficiaries' identification stage, an event that relates to facilitator availability and therefore is not a high-risk event.

Another interesting finding in Yogyakarta is the way in which respondents did not perceive labour shortages and labourers' limited knowledge on how to construct earthquake resistant houses as high-risk events. This indicates that in Yogyakarta and Central Java, labour stock is sufficient and they already have thecapacity to construct earthquake resistant houses.

5.8.4.4 Critical success factors

The statistical analysis on the implementation of CPHRP in Yogyakarta reconstruction reveals that 11 factors can be classified as CSFs, as their mean value is higher or equal to 4.00. The standard deviation on these factors also found to be low, as they are smaller than one. Moreover, the t-test also proves that the CSFs are statistically significant (see Table 5.17).

Table 5.17 CSFs in Yogyakarta reconstruction

Rank	Selected Success Factors	Mean	Std. Dev.	Test Value = 0			
				t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
1	Gathering trust from community	4.3500	0.5871	33.1330	0.0000	4.0752	4.6248
2	Transparency and accountability	4.3000	0.6570	29.2720	0.0000	3.9925	4.6075
3	Appropriate reconstruction policy/strategy	4.2500	0.5501	34.5500	0.0000	3.9925	4.5075
4	Understanding on community based method	4.2000	0.6156	30.5120	0.0000	3.9119	4.4881
5	Facilitator capacity	4.1500	0.5871	31.6100	0.0000	3.8752	4.4248
6	Significant level of community participation/control	4.1500	0.5871	31.6100	0.0000	3.8752	4.4248
7	Government support	4.1000	0.5525	33.1870	0.0000	3.8414	4.3586
8	Good coordination and communication	4.1000	0.6407	28.6170	0.0000	3.8001	4.3999
9	Appropriate project organisation	4.0000	0.7255	24.6580	0.0000	3.6605	4.3395
10	Involvement of all community members	4.0000	0.7255	24.6580	0.0000	3.6605	4.3395
11	Implementer capacity	4.0000	0.7947	22.5090	0.0000	3.6281	4.3719
12	Success on forming community organisation	3.9500	0.5104	34.6090	0.0000	3.7111	4.1889
13	Successful beneficiaries identification	3.9000	0.6407	27.2210	0.0000	3.6001	4.1999
14	Successful community training	3.8500	0.5871	29.3250	0.0000	3.5752	4.1248
15	Sufficient funding availability	3.7500	0.7864	21.3260	0.0000	3.3820	4.1180
16	Having a pre-reconstruction plan (scenario based) before disaster	3.7500	0.7864	21.3260	0.0000	3.3820	4.1180
17	Successful land tenure identification	3.7500	0.8507	19.7140	0.0000	3.3519	4.1481
18	Sufficient numbers of facilitators	3.7000	0.6570	25.1880	0.0000	3.3925	4.0075
19	Minimising bureaucracy	3.7000	0.6570	25.1880	0.0000	3.3925	4.0075
20	Conducive social environment	3.7000	0.8013	20.6500	0.0000	3.3250	4.0750
21	Government capacity	3.6500	0.7452	21.9060	0.0000	3.3013	3.9987
22	Materials availability	3.6500	0.7452	21.9060	0.0000	3.3013	3.9987
23	Successful damage assessment	3.5500	0.6048	26.2500	0.0000	3.2669	3.8331
24	Good written contract between community and implementer	3.5000	0.8885	17.6160	0.0000	3.0842	3.9158
25	Conducive political environment	3.5000	0.9459	16.5480	0.0000	3.0573	3.9427
26	Conducive physical environment	3.4500	0.6863	22.4800	0.0000	3.1288	3.7712
27	Conducive economical environment	3.4000	0.6806	22.3420	0.0000	3.0815	3.7185
28	Project duration	3.4000	0.7539	20.1680	0.0000	3.0471	3.7529
29	Access to affected community	3.3500	0.8127	18.4340	0.0000	2.9696	3.7304
30	Design flexibility	3.3500	0.8127	18.4340	0.0000	2.9696	3.7304
31	Project size	3.3000	0.9234	15.9830	0.0000	2.8678	3.7322
32	Project location	3.1000	0.7182	19.3040	0.0000	2.7639	3.4361

The highest CSFs perceived by respondents in Yogyakarta reconstruction are ‘gathering trust from community’, followed by ‘transparency and accountability’. The mean value of these two factors is 4.35 and 4.30 respectively. These two factors are closely related. As regards transparency and accountability, the community will trust organisations from outside the community. Suspicion from the community will automatically disappear. With the existence of trust, the community and the implementer of CPHRP can work together in housing reconstruction and lift the entire burden that might slow down the reconstruction process.

Appropriate reconstruction strategy, appropriate project organisation, good coordination and communication are factors that are also perceived by respondents as the CSFs in Yogyakarta reconstruction. This group of CSFs is in the control of the government. As a result, government support is immensely important. The government has to produce a strong and clear reconstruction policy and strategy. An adequate project organisation also has to be established with clear roles and responsibilities of stakeholders involved in CPHRP. These conditions can lead to effective coordination and communication.

The next CSF is related to the capacity of implementer and facilitator. A good understanding of the community-based approach is required, because it can affect the degree of community involvement and determine whether all community members participate in the reconstruction programme or not.

5.8.5 Case study 3: West Sumatra reconstruction

5.8.5.1 Advantages

As can be seen from Table 5.18, the only highly significant advantage perceived by respondents in West Sumatra reconstruction is ‘create sense of ownership’. This phenomenon implies that the implementation of CPHRP in West Sumatra might experience some problems, which may have hindered its distinct advantage. A sense of ownership also has been found to be the highest significant advantage of CPHRP in Aceh reconstruction and Yogyakarta.

Table 5.18 Advantages of CPHRP in West Sumatra reconstruction

Rank	Advantages	Mean	Std. Dev.	Test Value = 0			
				t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
1	Create sense of ownership	4.2000	0.7678	24.4640	0.0000	3.8407	4.5593
2	Fit to local culture/customs/wisdom	3.9000	0.9679	18.0200	0.0000	3.4470	4.3530
3	Build beneficiaries' confidence	3.8000	0.9515	17.8610	0.0000	3.3547	4.2453
4	Minimize corruption	3.8000	0.9515	17.8610	0.0000	3.3547	4.2453
5	More funding goes to community	3.8000	1.1517	14.7560	0.0000	3.2610	4.3390
6	Create jobs for beneficiaries' so they can get income	3.7500	1.0699	15.6740	0.0000	3.2493	4.2507
7	Re-establish trust between community	3.6000	0.7539	21.3540	0.0000	3.2471	3.9529
8	High accountability	3.6000	0.9403	17.1210	0.0000	3.1599	4.0401
9	Rebuild community networking	3.5500	0.7592	20.9130	0.0000	3.1947	3.9053
10	Meet beneficiaries needs and expectations	3.5500	0.9445	16.8090	0.0000	3.1080	3.9920
11	It is well accepted	3.5500	0.8870	17.8980	0.0000	3.1349	3.9651
12	Ease beneficiaries' trauma	3.5000	1.0513	14.8880	0.0000	3.0080	3.9920
13	Create pride among beneficiaries	3.5000	0.7609	20.5710	0.0000	3.1439	3.8561
14	Strengthen community organisation/institution	3.5000	0.6883	22.7430	0.0000	3.1779	3.8221
15	Better quality	3.4500	0.8256	18.6890	0.0000	3.0636	3.8364
16	Rebuild norms in community	3.3000	0.9234	15.9830	0.0000	2.8678	3.7322
17	Involve vulnerable group	3.3000	1.0809	13.6530	0.0000	2.7941	3.8059
18	High satisfaction	3.3000	0.8013	18.4170	0.0000	2.9250	3.6750
19	Faster reconstruction	3.1000	0.8522	16.2670	0.0000	2.7011	3.4989
20	Implementer can get good impressions	2.8500	1.0894	11.6990	0.0000	2.3401	3.3599
21	Cheaper reconstruction	2.7500	1.0196	12.0630	0.0000	2.2728	3.2272
22	Fewer problems	2.7500	0.9666	12.7240	0.0000	2.2976	3.2024

5.8.5.2 Risks probability and impact

Table 5.19 shows the probability of negative events and their impacts on construction objectives in West Sumatra reconstruction. The analysis of the questionnaire reveals that five events can be categorised as highly likely to take place in CPHRP. The most likely event to happen is limited funding in housing design. This event took place because the government can only give a small grant (Rp. 15 million for heavily damaged houses) to the community, the purpose of which is to stimulate the housing reconstruction process carried out by the community. This limited funding availability is actually the fifth highest probability event to happen. The second highest probability event is lack of beneficiaries' database, followed by rise of material price, and limited labour knowledge of earthquake resistant housing.

Table 5.19 Risk probability and impact in West Sumatra reconstruction

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**					
1	Lack of central government capacity	0.6030	0.2950	0.2700	0.2525	0.2700
2	Lack of local government capacity	0.6146	0.3400	0.2800	0.2825	0.3650
3	Unclear reconstruction policy	0.5727	0.3398	0.3225	0.3214	0.3746
4	Lack of implementers/NGOs reconstruction knowledge	0.5298	0.2825	0.3275	0.3125	0.4400
5	Lack of implementers/NGOs community based knowledge	0.5708	0.3025	0.3125	0.2925	0.3625
6	Failure to manage stakeholders	0.5525	0.2900	0.2775	0.2675	0.3000
7	Problems of communication and coordination	0.6454	0.3550	0.2875	0.2775	0.3100
8	Unclear roles and responsibilities of stakeholders	0.5527	0.2275	0.2600	0.2075	0.2600
9	Inappropriate reconstruction organisations	0.4813	0.2325	0.2325	0.2650	0.3100
10	Lack of government support	0.5214	0.2900	0.2925	0.2800	0.3325
11	Insufficient funding	0.7057	0.3775	0.3425	0.4075	0.4650
12	Tight schedule	0.6057	0.2650	0.2550	0.2425	0.2850
B	**FACILITATORS RECRUITMENT AND TRAINING**					
1	Shortage of facilitators	0.6133	0.2925	0.2953	0.2987	0.2984
2	Lack of facilitators' knowledge and experience	0.5943	0.2783	0.2562	0.3056	0.3059
3	Lack of trainers' knowledge and experience	0.5202	0.1848	0.2403	0.2581	0.2781
4	Insufficient training materials and unclear outcomes	0.4687	0.1809	0.1973	0.2193	0.2394
5	Tight schedule	0.6357	0.2786	0.2472	0.2834	0.2756
C	**HOUSING DAMAGE ASSESSMENT**					
1	Lack of housing database	0.6470	0.3769	0.3566	0.2866	0.3869
2	Too many parties involved	0.6463	0.3175	0.2975	0.2675	0.2900
3	Non-uniform assessment method	0.5948	0.3054	0.2813	0.2637	0.3305
4	Coordination problems	0.6268	0.3222	0.2886	0.2789	0.3157
5	Insufficient numbers of surveyors/facilitators	0.5624	0.2927	0.2570	0.2678	0.2753
6	Inexperienced surveyors/facilitators	0.5837	0.2905	0.2807	0.2954	0.3248
7	Transportation/access problems	0.6270	0.3630	0.3508	0.2638	0.2887
8	Collusion in defining damage category	0.6040	0.2663	0.3131	0.2521	0.4404
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**					
1	Lack of beneficiaries databases	0.7183	0.3700	0.3461	0.2652	0.4223
2	Insufficient numbers of surveyors/facilitators	0.5724	0.2702	0.2236	0.2309	0.2726
3	Inexperienced surveyors/facilitators	0.6346	0.2781	0.2600	0.2683	0.2997
4	Transportation/access problems	0.6359	0.3089	0.3086	0.2196	0.2632
5	Collusion in deciding beneficiaries'	0.6048	0.2559	0.2824	0.2757	0.3793
6	Problems with land tenure/rights	0.6270	0.3625	0.3150	0.2525	0.3225
7	Validation problems	0.6779	0.3844	0.3408	0.2752	0.3402

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
E	**PROGRAMME SOCIALISATION**					
1	Shortage of facilitators	0.5516	0.2595	0.2491	0.2464	0.2652
2	Inexperienced facilitators	0.6035	0.3048	0.3074	0.2883	0.3398
3	Lack of local government support	0.5208	0.2654	0.2663	0.2482	0.2854
4	Competition between donors/implementers/NGOs	0.5435	0.2223	0.2494	0.2073	0.2572
5	Community resistance	0.5110	0.2781	0.2889	0.2346	0.2869
6	Failures in community meetings	0.5411	0.2752	0.2811	0.2623	0.2789
7	Tight schedule	0.6244	0.2473	0.2384	0.2588	0.2850
F	**FORMING COMMUNITY ORGANISATION**					
1	Inexperienced facilitators	0.6122	0.2873	0.2738	0.2727	0.3041
2	Failure to establish community organisations	0.5387	0.2897	0.2498	0.2419	0.3002
3	Community resistance	0.5500	0.2670	0.2368	0.2146	0.2669
4	Community leader too dominant	0.5835	0.2510	0.2550	0.2430	0.2754
5	Community is manipulated by other parties	0.5717	0.2801	0.2824	0.2470	0.3229
6	Disagreement on community contract/consensus	0.4983	0.2729	0.2449	0.2593	0.2871
7	Tight schedule	0.5930	0.2803	0.2721	0.2698	0.3059
G	**Community/Labour Training**					
1	Facilitators shortages	0.5716	0.2815	0.2855	0.2804	0.2931
2	Inexperienced facilitator	0.5916	0.3251	0.3108	0.3090	0.3474
3	Labour shortages	0.6143	0.3483	0.3304	0.3095	0.3073
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.7075	0.3120	0.3415	0.4410	0.3614
5	Insufficient training materials and unclear outcomes	0.5395	0.2496	0.2585	0.2496	0.2902
H	**Housing Design AND MATERIALS**					
1	Inexperienced facilitators	0.5690	0.2601	0.2873	0.2855	0.2776
2	Lack of facilitators' technical knowledge	0.5706	0.2621	0.2713	0.2736	0.2754
3	Unclear building code	0.5003	0.2098	0.2346	0.2334	0.2100
4	Too many variations put forward by the community	0.5648	0.2999	0.2784	0.2477	0.2451
5	Too many cultural considerations	0.4687	0.2540	0.1967	0.1988	0.2221
6	Unconfirmed source/type of materials	0.5090	0.2511	0.2309	0.2343	0.2597
7	Material price increases	0.7090	0.3220	0.4667	0.3601	0.3350
8	Tight schedule	0.5589	0.2607	0.2656	0.2367	0.2549
9	Limited budget	0.7203	0.3285	0.3641	0.3383	0.3496
10	Too much paperwork prior to initial payment at start of construction work	0.6810	0.3978	0.3275	0.2693	0.4541

Regarding the impacts of negative events, it reveals that more than 98% of events have a moderate impact on project objectives. Particularly for satisfaction, all events identified (100%) have a moderate or higher impact on satisfaction. This implies that the West Sumatra reconstruction might experience the low satisfaction of the community.

The bureaucracy of funding disbursement prior to the beginning of the construction work has the highest impact on time. A long process and complicated procedure for the first funding disbursement delayed the start of housing reconstruction. Problems with beneficiaries' validation are the second highest event affecting time completion.

The increase of material prices is the number one reason for cost escalation in CPHRP. It is followed by problems of transportation access to the disaster-affected area. The scale of the impact is 0.4667 and 0.3508. It can be seen that the gap between the first two highest impacts is slightly wide, suggesting that in order to reduce the cost escalation the government has to control the material price.

Moreover, the highest impact on the quality of the housing is the lack of labour knowledge of earthquake resistant housing, followed by limited funding availability.

5.8.5.3 Probability impact factor

Table 5.20 presents the probability impact factor of risk in West Sumatra housing reconstruction. The number of high-risk events that affect time, cost, quality, and satisfaction is 19, 16, 5, and 22 respectively. The highest number of high-risk events is present in the impact of risk on community satisfaction. As has been discussed in section 5.8.4.2, this fact strengthens the indication on low satisfaction of beneficiaries in West Sumatra reconstruction.

The highest number of high-risk events that affect time completion relates to the delay of funding disbursement to the community because of bureaucracy. The mean value of the probability impact factor for this risk is 0.2921. Another high-risk event related to financial problems is insufficient funding availability. Further, the second highest risk event that can delay housing completion is validation problems with the eligibility of beneficiaries to receive assistance. This event is inevitably related to situations where the database of beneficiaries is not good. Some activities in damage assessment were also perceived by respondents as high-risk events. The risks were lack of housing database, too many organisations involved in damage assessment, variability in assessment method, and coordination problems. Transportation problems were also classified as high-risk events that could affect damage assessment and beneficiaries' identification.

Table 5.20 Risk probability-impact factor in West Sumatra reconstruction

No	Risk	Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**				
1	Lack of central government capacity	0.1882	0.1631	0.1549	0.1622
2	Lack of local government capacity	0.2238	0.1739	0.1902	0.2443
3	Unclear reconstruction policy	0.2039	0.1924	0.1914	0.2193
4	Lack of implementers/NGOs reconstruction knowledge	0.1647	0.1912	0.1907	0.2589
5	Lack of implementers/NGOs community based knowledge	0.1796	0.1864	0.1709	0.2114
6	Failure to manage stakeholders	0.1700	0.1603	0.1553	0.1730
7	Problems of communication and coordination	0.2337	0.2013	0.1883	0.2002
8	Unclear roles and responsibilities of stakeholders	0.1398	0.1545	0.1268	0.1561
9	Inappropriate reconstruction organisations	0.1223	0.1203	0.1365	0.1600
10	Lack of government support	0.1783	0.1760	0.1698	0.1935
11	Insufficient funding	0.2813	0.2574	0.3048	0.3401
12	Tight schedule	0.1756	0.1666	0.1575	0.1836
B	**FACILITATORS RECRUITMENT AND TRAINING**				
1	Shortage of facilitators	0.1824	0.1869	0.1865	0.1839
2	Lack of facilitators' knowledge and experience	0.1738	0.1519	0.1865	0.1780
3	Lack of trainers' knowledge and experience	0.1014	0.1383	0.1432	0.1542
4	Insufficient training materials and unclear outcomes	0.0942	0.1029	0.1156	0.1230
5	Tight schedule	0.1909	0.1686	0.1904	0.1822
C	**HOUSING DAMAGE ASSESSMENT**				
1	Lack of housing database	0.2607	0.2477	0.1977	0.2618
2	Too many parties involved	0.2329	0.2105	0.1915	0.1983
3	Non-uniform assessment method	0.2067	0.1921	0.1788	0.2172
4	Coordination problems	0.2154	0.1951	0.1893	0.2099
5	Insufficient numbers of surveyors/facilitators	0.1704	0.1539	0.1559	0.1587
6	Inexperienced surveyors/facilitators	0.1881	0.1832	0.1905	0.2101
7	Transportation/access problems	0.2423	0.2342	0.1798	0.1933
8	Collusion in defining damage category	0.1771	0.2169	0.1705	0.2809
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**				
1	Lack of beneficiaries databases	0.2783	0.2571	0.1933	0.3094
2	Insufficient numbers of surveyors/facilitators	0.1511	0.1263	0.1299	0.1533
3	Inexperienced surveyors/facilitators	0.1834	0.1724	0.1781	0.1947
4	Transportation/access problems	0.2043	0.2049	0.1473	0.1716
5	Collusion in deciding beneficiaries'	0.1660	0.1921	0.1914	0.2629
6	Problems with land tenure/rights	0.2521	0.2209	0.1796	0.2201
7	Validation problems	0.2868	0.2470	0.1942	0.2403
E	**PROGRAMME SOCIALISATION**				
1	Shortage of facilitators	0.1504	0.1459	0.1388	0.1509

No	Risk	Time	Cost	Quality	Satisfac-tion
2	Inexperienced facilitators	0.1948	0.1964	0.1884	0.2176
3	Lack of local government support	0.1469	0.1483	0.1368	0.1559
4	Competition between donors/implementers/NGOs	0.1365	0.1538	0.1280	0.1559
5	Community resistance	0.1492	0.1560	0.1304	0.1535
6	Failures in community meetings	0.1698	0.1701	0.1592	0.1687
7	Tight schedule	0.1655	0.1590	0.1753	0.1869
F	**FORMING COMMUNITY ORGANISATION**				
1	Inexperienced facilitators	0.1890	0.1809	0.1798	0.1960
2	Failure to establish community organisations	0.1768	0.1552	0.1467	0.1786
3	Community resistance	0.1540	0.1364	0.1228	0.1480
4	Community leader too dominant	0.1627	0.1627	0.1557	0.1719
5	Community is manipulated by other parties	0.1720	0.1724	0.1573	0.2091
6	Disagreement on community contract/consensus	0.1472	0.1306	0.1375	0.1503
7	Tight schedule	0.1793	0.1750	0.1754	0.1989
G	**Community/Labour Training**				
1	Facilitators shortages	0.1742	0.1810	0.1735	0.1793
2	Inexperienced facilitator	0.2097	0.2017	0.2000	0.2163
3	Labour shortages	0.2243	0.2120	0.1998	0.1898
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.2273	0.2459	0.3159	0.2592
5	Insufficient training materials and unclear outcomes	0.1506	0.1546	0.1505	0.1721
H	**Housing Design AND MATERIALS**				
1	Inexperienced facilitators	0.1569	0.1700	0.1679	0.1606
2	Lack of facilitators' technical knowledge	0.1541	0.1587	0.1590	0.1593
3	Unclear building code	0.1085	0.1229	0.1148	0.1041
4	Too many variations put forward by the community	0.1886	0.1761	0.1510	0.1467
5	Too many cultural considerations	0.1336	0.1021	0.1007	0.1123
6	Unconfirmed source/type of materials	0.1439	0.1328	0.1345	0.1482
7	Material price increases	0.2400	0.3493	0.2687	0.2381
8	Tight schedule	0.1555	0.1569	0.1409	0.1495
9	Limited budget	0.2437	0.2765	0.2485	0.2463
10	Too much paperwork prior to initial payment at start of construction work	0.2921	0.2422	0.1961	0.3366

The increase of material price is the highest risk event that can affect the cost of CPHRP. The probability impact factor of this risk is 0.3493. Similar to the affect on time completion, some activities in housing damage assessment and beneficiaries' identification contributed to 50% of the high-risk events that affect project cost. Another significant stage that affects project cost is community training. Inexperienced facilitator, labour shortages and their limited knowledge are some of the risk events that affect the project.

In quality, respondents perceived that limited funding availability, the increase of material price, inexperienced facilitators, and the lack of knowledge of labourers are events that can be categorised as high-risk events that affect the quality of housing. The highest contributor to quality degradation is the lack of labour knowledge on how to construct earthquake resistant housing, with the mean probability impact factor at 0.3159.

Insufficient funding for housing reconstruction is the highest risk for community satisfaction. This indicates that there is a gap between the amount of funding expected by the community and the amount of assistance that can be afforded by the government. The community felt that Rp. 15 millions given by the government was too small, and that little could be done with that grant. Other high-risk events relate to the capacity of the government in managing the reconstruction programme. Lack of local government capacity, unclear reconstruction policy, lack of implementer knowledge on how reconstruction/CPHRP should be carried out, communication and coordination problems are some risks that occurred in the initial stage that affect community satisfaction. This implies that the community wishes the CPHRP to be implemented smoothly, without any disruption or confusion over the procedure that has to be followed. Moreover, damage assessment and beneficiaries' identification activity again contribute to the high-risk event of CPHRP.

5.8.5.4 Critical success factors

Table 5.21 presents the CSFs of CPHRP in West Sumatra reconstruction. It can be seen that 10 factors can be classified as CSFs. The data variation on CSFs is not high, since the standard deviation value is smaller than one, and data was also statistically significant as the t-value is less than 0.050.

Table 5.21 CSFs in West Sumatra reconstruction

Rank	Selected Success Factors	Mean	Std. Dev.	Test Value = 0			
				t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
1	Transparency and accountability	4.4000	0.8208	23.9740	0.0000	4.0159	4.7841
2	Sufficient funding availability	4.3000	0.9234	20.8260	0.0000	3.8678	4.7322
3	Government support	4.2500	0.7864	24.1690	0.0000	3.8820	4.6180
4	Appropriate reconstruction policy/strategy	4.2000	0.6156	30.5120	0.0000	3.9119	4.4881
5	Understanding on community based method	4.2000	0.6959	26.9930	0.0000	3.8743	4.5257
6	Involvement of all community members	4.0500	0.7592	23.8580	0.0000	3.6947	4.4053
7	Successful beneficiaries identification	4.0500	0.9445	19.1760	0.0000	3.6080	4.4920
8	Good coordination and communication	4.0000	0.5620	31.8330	0.0000	3.7370	4.2630
9	Minimising bureaucracy	4.0000	0.6489	27.5680	0.0000	3.6963	4.3037
10	Facilitator capacity	4.0000	0.7255	24.6580	0.0000	3.6605	4.3395
11	Implementer capacity	3.9000	0.7182	24.2850	0.0000	3.5639	4.2361
12	Gathering trust from community	3.9000	0.9119	19.1260	0.0000	3.4732	4.3268
13	Significant level of community participation/control	3.8500	0.8751	19.6750	0.0000	3.4404	4.2596
14	Materials availability	3.8500	0.8751	19.6750	0.0000	3.4404	4.2596
15	Successful land tenure identification	3.8500	0.9333	18.4480	0.0000	3.4132	4.2868
16	Sufficient numbers of facilitators	3.7500	0.7164	23.4110	0.0000	3.4147	4.0853
17	Access to affected community	3.7500	1.1180	15.0000	0.0000	3.2267	4.2733
18	Successful community training	3.6500	0.7452	21.9060	0.0000	3.3013	3.9987
19	Conducive social environment	3.6500	0.7452	21.9060	0.0000	3.3013	3.9987
20	Conducive economical environment	3.6500	0.8127	20.0850	0.0000	3.2696	4.0304
21	Successful damage assessment	3.6500	0.9881	16.5200	0.0000	3.1876	4.1124
22	Project duration	3.6500	1.1821	13.8090	0.0000	3.0968	4.2032
23	Government capacity	3.6000	0.8826	18.2420	0.0000	3.1869	4.0131
24	Good written contract between community and implementer	3.6000	1.0463	15.3870	0.0000	3.1103	4.0897
25	Conducive physical environment	3.5500	0.7592	20.9130	0.0000	3.1947	3.9053
26	Appropriate project organisation	3.5000	0.8272	18.9230	0.0000	3.1129	3.8871
27	Design flexibility	3.4500	0.8256	18.6890	0.0000	3.0636	3.8364
28	Success on forming community organisation	3.4500	0.9987	15.4490	0.0000	2.9826	3.9174
29	Project location	3.4500	1.0990	14.0380	0.0000	2.9356	3.9644
30	Conducive political environment	3.3500	0.9333	16.0520	0.0000	2.9132	3.7868
31	Project size	3.2500	0.9666	15.0380	0.0000	2.7976	3.7024
32	Having a pre-reconstruction plan (scenario based) before disaster	3.2000	1.1050	12.9510	0.0000	2.6828	3.7172

The most significant CSF perceived by respondents is transparency and accountability, with a mean value of 4.40. The nature of the community-based approach is to urge the community and the external organisations to work together. Thus, transparency and accountability is necessary, not only by one party, but on both sides. All stakeholders have to be transparent in everything they do.

The second highest CSF is sufficient funding availability for housing reconstruction. This factor cannot be ignored if a successful community-based project is to be delivered. If funding availability is high, the government can afford to provide full housing reconstruction for the community, instead of only for a stimulant. Thus, the chance for government to meet the needs and expectations of the community is high.

Support from the government is also immensely important. Together with an appropriate reconstruction policy and good coordination and communication flow, the success of CPHRP will not be hard to achieve.

Other CSFs relate to the capacity of the government or implementer in conducting CPHRP. First, a good understanding of the community-based approach is urgently required. With this, the implementer will know how essential the involvement of all community members is in a reconstruction programme.

The absence of bureaucracy, particularly in funding disbursement procedure, is imperative. Although the source of the reconstruction budget is the government, the simplicity of its procedure has to be established. Disaster conditions cannot be treated the same way as normal conditions. As a result, government should provide a special procedure for funding disbursement in post-disaster reconstruction.

5.9 Summary of Part 3

Part 3 presents the analysis and discussion of the questionnaire survey. The result of the quantitative analysis for each case study is discussed. The respondents in Aceh perceive that there are 8 highly significant advantages, while only 5 and 1 were reported in Yogyakarta and West Sumatra respectively. The greatest advantage in each location is the same, the sense of ownership. Some high risk events were also revealed. Unlike in West Sumatra, respondents from Aceh and Yogyakarta believed that the high risk events mostly affected the time taken to complete the project. This study also found that 17, 11, and 10 CSFs were identified by respondents from Aceh, Yogyakarta and West Sumatra respectively.

Part 3 discusses the findings from the questionnaires survey in each case study. Although the findings contain several similarities and differences between case studies, these have not yet been discussed in this section. Instead, this discussion is presented in Part 4, in the cross-case analysis. Part 4 also presents the validation of the findings.

Part 4: Cross-case analysis

5.10 Cross-case analysis

This section discusses the cross-case analysis of the three case study areas. It primarily highlights the similarities and differences of each case. It also combines data from each case study area in order to establish a general condition of the implementation of CPHRP in Indonesia.

5.10.1 Advantages

All three case studies reveal that creation of ownership is the most significant advantage of the implementation of CPHRP. Thus, without doubt, this advantage is the most advantageous of the implementation of CPHRP in Indonesia.

More analysis on Aceh reconstruction reveals that it has a specific significant advantage that might not exist in Yogyakarta and West Sumatra reconstruction. In Aceh, many of the community's sources of income or their tools were washed away by the tsunami, farmers lost their land because it was inundated by the tsunami, or fishermen lost their boats. This condition did not happen in the other two areas. As a result, the implementation of CPHRP in Aceh has been seen as a temporary source of income for community. In more general conditions, CPHRP can regenerate the economy of a local community almost destroyed by the disaster.

Moreover, in Indonesia, particularly in Java, the spirit of *gotong royong* or mutual aid/working together is fundamental in communities. A close relationship between members of communities in one village still exists. A regular meeting between them, formal or informal, still takes place. Disaster can affect this ideal condition. By the implementation of CPHRP, the community was urged to regroup and work together again. As a result, in Yogyakarta, advantages such as trust re-establishment and strengthened community organisation have been perceived by respondents as highly significant. These kinds of advantages are not classified as very significant in the other two disaster-affected areas.

In all three case study areas, it was also found that the traditional objectives of a construction project – time, cost, and quality – have been perceived by respondents as less significant compared with the other advantages. Their rank was on the bottom half of the order of significant advantages.

Furthermore, analysis on all questionnaire survey data reveals that four advantages of CPHRP can be classified as very significant. As can be seen from Table 5.22, creating a sense of ownership for beneficiaries to the programme is the most advantageous benefit of CPHRP as perceived by respondents. The second most advantageous is the way the houses built using the CPHRP approach fit with local culture, customs, or wisdom existing in the community. The third advantage is that CPHRP can build beneficiaries' confidence. The second and third advantages have the same mean value, but the latter has a higher standard deviation. Thus, 'building beneficiaries' confidence' is ranked at third place. The fourth most significant advantage of CPHRP is it can minimise corrupt practices during the reconstruction process.

It also appears that the best rank of traditional objectives of construction project in the list is better quality. It lies in rank 15 with a mean value of 3.60. Faster and cheaper reconstruction is ranked at 19 and 21 out of 22 advantages of CPHRP. This condition implies that the normal construction objective is not the main purpose of the implementation of a community-based project. The non-physical advantage seems more important than the physical.

Table 5.22 Advantages of CPHRP

Rank	Advantages	Mean	Std. Dev.	Test Value = 0			
				t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
1	Create sense of ownership	4.3538	0.7166	48.9860	0.0000	4.1763	4.5314
2	Fit to local culture/customs/wisdom	4.0308	0.7900	41.1380	0.0000	3.8350	4.2265
3	Build beneficiaries' confidence	4.0308	0.8833	36.7890	0.0000	3.8119	4.2497
4	Minimize corruption	4.0154	0.9920	32.6330	0.0000	3.7696	4.2612
5	More funding goes to community	3.8308	1.0394	29.7150	0.0000	3.5732	4.0883
6	Create jobs for beneficiaries' so they can get income	3.8000	0.9220	33.2300	0.0000	3.5716	4.0284
7	Re-establish trust between community	3.7846	0.9099	33.5350	0.0000	3.5592	4.0101
8	High accountability	3.7692	0.8798	34.5400	0.0000	3.5512	3.9872
9	Rebuild community networking	3.7692	0.7860	38.6620	0.0000	3.5745	3.9640
10	Meet beneficiaries needs and expectations	3.7538	1.0312	29.3480	0.0000	3.4983	4.0094
11	It is well accepted	3.7385	0.8154	36.9630	0.0000	3.5364	3.9405
12	Ease beneficiaries' trauma	3.7231	0.8928	33.6200	0.0000	3.5018	3.9443
13	Create pride among beneficiaries	3.6923	0.8646	34.4290	0.0000	3.4781	3.9066
14	Strengthen community organisation/institution	3.6154	1.0853	26.8570	0.0000	3.3465	3.8843
15	Better quality	3.6000	1.0869	26.7050	0.0000	3.3307	3.8693
16	Rebuild norms in community	3.5385	1.2000	23.7740	0.0000	3.2411	3.8358
17	Involve vulnerable group	3.5231	0.9700	29.2830	0.0000	3.2827	3.7634
18	High satisfaction	3.5231	0.9372	30.3070	0.0000	3.2908	3.7553
19	Faster reconstruction	3.0308	1.1855	20.6120	0.0000	2.7370	3.3245
20	Implementer can get good impressions	2.9692	1.1035	21.6930	0.0000	2.6958	3.2427
21	Cheaper reconstruction	2.9692	1.2115	19.7590	0.0000	2.6690	3.2694
22	Fewer problems	2.9077	1.1142	21.0410	0.0000	2.6316	3.1838

5.10.2 Risks probability and impact

The highest risk probability from the three case studies is perceived by respondents from Aceh reconstruction. According to them, the probability of transportation/access problem was 73.2%. West Sumatra respondents also thought that this event was high-risk, with a probability of 0.7075. This indicates that disaster has a direct negative impact on transportation infrastructure, particularly on roads and bridges. Thus, it was difficult to reach the disaster-affected area. Further, in all three case study areas, this factor is also the main risk affecting project time and project cost. The highest impact on time and cost are both found in Aceh reconstruction where the impact factor is 0.5360 and 0.4940 respectively. In terms of quality and satisfaction, respondents from West Sumatra reconstruction perceived the highest impact. The impact on quality was mainly affected by limited labour knowledge on constructing earthquake resistant housing, whilst the highest impact on satisfaction resulted from the lack of funding. The impact factor on this factor is 0.4410 and 0.4650 respectively.

There are similarities and differences resulting from the questionnaire survey. Some significant similarities in the three case study areas are in terms of lack of beneficiaries' database, coordination problems in housing damage assessment, tight schedule, and the increase of material price. In term of differences, it can be analysed that there are three main differences between the three case study areas. First is the funding availability, where the Aceh reconstruction differed significantly from the Yogyakarta and West Sumatra reconstruction. In Aceh, because CPHRP was mainly carried out by NGOs, the source of funding was their donors. They could afford to provide full and complete housing to beneficiaries. However, in Yogyakarta and West Sumatra, the government carried out housing reconstruction. The government had limited funding in implementing CPHRP and could only afford a small grant to communities, which functioned as a stimulant.

Another difference is in local government capacity and labour availability. There is a significant difference between Yogyakarta reconstruction and Aceh and West Sumatra reconstruction. In Yogyakarta, local government capacity is acknowledged to be higher than that of the local government of Aceh and West Sumatra. In Yogyakarta or in Java Island in general, the availability of labour was considerably higher than that of Aceh and West Sumatra. During the reconstruction of Aceh and West Sumatra, the problem of labour shortages was solved by transporting labour from Java Island.

Turning now to the average of probabilities and impacts of risks from the three case study areas, Table 5.23 presents the average of risks probabilities and their impact on time, cost, quality, and satisfaction. The analysis reveals that the highest probability of negative event is the increase of material price, with the mean value of 0.6903.

Regarding the impacts, time completion was mainly affected by transportation problems to the disaster-affected area. The scale of impact is classified as high at 0.4302. The impact on cost is also classified as high at 0.4344, and resulted from the increase of material price. The highest impact on quality and satisfaction resulted from the limited knowledge of labourers of how to construct earthquake resistant houses and collusion in defining damage category respectively.

Table 5.23 Risk probability and impact

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**					
1	Lack of central government capacity	0.5603	0.3085	0.2423	0.2123	0.2638
2	Lack of local government capacity	0.5951	0.3554	0.2492	0.2431	0.3123
3	Unclear reconstruction policy	0.5509	0.3392	0.2946	0.2666	0.3353
4	Lack of implementers/NGOs reconstruction knowledge	0.4968	0.3162	0.3054	0.2838	0.3169
5	Lack of implementers/NGOs community based knowledge	0.5159	0.3223	0.3062	0.2738	0.3038
6	Failure to manage stakeholders	0.5508	0.3292	0.2862	0.2746	0.2985
7	Problems of communication and coordination	0.6172	0.3685	0.3062	0.2854	0.3262
8	Unclear roles and responsibilities of stakeholders	0.5540	0.2754	0.2692	0.2362	0.2638
9	Inappropriate reconstruction organisations	0.5254	0.2885	0.2831	0.2900	0.3131
10	Lack of government support	0.5286	0.2800	0.2638	0.2462	0.2662
11	Insufficient funding	0.6143	0.3300	0.2962	0.3108	0.3292
12	Tight schedule	0.6143	0.2900	0.2777	0.2808	0.2962
B	**FACILITATORS RECRUITMENT AND TRAINING**					
1	Shortage of facilitators	0.5667	0.2992	0.2555	0.2734	0.2680
2	Lack of facilitators' knowledge and experience	0.5857	0.3195	0.2742	0.3117	0.3180
3	Lack of trainers' knowledge and experience	0.5032	0.2469	0.2562	0.2617	0.2617
4	Insufficient training materials and unclear outcomes	0.4746	0.2187	0.1953	0.2359	0.2383
5	Tight schedule	0.6143	0.2727	0.2438	0.2687	0.2617
C	**HOUSING DAMAGE ASSESSMENT**					
1	Lack of housing database	0.6305	0.3813	0.3259	0.2759	0.3313
2	Too many parties involved	0.6239	0.3331	0.3146	0.2631	0.2731
3	Non-uniform assessment method	0.5952	0.3101	0.2766	0.2742	0.3094
4	Coordination problems	0.6365	0.3445	0.2727	0.2773	0.3148
5	Insufficient numbers of surveyors/facilitators	0.5476	0.3047	0.2398	0.2562	0.2555
6	Inexperienced surveyors/facilitators	0.5730	0.3094	0.2648	0.3009	0.2961
7	Transportation/access problems	0.6397	0.4302	0.4079	0.2635	0.2873
8	Collusion in defining damage category	0.5794	0.3135	0.2810	0.2706	0.3540
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**					
1	Lack of beneficiaries databases	0.6651	0.3992	0.3211	0.2539	0.3461
2	Insufficient numbers of surveyors/facilitators	0.5476	0.3039	0.2227	0.2172	0.2523

No	Risk	Proba-bility	Impact			
			Time	Cost	Quality	Satisfac-tion
3	Inexperienced surveyors/facilitators	0.5921	0.3125	0.2508	0.2664	0.2937
4	Transportation/access problems	0.6175	0.3773	0.3727	0.2353	0.2641
5	Collusion in deciding beneficiaries’	0.5952	0.3172	0.2977	0.2641	0.3367
6	Problems with land tenure/rights	0.6366	0.3908	0.3215	0.2362	0.3046
7	Validation problems	0.6557	0.3821	0.3095	0.2485	0.2985
E	**PROGRAMME SOCIALISATION**					
1	Shortage of facilitators	0.5317	0.2898	0.2328	0.2281	0.2547
2	Inexperienced facilitators	0.5698	0.2969	0.2484	0.2664	0.2961
3	Lack of local government support	0.5159	0.2586	0.2266	0.2148	0.2586
4	Competition between donors/implementers/NGOs	0.5698	0.2469	0.2375	0.2469	0.2445
5	Community resistance	0.5190	0.3125	0.2773	0.2422	0.2875
6	Failures in community meetings	0.5222	0.3031	0.2711	0.2453	0.2781
7	Tight schedule	0.5889	0.2899	0.2687	0.2750	0.2992
F	**FORMING COMMUNITY ORGANISATION**					
1	Inexperienced facilitators	0.5444	0.2961	0.2266	0.2547	0.2828
2	Failure to establish community organisations	0.4746	0.2938	0.2469	0.2375	0.3031
3	Community resistance	0.5000	0.2898	0.2352	0.2430	0.2883
4	Community leader too dominant	0.5698	0.2695	0.2285	0.2340	0.2586
5	Community is manipulated by other parties	0.5349	0.2800	0.2531	0.2391	0.3070
6	Disagreement on community contract/consensus	0.4651	0.3078	0.2484	0.2359	0.2914
7	Tight schedule	0.5603	0.2555	0.2414	0.2453	0.2687
G	**Community/Labour Training**					
1	Facilitators shortages	0.5317	0.2805	0.2609	0.2586	0.2625
2	Inexperienced facilitator	0.5317	0.3016	0.2656	0.2805	0.2977
3	Labour shortages	0.5857	0.3664	0.3578	0.2883	0.2961
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.6492	0.3398	0.3305	0.3703	0.3273
5	Insufficient training materials and unclear outcomes	0.4905	0.2430	0.2203	0.2414	0.2547
H	**Housing Design AND MATERIALS**					
1	Inexperienced facilitators	0.4903	0.2523	0.2469	0.2594	0.2523
2	Lack of facilitators’ technical knowledge	0.5065	0.2414	0.2250	0.2727	0.2570
3	Unclear building code	0.5032	0.2469	0.2430	0.2688	0.2500
4	Too many variations put forward by the community	0.5484	0.2977	0.2672	0.2547	0.2523
5	Too many cultural considerations	0.4871	0.2797	0.2336	0.2266	0.2414
6	Unconfirmed source/type of materials	0.4903	0.2719	0.2680	0.2367	0.2437
7	Material price increases	0.6903	0.3398	0.4344	0.3023	0.2992
8	Tight schedule	0.5590	0.2571	0.2563	0.2421	0.2492
9	Limited budget	0.6032	0.2703	0.2813	0.2656	0.2914
10	Too much paperwork prior to initial payment at start of construction work	0.6097	0.3562	0.2500	0.2298	0.3359

5.10.3 Probability Impact Factor

This section presents the cross-case analysis of PI factor of risks in CPHRP. The highest PI factor on time and cost were found in Aceh reconstruction and resulted from transportation problems on housing damage assessment (0.4096) and the increase of material price respectively (0.3874). In terms of quality and satisfaction, the highest PI factor was contributed by West Sumatra reconstruction. The highest PI factor in quality resulted from the lack of labourer knowledge on how to construct earthquake resistant housing (0.3159), whilst for satisfaction, it resulted from the problem of insufficient funding (0.3401).

The pattern for similarities and differences of PI factor in each case study were very similar to the probability and impact value discussed in section 5.10.2. The similarity is on the risk of lack of housing and beneficiaries' database, coordination problems in housing damage assessment, and the increase of material price.

In term of differences, there are also three factors to be highlighted. Funding availability seems not to be a high risk in Aceh reconstruction, but in Yogyakarta and West Sumatra, this factor has been perceived by respondent to have significant impact on project objectives. Other specific differences in Aceh compared to Yogyakarta and West Sumatra reconstruction was the tight schedule in the initiation stage. It affected all the parameters of construction objectives in Aceh, while in Yogyakarta and West Sumatra this factor seems not to be the high-risk event. Further, comparing Yogyakarta reconstruction to Aceh and West Sumatra reconstruction, there is a significant difference in perceiving the risk of local government capacity and labour availability. In Aceh and West Sumatra, lack of local government capacity was perceived to have significant risk impact on time and satisfaction, whilst this was not the case Yogyakarta. The same condition applied to the risk of labour shortages and their lack of knowledge on constructing earthquake resistant housing.

Further analysis to generalise the high-risk event of CPHRP in Indonesia is presented in Table 5.24. This table shows the average value of PI factor on time, cost, quality, and satisfaction from all three case studies. It reveals that the number of high-risk events that affect time, cost, quality, and satisfaction are 20, 13, 3, and 15 events respectively.

From this figure, we can conclude that the objective most affected by the risk of CPHRP during pre-construction stage is time. It is followed by satisfaction and cost. The least affected is quality of housing as the number of high-risk events for this was only three events.

Table 5.24 Risk probability-impact factor in CPHRP

No	Risk	Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**				
1	Lack of central government capacity	0.1870	0.1406	0.1230	0.1511
2	Lack of local government capacity	0.2222	0.1535	0.1570	0.2010
3	Unclear reconstruction policy	0.2089	0.1786	0.1564	0.2032
4	Lack of implementers/NGOs reconstruction knowledge	0.1788	0.1708	0.1607	0.1789
5	Lack of implementers/NGOs community based knowledge	0.1851	0.1766	0.1581	0.1745
6	Failure to manage stakeholders	0.1955	0.1668	0.1669	0.1786
7	Problems of communication and coordination	0.2432	0.2090	0.1900	0.2107
8	Unclear roles and responsibilities of stakeholders	0.1636	0.1588	0.1406	0.1550
9	Inappropriate reconstruction organisations	0.1713	0.1694	0.1685	0.1810
10	Lack of government support	0.1707	0.1587	0.1531	0.1598
11	Insufficient funding	0.2334	0.2083	0.2218	0.2292
12	Tight schedule	0.1934	0.1866	0.1891	0.1988
B	**FACILITATORS RECRUITMENT AND TRAINING**				
1	Shortage of facilitators	0.1867	0.1568	0.1706	0.1668
2	Lack of facilitators’ knowledge and experience	0.2022	0.1696	0.1958	0.1969
3	Lack of trainers’ knowledge and experience	0.1411	0.1485	0.1462	0.1465
4	Insufficient training materials and unclear outcomes	0.1187	0.1040	0.1287	0.1300
5	Tight schedule	0.1818	0.1639	0.1795	0.1750
C	**HOUSING DAMAGE ASSESSMENT**				
1	Lack of housing database	0.2604	0.2230	0.1870	0.2234
2	Too many parties involved	0.2318	0.2139	0.1831	0.1839
3	Non-uniform assessment method	0.2061	0.1863	0.1854	0.2043
4	Coordination problems	0.2333	0.1855	0.1904	0.2133
5	Insufficient numbers of surveyors/facilitators	0.1849	0.1482	0.1563	0.1576
6	Inexperienced surveyors/facilitators	0.1982	0.1688	0.1920	0.1901
7	Transportation/access problems	0.3048	0.2911	0.1838	0.1994
8	Collusion in defining damage category	0.2049	0.1871	0.1742	0.2248
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**				
1	Lack of beneficiaries databases	0.2815	0.2212	0.1720	0.2431
2	Insufficient numbers of surveyors/facilitators	0.1813	0.1282	0.1266	0.1497
3	Inexperienced surveyors/facilitators	0.1965	0.1552	0.1688	0.1834
4	Transportation/access problems	0.2587	0.2557	0.1543	0.1726
5	Collusion in deciding beneficiaries’	0.2107	0.2022	0.1776	0.2246
6	Problems with land tenure/rights	0.2801	0.2307	0.1642	0.2093

No	Risk	Time	Cost	Quality	Satisfac-tion
7	Validation problems	0.2718	0.2179	0.1712	0.2037
E	**PROGRAMME SOCIALISATION**				
1	Shortage of facilitators	0.1709	0.1363	0.1325	0.1481
2	Inexperienced facilitators	0.1825	0.1508	0.1641	0.1812
3	Lack of local government support	0.1521	0.1285	0.1228	0.1493
4	Competition between donors/implementers/NGOs	0.1568	0.1483	0.1593	0.1529
5	Community resistance	0.1781	0.1591	0.1403	0.1664
6	Failures in community meetings	0.1794	0.1604	0.1432	0.1617
7	Tight schedule	0.1907	0.1820	0.1822	0.1950
F	**FORMING COMMUNITY ORGANISATION**				
1	Inexperienced facilitators	0.1761	0.1326	0.1501	0.1660
2	Failure to establish community organisations	0.1532	0.1267	0.1272	0.1556
3	Community resistance	0.1594	0.1239	0.1304	0.1537
4	Community leader too dominant	0.1706	0.1396	0.1468	0.1606
5	Community is manipulated by other parties	0.1677	0.1527	0.1433	0.1853
6	Disagreement on community contract/consensus	0.1630	0.1302	0.1230	0.1513
7	Tight schedule	0.1532	0.1503	0.1488	0.1637
G	**Community/Labour Training**				
1	Facilitators shortages	0.1647	0.1556	0.1470	0.1486
2	Inexperienced facilitator	0.1749	0.1533	0.1623	0.1706
3	Labour shortages	0.2367	0.2277	0.1833	0.1823
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.2363	0.2302	0.2530	0.2183
5	Insufficient training materials and unclear outcomes	0.1314	0.1198	0.1314	0.1384
H	**Housing Design AND MATERIALS**				
1	Inexperienced facilitators	0.1368	0.1299	0.1406	0.1380
2	Lack of facilitators' technical knowledge	0.1335	0.1215	0.1489	0.1426
3	Unclear building code	0.1349	0.1337	0.1492	0.1380
4	Too many variations put forward by the community	0.1787	0.1611	0.1506	0.1474
5	Too many cultural considerations	0.1569	0.1298	0.1233	0.1309
6	Unconfirmed source/type of materials	0.1503	0.1468	0.1275	0.1353
7	Material price increases	0.2508	0.3265	0.2230	0.2145
8	Tight schedule	0.1597	0.1635	0.1515	0.1564
9	Limited budget	0.1784	0.1916	0.1748	0.1863
10	Too much paperwork prior to initial payment at start of construction work	0.2435	0.1661	0.1534	0.2249
	Number of high risk events	20	13	3	15

5.10.3.1 High-risk events on time

The high-risk event on time completion resulted from transportation/access problems to the disaster-affected area. The PI factor from this event is 0.3048. From eight groups of activities in CPHRP, respondents perceived that only two groups of activities do not contain high-risk events, programme socialisation and forming community organisation. Many high-risk events are present in the initiation stage, the damage assessment and beneficiaries' identification. Three high-risk events in the initiation stage originate from the government, lack of local government capacity, unclear reconstruction policy, and failure in managing coordination and communication. Simplifying the bureaucratic process and controlling material prices is another challenge for the government in speeding up the reconstruction process. This fact suggests that increasing government capacity to tackle future disaster is highly necessary.

In damage assessment and beneficiaries' identification stages, the pace of CPHRP is hampered by the lack of a database. A database recording how many houses are affected, how severe the destruction is, and who is eligible to receive the assistance, these being common problems arising during CPHRP. Although community-based approach can minimise collusion, the lack of a database can create a chance for survivors to engage in a conspiracy in damage category decisions and eligible beneficiaries, lengthening the validation process. Thus, developing an up-to-date database system is immensely important. It has to be created long before the disaster strikes. Furthermore, clear, trouble-free access to the affected areas plays an important role to guarantee that the housing reconstruction can be delivered as scheduled.

In the aftermath of an earthquake, many organisations quickly provide assistance to assess the safety of houses for occupation by the survivors. Problems emerge because organisations sometimes bring their own assessment methods. Then, when the government carries out the official assessment, and there is a difference in the damage category, it creates confusion and dissatisfaction among beneficiaries, especially when the damage category is lowered. For instance, when the damage category is changed from heavily damaged to moderately damaged, beneficiaries will make a complaint because it relates to the amount of funds they will receive in the future. The process of giving an explanation to the beneficiaries can be time-consuming. As a result, providing a uniform assessment method from the very beginning is essential to achieve the time objectives of CPHRP.

Moreover, in facilitator recruitment and training, respondents perceived that a lack of facilitator knowledge and experience could restrain the reconstruction process. The same situation can arise in community/labour training where respondents also suggest that a lack of knowledge of labourers on how to construct earthquake resistant housing, together with their shortages, are high-risk events that affect the time completion of CPHRP.

5.10.3.2 High-risk events on beneficiaries' satisfaction

The high-risk events that affected beneficiaries' satisfaction were perceived by respondents to fall into six groups of activities; initiation stage, facilitators' recruitment and training, housing damage assessment, beneficiaries' identification and land tenure, community/labour training, and housing design and materials. The highest risk event was lack of beneficiaries' database, followed by insufficient funding, bureaucratic process of funding disbursement, collusion in defining damage category and beneficiaries, and lack of housing database.

It can be analysed that most of the high-risk events originate from the problems of damage assessment and beneficiaries' identification, eight out of fifteen high-risk events (53%) taking place in this category. This suggests that there is a high concern from the community about their eligibility in becoming a beneficiary of a housing reconstruction project. The big question among the community is whether their name is on the list to receive assistance. Problems related to a lack of housing database can lead to community dissatisfaction. It can also create an opportunity among the community to engage in collusion. Parties wanting to take advantage of the situation can easily manipulate the lack of a database.

The next concern of the community is in which category of damage their house belongs. Inevitably, the community want this process to be transparent and carried out using the same standard methods in order to avoid differences in damage category for houses that in reality have the same damage. Failure to address this risk can lead to community dissatisfaction. For instance, if two houses in reality have the same damage but have a different damage category, the beneficiaries who have the lower category will raise a complaint and be unsatisfied, because the damage category has a direct implication on the amount of funding they will receive for housing reconstruction. For example, in West Sumatra, heavily damaged houses entitled Rp. 15 millions, while moderately damaged house receive less than Rp. 10 millions.

Further, the next risk that can affect community satisfaction is funding availability and the procedure for its disbursement. There was a big gap between Aceh reconstruction and Yogyakarta or West Sumatra reconstruction. In Aceh, the owner of a heavily damaged or destroyed house was entitled for a new complete house that costs around Rp. 50 millions, while in Yogyakarta and West Sumatra the community only received Rp. 15 millions. The community in the latter case study area raised their dissatisfaction by saying that they could not do much with the amount of grant given. Inadequate funding availability was exacerbated by the bureaucratic process of funding disbursement and the increase of material prices. Regarding this problem, the community want a simple procedure and urge government to control the price of materials.

Three events at the initiation stage, lack of government capacity, unclear policy, and problems in communication and coordination may also affect community satisfaction. The community desires a high government capacity, able to produce strong policy that can guide the reconstruction process to the right way, able to give a clear and certain reconstruction process, and able to create good communication and coordination. Problems in this sector might affect time needed for reconstruction, which in the end can affect community satisfaction.

The last factor that might affect community satisfaction relates to the quality of housing that will be constructed. There are community concerns about the capacity of the labour to construct earthquake resistant houses. The availability of this kind of labour is hard to find. Thus, training for labour is urgently needed.

5.10.3.3 High-risk events on cost

The highest risk event that can affect project cost is inevitably the increase of material cost. It is followed by transportation/access problems to the disaster-affected area.

Five groups of activity produce high-risk events, initiation stage, housing damage assessment, beneficiaries and land tenure identification, community/labour training, and housing design and materials.

Further, we can classify the origin of cost escalation into two groups. First, events that have direct impact on cost escalation, such as the increase of material price, transportation problems, and labour shortages. Transportation problems can increase construction costs because many areas cannot be reached using normal transportation methods, thus alternative methods have to be used which are much more expensive. Labour shortages will automatically increase wages, as the demand is higher than the supply. Deploying labour from outside the disaster-affected area adds another cost to the reconstruction effort.

Second, there are events that have an indirect impact, whereby the cost is increased by events that affect other objectives of CPHRP project, such as time and quality. For instance, the lack of beneficiaries' database first affected time completion. The problem of the database implies that identification of beneficiaries will have to take longer. Thus, the surveyor has to stay longer in the disaster-affected area that indirectly increases the cost.

5.10.3.4 High-risk events on quality

In the pre-construction stage of CPHRP, quality of housing is the construction objective least affected by risk. There are three high-risk events affecting housing quality. The highest risk is the limited knowledge of labourers of how to construct earthquake resistant houses, followed by the increase of material price and insufficient funding. The last two events are closely related to the affordability of good quality materials for the community to buy for their housing reconstruction.

5.10.4 Critical success factors

Among the three case study areas, the highest value of CSF was perceived by respondents from Aceh reconstruction where they acknowledged 'appropriate reconstruction policy/strategy' is the most important CSF at mean value of 4.480. In each case study area, respondents have perceived the most important CSF differently.

In Yogyakarta, respondents chose ‘gathering trust from community’ as the most important factor, whilst in West Sumatra it is ‘transparency and accountability’.

Through further analysis, comparing the resulting CSFs in each case study area, it was found that six CSFs were present in each case. They are ‘appropriate reconstruction policy/strategy’, ‘transparency and accountability’, ‘understanding on community-based method’, ‘good coordination and communication’, ‘facilitator capacity’, and ‘involvement of all community members’.

CSFs present in Aceh and Yogyakarta reconstruction but absent in West Sumatra are ‘implementer capacity’, ‘gathering trust from community’, and ‘significant level of community participation/control’. The absence of the last two factors in West Sumatra reconstruction indicates that the degree of community participation in West Sumatra is smaller compared to Aceh and Yogyakarta reconstruction. Further, one CSF absent in Aceh but existing in Yogyakarta and West Sumatra is ‘government support’. This is not surprising, as the implementation of CPHRP in Yogyakarta and West Sumatra depended largely on government support. Policy and detail of the reconstruction programme originated from the government.

Overall analysis of CSFs in the implementation of CPHRP in three case study areas reveals that twelve factors can be considered as CSFs of CPHRP. Statistical analysis on these factors found that the standard deviation is small which suggests that there is not much data variation, and the small value of t-test (≤0.050) indicates that the result is statistically significant. As can be seen from Table 5.25, the most influential CSF is (1) transparency and accountability at the mean value of 4.3846. It is followed by (2) appropriate reconstruction policy/strategy, (3) understanding the community based method, (4) gathering trust from community, (5) facilitator capacity, (6) good coordination and communication, (7) sufficient funding availability, (8) implementer capacity, (9) significant level of community participation/control, (10) government support, (11) involvement of all community members, and (12) successful beneficiary identification.

Table 5.25 CSFs of CPHRP

Rank	Selected Success Factors	Mean	Std. Dev.	Test Value = 0			
				t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
1	Transparency and accountability	4.3846	0.7436	47.5410	0.0000	4.2004	4.5689
2	Appropriate reconstruction policy/strategy	4.3231	0.5892	59.1580	0.0000	4.1771	4.4691
3	Understanding on community based method	4.2615	0.6680	51.4380	0.0000	4.0960	4.4270
4	Gathering trust from community	4.2154	0.7805	43.5450	0.0000	4.0220	4.4088
5	Facilitator capacity	4.1846	0.7478	45.1180	0.0000	3.9993	4.3699
6	Good coordination and communication	4.1692	0.7196	46.7130	0.0000	3.9909	4.3475
7	Sufficient funding availability	4.1692	0.8582	39.1670	0.0000	3.9566	4.3819
8	Implementer capacity	4.1538	0.7548	44.3690	0.0000	3.9668	4.3409
9	Significant level of community participation/control	4.0769	0.8349	39.3670	0.0000	3.8700	4.2838
10	Government support	4.0154	0.8195	39.5020	0.0000	3.8123	4.2185
11	Involvement of all community members	4.0154	0.8195	39.5020	0.0000	3.8123	4.2185
12	Successful beneficiaries identification	4.0154	0.8384	38.6140	0.0000	3.8076	4.2231
13	Minimising bureaucracy	3.9538	0.7792	40.9080	0.0000	3.7608	4.1469
14	Successful land tenure identification	3.9077	0.8966	35.1390	0.0000	3.6855	4.1299
15	Appropriate project organisation	3.8769	0.8005	39.0450	0.0000	3.6786	4.0753
16	Materials availability	3.8615	0.8268	37.6530	0.0000	3.6567	4.0664
17	Successful community training	3.8462	0.7338	42.2580	0.0000	3.6643	4.0280
18	Good written contract between community and implementer	3.8000	0.9874	31.0270	0.0000	3.5553	4.0447
19	Success on forming community organisation	3.7846	0.8384	36.3950	0.0000	3.5769	3.9924
20	Conducive social environment	3.7692	0.8056	37.7200	0.0000	3.5696	3.9689
21	Sufficient numbers of facilitators	3.7538	0.7506	40.3180	0.0000	3.5678	3.9398
22	Access to affected community	3.6769	0.9860	30.0660	0.0000	3.4326	3.9212
23	Successful damage assessment	3.6154	0.8605	33.8750	0.0000	3.4022	3.8286
24	Conducive physical environment	3.6000	0.7866	36.8980	0.0000	3.4051	3.7949
25	Project duration	3.5846	0.9502	30.4150	0.0000	3.3492	3.8201
26	Government capacity	3.5385	0.9027	31.6020	0.0000	3.3148	3.7621
27	Having a pre-reconstruction plan (scenario based) before disaster	3.5385	0.9855	28.9490	0.0000	3.2943	3.7826
28	Conducive economical environment	3.4923	0.8501	33.1220	0.0000	3.2817	3.7029
29	Conducive political environment	3.4769	0.9860	28.4310	0.0000	3.2326	3.7212
30	Project location	3.3538	0.9426	28.6870	0.0000	3.1203	3.5874
31	Design flexibility	3.3385	0.8710	30.9020	0.0000	3.1226	3.5543
32	Project size	3.3385	0.9233	29.1530	0.0000	3.1097	3.5672

The above section presents the cross-case analysis of the research. It reveals four high significant advantages of CPHRP; several high-risk events and their impacts on project objectives; and the twelve CSFs of CPHRP. The next section analyses whether the findings represent the real conditions in the field by conducting the semi-structured interviews.

5.11 Validation

This section presents the analysis of validation on the findings of the research. The validation is carried out by conducting expert interviews. Four respondents were asked their views on the findings of the research (see section 3.9.1.4). Coding, institution and experience of case study location of interviewees are presented in Table 5.26.

Table 5.26 Interviewee data for validation

No.	Interviewee	Code	Institution	Case study
1.	Interviewee 1	VAL1	NGO	Aceh and West Sumatra
2.	Interviewee 2	VAL2	Government	Aceh and Yogyakarta
3.	Interviewee 3	VAL3	Government	Aceh, Yogyakarta, and West Sumatra
4.	Interviewee 4	VAL4	NGO	Aceh and West Sumatra

Interviews for validation follow the semi-structured interview. Questions are about the key findings on advantages, high-risks events and their impacts, and CSFs. Interview guidelines are presented in Appendix D.

5.11.1 Advantages

The key findings on the advantages of CPHRP are that: (i) four advantages can be categorised as highly significant: creating sense of ownership, fitting to local culture, building beneficiaries' confidence, and minimizing corruption; and (ii) psychological advantages are more dominant than the physical advantages. Respondents were asked about their opinion of the findings of the four factors, why sense of ownership is very significant and their opinion about the dominant of psychological advantages over physical advantages.

High significant advantages

All respondents agreed with the findings on the four highly significant advantages. For example, VAL2 expressed his opinion:

> *"These four highly significant advantages, the sense of ownership, local wisdom, building beneficiaries' confidence, and minimising corruption are very true, it is what exactly we found in the field."*

A slightly different view is given by VAL4. Although he agreed with the findings from the questionnaire survey about the most significant advantages of CPHRP, he questioned the significance of 'building beneficiaries' confidence':

> *"For point 1, 2 and 4, I absolutely agree, but for building beneficiaries' confidence, I am not really sure about the form of its implementation in the field".*

The argument communicated by VAL4 is not a surprise, as the psychological advantages such as building beneficiaries' confidence is not a tangible condition. It is something that cannot be seen instantly. However, many reports (ie: Barakat, 2003; Lawther, 2009) support this finding.

Sense of ownership

Creating sense of ownership appears to be the most significant advantages of CPHRP resulting from the questionnaire survey. All the validation interviewees expressed their agreement on this. VAL3 linked the sense of ownership to the sustainability of a programme:

> *"For me, sense of ownership is the most significant…because the success of sustainability of a programme will depend on the sense of ownership"*

The high sense of ownership to CPHRP comes from many factors. VAL1 and VAL2 said that it is because community are directly involved and empowered during the reconstruction process. VAL1 said:

> *"The sense of ownership is very high because the community was directly involved, from the initiation stage until the house is completely built. Even during the supervision process, which is a bit technical, the community was also involved. Women knew how to mixed concrete, bars to be used, so they cannot*

be manipulated by other that would take advantage of them. As a result they were very satisfied, 'this is the result of our hard work, our cooperation'. Included the accountability, funding, they know everything as it is publicly announced."

VAL2 added:

"The community-based method is a tool to empower the community. Basically, the community has an ability to stand alone, the art is on how facilitate them. So if we can facilitate them to empowerment, automatically the sense of ownership will be high."

In addition, the reason why ownership is very important according to VAL4 is that the reconstruction is not only for physical reconstruction, but also for psychological reconstruction. As he noted:

"It means that it is not only to build houses for beneficiaries but also to establish the sense of ownership and care from the beneficiaries. …with high sense of ownership, the community willingly add their own funding to build their house…"

The dominance of psychological advantages

The findings on CPHRP's advantages indicates that the psychological advantages are more dominant than the physical. The physical advantages relate to the traditional objectives of a construction project, such as 'faster reconstruction', 'cheaper reconstruction', and 'better quality' product. VAL1, VAL2 and VAL4 confirm the validity of the findings.

VAL2 said the findings are true and added:

"After the disaster, the victims will feel very down, feeling they don't have anything anymore. However, with the community-based method, which keeps them together, they share the burden, do the planning together, psychologically it can lift their spirit again and which in the end can increase their self-confidence. If we compare with the contractor-based approach, we clearly can't get these kinds of advantages."

VAL1 also noted the time needed for CPHRP compared to the contractor-based approach:

"The time needed for CPHRP is a bit long. It can't be as fast as the contractor-based approach. Because it is a long process, starting from establishing the community organisation, socialisation, a lot of meetings and forums have to be carried out till the construction is finished."

VAL4 also highlighted the importance of achieving the psychological advantages:

> *"The speed of CPHRP cannot be as fast as the contractor-based, in terms of quality it can be better or worse. But the most important thing is the psychological advantages that can be gathered."*

VAL1 also noted problems with time completion. VAL1 explains that many factors contributed to the speed of construction, such as how far the location, availability of local material, and availability of local labour.

Unlike other validity respondents, VAL3 had another view on the comparison between psychological advantages compared to physical advantages. He argued:

> *"It is very debatable. For example, we can't put the better quality at the bottom. If the goal is to build back better, the meaning of better is not only to cure the psychology of community to normal condition, but also not to neglect the building code for earthquake resistant housing."*

5.11.2 Risk

Time is much affected

The risk assessment has revealed that time completion is the objective most affected by high-risk events. VAL1 absolutely agreed that during the initiation stage, the occurrence of risk affected time completion very badly. He adds that because of the delay, costs will also automatically increase.

VAL2 also perceives that time is the element which suffered the most, should risk occur, and confirmed his support on the research findings on risk. Many factors can affect time completion, such as funding disbursement problems and data invalidity.

According to VAL3, high-risk at initiation stages are due to lack of government capacity, unclear reconstruction policy, and problems of communication and coordination. Regarding insufficient funding, he said:

> *"Because 'sufficient' has no parameter, it will depend on the house owner. Based on my experience, the more money the beneficiaries have, they will struggle to define which activity is important, but if the money is limited, they will think hundreds or thousands of times about which one is more important for them. There are additional needs when we have a lot of money."*

He also re-emphasizes that above high-risks are valid:

> *"Risk no 1, 2, and 3 are definitely valid. I had an experienced on how difficult to synchronise government plan and NGO proposal. The NGO with its Aceh style and the government with its Yogyakarta style".*

VAL4 confirms that time and satisfaction are two factors most affected by risk during the pre-construction stage, then cost and quality.

Database

VAL1 also agree that the database is very important. It should be created together with the community and should set clear eligibility criteria. Even if only one piece of data (beneficiary or house) is missing, it can create a big problem. He explained:

> *"If database is valid from the very beginning, has been agreed by the community, publicly announced, having allocated enough objection time, nobody can mess it up."*

VAL1 argues that one special condition applied in Aceh where land acquisition creates a big problem. This is due to the loss of land certificates, some families completely lost, and many physical buildings/land markings were swept away by the tsunami. This condition did not happen in Nias, Yogyakarta or West Sumatra.

Regarding the database programme, VAL2 said that until now there is still no special programme to accommodate the database for housing reconstruction. He adds that local governments should initiate this kind of programme, because they are the one that really knows their area.

Labour availability

In the case of massive reconstruction, VAL1 argues that there is no simple way out for this problem except bringing labour from outside the disaster-affected area. He said:

> *"The solution is to bring labour from other areas. If we want to speed up the completion time, training will not give much help. To create highly skilled labour, it will take ages. The skill cannot come instantly. But, for helpers, we can do it. They can learn from that point."*

Labour training

VAL1 adds that during his days in Aceh and Nias, he trained traditional labourers with very limited knowledge of construction, not a community that has no experience at all in house building skills.

Bureaucracy

Many NGOs in Aceh did not experience bureaucracy problems. VAL1 said:

> *'We did not experience that kind of problem. We only come to the government (BRR) before we come to the community and the other one when we finished our job to say goodbye or handover. We only inform government about our programme, share the information. Government, because they know that it is a grant and we help them, they have never disturbed our work, but sometimes they helped our staff'.*

VAL2 agrees that sometimes bureaucracy creates a bottleneck in the reconstruction effort. However, he adds that in spending the public funding, we have to administer it very carefully. It is highly necessary, but finding the mechanism to disburse it needs to be fast, flexible, and accountable.

Regarding the bureaucracy barrier, VAL4 states:

> *"It is really difficult. Cost disbursement inevitably has administrative procedure and requirements, and there are clear guidelines about it. The Public Works department as an organisation of course will stick to the rule. On the other hand, there is a need for flexibility in order to disburse the fund to community. So, basically, the Public Works department needs a kind of protection to make them save (when audited)."*

Participation

VAL1 expresses that the idea of the higher the community participation the higher the success of CPHRP is not necessarily the case. Community participation has certain limits, it must be controllable. It is best to deal with the community as an organisation, not as an individual.

5.11.3 Critical success factors

Twelve factors have been identified as CSFs for CPHRP. Validation interviewees were asked about the validity of the finding. All respondents shared agreement on the findings. VAL1 and VAL4 noted:

> *"The 12 factors identified are very true."*

VAL2 also confirmed his validation on the findings of CSFs. He explained the connection between understanding of the community-based method, capacity, transparency and trust. As he explained:

> *"The foundation of empowerment is participation. Participation is really needed in community-based, how to encourage community to participate. Who encourages them? Of course, the facilitators. The capacity of facilitator has to be good. After that, the community urges that all the process has to be done transparently. As a result, trust will be built, no suspicion between communities. This is true, all is valid. But we also can't dismiss the support from the government to facilitate all the process."*

Moreover, VAL3 absolutely agrees with the findings on CSFs but regarding the order, many factors have to be considered. He said:

> *"First of all, all the twelve factors are valid. But the ranking will depend on the affected area."*

Then he gives an example for the Aceh case:

> *"In Aceh, factor no 12 (successful beneficiaries' identification) is very important, because of two things, the area was wiped out by the tsunami, and fraud took place where for example one family received five houses. This case did not happen in Yogyakarta or West Sumatra. So which one is most important? It will depend on the affected area. But no 1 is very valid, transparency and accountability."*

VAL4 also analyses it differently, as he stated:

> *"Among all factors, the most important in the field is transparency and accountability. Because they work in community organisation, if there is no transparency, it will be a big problem. Then, capacity of facilitators that their task is to educate/facilitate beneficiaries. After that, funding availability."*

From what is expressed by VAL3 and VAL4, it can be underlined that transparency and accountability is the most important factor contributing to the success of CPHRP. It is in line with findings from the questionnaire survey as respondents perceived that transparency and accountability is immensely important. This factor can also generate other CSFs, such as gathering trust from beneficiaries. However, regarding the ranking, there is a case when we have to consider the order of the CSFs, such as the degree of destruction. Aceh is a very special case, where the level of destruction is massive. We witnessed entire areas wiped out by the tsunami; as a result, there are cases where an entire family was lost.

Transparency and accountability

It is very clear that transparency and accountability is the most important factor in CPHRP. VAL3 stated that with transparency and accountability, corruption practices can be minimised. It is also related to the sensitivity issues in Indonesian community and without transparency, conflict can erupt. As VAL1 said:

> *"We have to be aware that community in Indonesia is very sensitive about government accountability, very sensitive, mostly something related to money. They are very suspicious about this. So that's why it becomes very important. If it is not handled correctly, it can create a physical conflict. Not to mention with us, who come from outside community, but between the organizing community itself, if it is not transparent, the conflict can emerge. If they are controlling each other, not any single rupiahs can be corrupted."*

Gathering trust

VAL3 views that gathering trust from the beneficiaries is also important. He links this factor with accountability. By providing high accountability, trust from the community will be gathered. He gives an example in the West Sumatra case where the religious issue is very sensitive and more than 90% of the population is Muslim. He illustrated:

> *"One of the successful projects is provided by a catholic NGO. The first time they came to the communities, they have a big challenge to be accepted by the communities, because they are a catholic organisation. So why they were successful? Because the community really respected their accountability. Accountability becomes the foundation to treat people equally and respectfully. Their project is working smoothly without any disruption, and the barrier about religion can be defeated."*

VAL4 also said:

> *"Because our aim is to build back better, so gathering trust from the community is important."*

Capacity

The capacity of the facilitator is important to achieve successful CPHRP. VAL1 said:

> *"In order to increase the capacity of the community, we trained them, which is why CPHRP becomes a long process. First we have to train the facilitator, then the community. We have to bear in mind that they don't know anything. Facilitators are also still very young, don't know anything about the condition of the affected area, their customs and decorum. These are very important to learn before getting into the community."*

He added that what was taught related to construction aspects, safety, budgeting/accounting, and how to deal with community.

VAL3 perceived this factor depends on human resources availability. He said

> *"There is a big difference in terms of human resources between Yogyakarta and West Sumatra. In West Sumatra, we have already advertised the job vacancy for an engineer to join the reconstruction programme, but the numbers are not sufficient, and many of them are still fresh graduate with no experience at all. It is a different situation compare to Yogyakarta, they have enough resources."*

He adds that this problem can be avoided by providing training of the programme.

According to VAL4, to increase the capacity, we need to involve well experienced people/organisations, which have good procedures, and also which carry out training programmes.

Coordination

According to VAL1, a solution that he adopted to avoid lack of coordination is by implementing cluster meetings, regularly, fortnightly or monthly, to clarify that this particular NGO will build this number of houses in this location. Problems in coordination sometimes emerged because of personal ego, not the organisation. Sometimes they make bad issues for other NGOs.

VAL1 confirms that coordination is one of the biggest problems in reconstruction effort:

> *"Coordination is really difficult. People easily said coordination, coordination. But in fact they only had a meeting, talk about something, is this called coordination? In my opinion, it is not. Coordination will be better if after the meeting, come up with a decision, and they commit to implementing that decision in the field."*

VAL1 adds that coordination also has to be adjusted to suit local culture. Coordination does not always mean a meeting, many methods can be used.

According to VAL2, coordination problems sometimes arise because of organisation egos, between central government and local government or between institutions. He suggests that this problem can be tackled if from the beginning all stakeholders have sat together. He gives an example:

> *"For instance when designing a reconstruction plan, do it together, make a decision together. You do this, I do this. If we make a decision together, we can reduce it. Why does this happen? Just because of the funding. It can create personal interest. If roles and responsibilities of each institution stated very clearly then we can minimise it."*

VAL3 perceives that coordination, whether good or not, will depend on many factors, massive destruction will make coordination more difficult. Secondly, coordination also becomes difficult when massive funding is available, but this case only happened in Aceh.

VAL4 said:

> *"Coordination between the community organisation and the internal relationships between them are highly necessary."*

VAL4 gave another view on coordination, as he said:

> *"There is a dilemma regarding coordination. The government should have strong guidelines and rules, however the government still have no capacity in doing this. If the government had it, then coordination with the NGO will run smoothly."*

Preplanning/mispolicy

The pre-planning for reconstruction as suggested by Lloyd-Jones (2006) can be done before or after disaster. However, this view has not been seen as an essential part of recovery planning by some respondents, such as VAL2:

> *"Pre-planning will not help much when we set up the reconstruction policy. The post-disaster policy for reconstruction was expressed in the action plan for reconstruction (RENAKSI). Because it is a policy, it needs to be evaluated. If based on the evaluation we need a new strategy, for example for accelerating the reconstruction, then we change it. But not in the form of plan A or plan B, instead in the form of an alternative, and it is normally based on funding availability. If funding is enough to do everything, then we don't need any alternative or to prioritize certain sector. We can do everything at once, as in the Aceh case."*

VAL3 suggests that to overcome this problem (central) government has to prepare all provincial governments to gain a better understanding of disaster risk reduction, which includes preparedness, response, and reconstruction.

VAL4 analysed that to reduce the mispolicy, government need to learn from experience to get a better policy in the future.

Funding

VAL2 said that to overcome the limited funding, the government plans to establish a special account for disasters to collect funding grants from donors or from the international community. In case of a disaster taking place, the government can immediately draw down the funding.

Regarding solving the funding problems VAL3 said:

> *"As far as I remembered, there is a plan to establish a disaster account, but I am not really sure if this plan will work out."*

VAL4 confirms that the funding availability in Padang is very limited. In addition, he also links this problem to lack of coordination. He said:

> *"Actually an NGO fund in Padang is available, but because of lack of coordination between the government and NGOs, it seems that NGOs worked on their own. It resulted to the limited availability of funding in Padang."*

5.12 Summary of Part 4

In this part, the cross-case analysis from the case study areas is presented. It is followed by an analysis of the validation interviews. It was found that four advantages of CPHRP can be categorised as highly significant. These are: creating a sense of ownership, fitting to local culture/customs/wisdom, building beneficiaries' confidence, and minimising corruption. Twenty high risk events and twelve CSFs were also revealed. The highest CSFs in conducting CPHRP are the availability of transparency and accountability during the housing reconstruction process. Further, all the interviewees for validation purposes expressed their support and agreement on the findings. According to them, the research successfully captured the real context of CPHRP.

5.13 Summary

This chapter has presented the analysis of semi-structured interview and questionnaire survey. The qualitative analysis is discussed in section 5.6. The semi-structured interview conducted for this analysis reveals several advantages (section 5.6.2) and limitations (section 5.6.3), the role of stakeholders (section 5.6.4), probable risks (section 5.6.6), and CSFs of CPHRP (section 5.6.7). These findings, particularly on advantages, risks, and CSFs, were used to develop a questionnaire. In the questionnaire, respondents were invited to quantify the level of advantages, risk probability and its impacts on project objectives, and to rate the level of importance of CSFs. The quantitative analysis of data from the questionnaire survey was analysed and discussed in section 5.8. Further, cross-case analysis was drawn in section 5.10. This section discusses the similarities and differences of each case study findings, and attempts to develop a general finding of the research. Finally, at section 5.11, the findings are validated using a semi-structured interview with experts. Having critically analysed the primary data, the next chapter presents the main findings of the research.

Chapter 6 - Findings

6.1 Introduction

Chapter 5 presents the analysis of qualitative and quantitative data of this study. This chapter presents the empirical findings of the research and triangulates them with the literature. The structure of this chapter is as follows; first, it presents findings that focus on the context of the community-based approach in post-disaster housing reconstruction projects. The definition, advantages and limitation are presented. Then, it presents the findings from the implementation of risk management in CPHRP, followed by the presentation of CSFs of CPHRP. Finally, it presents the refinement of the conceptual framework through data findings.

6.2 Community-based method

6.2.1 Definition

Establishing a clear definition of community in the context of post-disaster housing reconstruction is important as the meaning of community can be interpreted in so many ways. As critically examined earlier in section 2.5.1, the researcher has devised a simple definition of community. In the context of post-disaster housing reconstruction, the researcher defines community as groups of beneficiaries of housing reconstruction whose houses have been affected by disaster. The grouping is normally based on geographical area.

Furthermore, types of community participation are presented in section 2.5.2. Arstein's model (1969) and Davidson *et al*.'s model (2007) is discussed. The researcher decided that in order for a reconstruction programme to be known as a 'community-based' or 'community-driven' programme, the level of participation of a community should be at the collaboration or empowerment level. These two levels of participation provide the community with enough power to control their own reconstruction project. They take part in the decision-making process, and are not simply consulted about their needs and wants without any guarantee that these will be implemented. In practical terms, beneficiaries at this level of participation can act as the owner, the supervisor, or even the contractor of their own housing reconstruction project. Thus, the definition of 'community-based' in the context of a post-disaster housing reconstruction project constitutes an approach where participation of the community is at the level of collaboration or empowerment (Ophiyandri *et al.*, 2010a).

The representation of this definition is depicted in Figure 6.1.

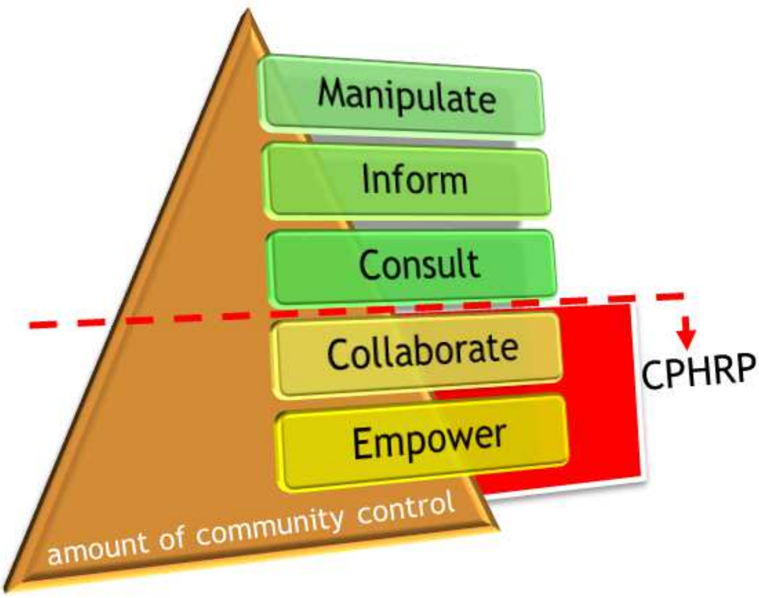


Figure 6.1 Minimum level of community participation in CPHRP
(adapted from Davidson *et al*., 2007)

6.2.2 Advantages

Advantages of CPHRP can be classified into two, physical and psychological. Physical advantages are then divided into two categories, construction and non-construction advantages. The literature review and analysis of semi-structured interviews have resulted into 22 advantages of CPHRP. To rank the level of significant of these advantages, a questionnaire was designed. The detailed results of the questionnaire survey can be seen in section 5.10.1. It was found that four factors can be categorised as highly significant, 'create sense of ownership', 'fit to local culture/customs/wisdom', 'build beneficiaries' confidence', and 'minimise corruption'. The categorisation of advantages and their rank is shown in Figure 6.2.

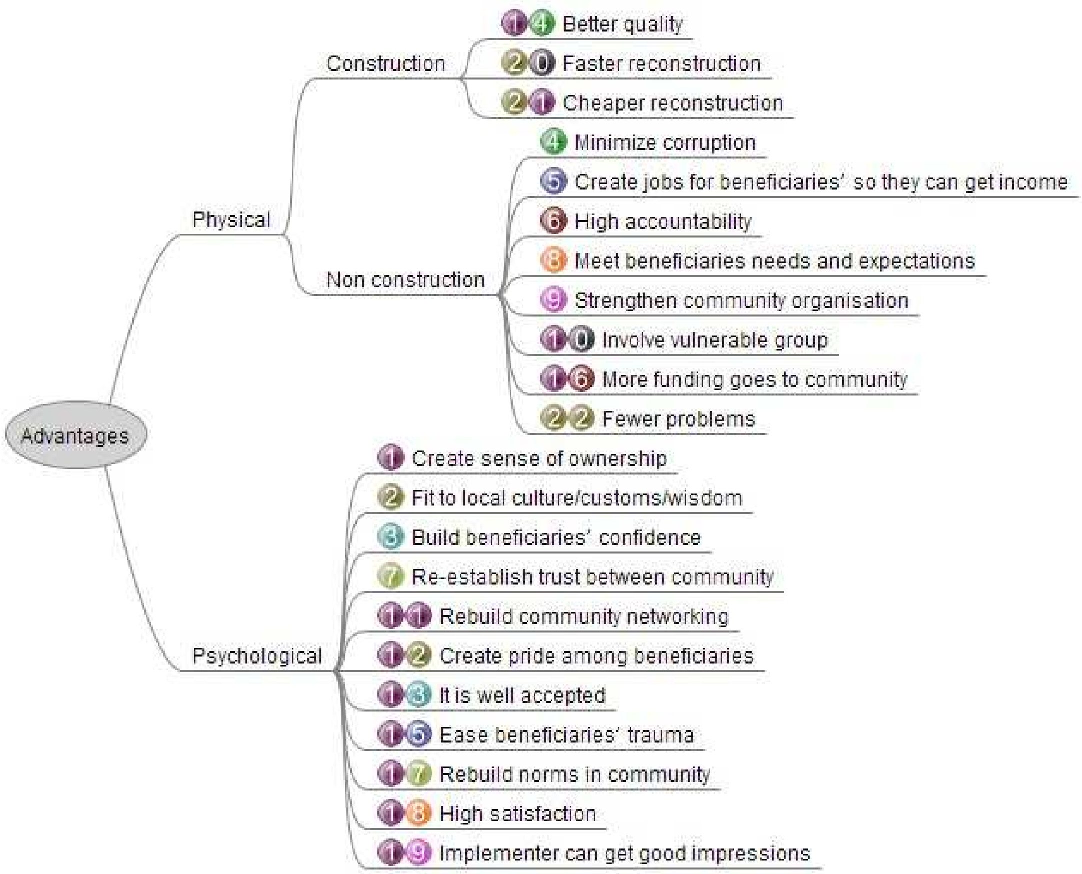


Figure 6.2 Advantages of CPHRP

It can be seen from Figure 6.2 that the psychological advantages are more dominant than the physical advantages. The top three advantages are psychological. The empirical data analysis and semi-structured interviews have also supported this finding. Further, it can be analysed that construction advantages with parameters of better quality, faster reconstruction, and cheaper reconstruction are not particularly significant compared to other factors. The ranking of their advantages are 14, 20, and

21 respectively. This suggests that the psychological advantage is distinct to the community-based method, and perhaps could not be delivered by a method of housing procurement that did not involve active participation of beneficiaries, such as normally happens in the contractor-based method. This distinct advantage definitely contributes to the success of CPHRP. For example, as this method can create a sense of ownership, beneficiaries will make sure that their houses are built to meet a required quality or even that they are higher than the standard.

6.2.3 Limitations

Despite numerous advantages of CPHRP, this method also has limitations, which are discussed in section 5.6.3 Two main drawbacks of this method were discovered. Firstly, it requires a long pre-construction process, which is the nature of CPHRP (see section 5.6.3.1). Some activities cannot be carried out in a short time, e.g. forming community consultation. This kind of activity is considerably time-consuming. Secondly, the capacity of stakeholders of CPHRP, particularly the government and facilitators, to conduct a community-based programme was also found to be limited (see section 5.6.3.2). Although nowadays CPHRP is encouraged by Government of Indonesia, there is still a lack of understanding of the principles of the community-based approach. This is in line with the findings of Davidson *et al*. (2007) which state that only a little knowledge exists on how CPHRP should be carried out at project level.

6.3 Implementation of risk management process

6.3.1 Implementation

As discussed in section 5.6.5, a risk management process in CPHRP was not commonly implemented. The majority of interviewees had never implemented one in CPHRP or even in a general construction project. Interviewees that had implemented risk management process in CPHRP also acknowledged that the implementation was still very general in nature and at the proposal stage. Further, the majority of respondents agreed that risk in pre-construction is higher than risk at the construction stage.

6.3.2 High-risks events

A risk management process has been conducted in this study. It started by conducting risk identification by deploying a semi-structured interview. The analysis of risk identification was presented section 5.6.6. Risk is clustered into eight groups of pre-construction activities of CPHRP. After that, it was assessed by conducting a questionnaire survey in which respondents were asked about the probability of risk taking place and its impact on project objectives. The analysis of probability and impact is presented in section 5.10.2, and the probability index and impact factor can be seen in Table 5.23. Further analysis on classifying the level of risk is presented in section 5.10.3. For this analysis, the probability impact factor was used, with results shown in Table 5.24.

Six groups of activities in CPHRP were found to contain high-risk events. They are initiation stage, facilitator recruitment and training, housing damage assessment, beneficiaries' identification and land tenure, community/labour training, and housing design and materials. Only two groups of activities did not contain high-risk events, programme socialisation and forming a community organisation.

Furthermore, the objective most affected by high-risk events is time completion of CPHRP. Twenty high-risk events have been revealed to have negative consequences on time. This is followed by the impact on satisfaction and cost. The number of high-risk events on these objectives is almost the same, 15 and 13 high-risk events. The objective least affected by high-risk is housing quality, where only three events categorised as a high-risk event on quality. The summary of high-risk events and their PI value can be seen in Table 6.1. The 'No' column on the left of the table indicates the number taken from the original source of risk events in Table 5.24.

Table 6.1 Summary of high-risk events and impacts on project objectives

No	Risk	Time	Cost	Quality	Satisfac-tion
A	**INITIATION STAGES**				
2	Lack of local government capacity	0.2222	0.1535	0.1570	0.2010
3	Unclear reconstruction policy	0.2089	0.1786	0.1564	0.2032
7	Problems of communication and coordination	0.2432	0.2090	0.1900	0.2107
11	Insufficient funding	0.2334	0.2083	0.2218	0.2292
B	**FACILITATORS RECRUITMENT AND TRAINING**				
2	Lack of facilitators' knowledge and experience	0.2022	0.1696	0.1958	0.1969
C	**HOUSING DAMAGE ASSESSMENT**				
1	Lack of housing database	0.2604	0.2230	0.1870	0.2234
2	Too many parties involved	0.2318	0.2139	0.1831	0.1839
3	Non-uniform assessment method	0.2061	0.1863	0.1854	0.2043
4	Coordination problems	0.2333	0.1855	0.1904	0.2133
7	Transportation/access problems	0.3048	0.2911	0.1838	0.1994
8	Collusion in defining damage category	0.2049	0.1871	0.1742	0.2248
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**				
1	Lack of beneficiaries databases	0.2815	0.2212	0.1720	0.2431
4	Transportation/access problems	0.2587	0.2557	0.1543	0.1726
5	Collusion in deciding beneficiaries'	0.2107	0.2022	0.1776	0.2246
6	Problems with land tenure/rights	0.2801	0.2307	0.1642	0.2093
7	Validation problems	0.2718	0.2179	0.1712	0.2037
G	**Community/Labour Training**				
3	Labour shortages	0.2367	0.2277	0.1833	0.1823
4	Limited knowledge by labour of how to construct earthquake resistant houses	0.2363	0.2302	0.2530	0.2183
H	**Housing Design AND MATERIALS**				
7	Material price increases	0.2508	0.3265	0.2230	0.2145
10	Too much paperwork prior to initial payment at start of construction work	0.2435	0.1661	0.1534	0.2249
	Number of high risk events	20	13	3	15

In addition, to represent the high-risk events of CPHRP and which objective they affect, a simple model has been established (see Figure 6.3.). The model consists of two elements, first the high-risk events, and second the affected objective of CPHRP. In this model, the impact of high-risk events on CPHRP's objectives was identified by grouping them in a box. Each box has a different colour in order to identify which of CPHRP's objectives were affected. For example, the high-risk event 'bureaucratic process in funding disbursement' has an impact on satisfaction and time. Thus, a purple box (satisfaction impact) and a red box (time impact) mark this event. This event does not affect cost and quality, so it was placed outside the boundary of the blue and green box.

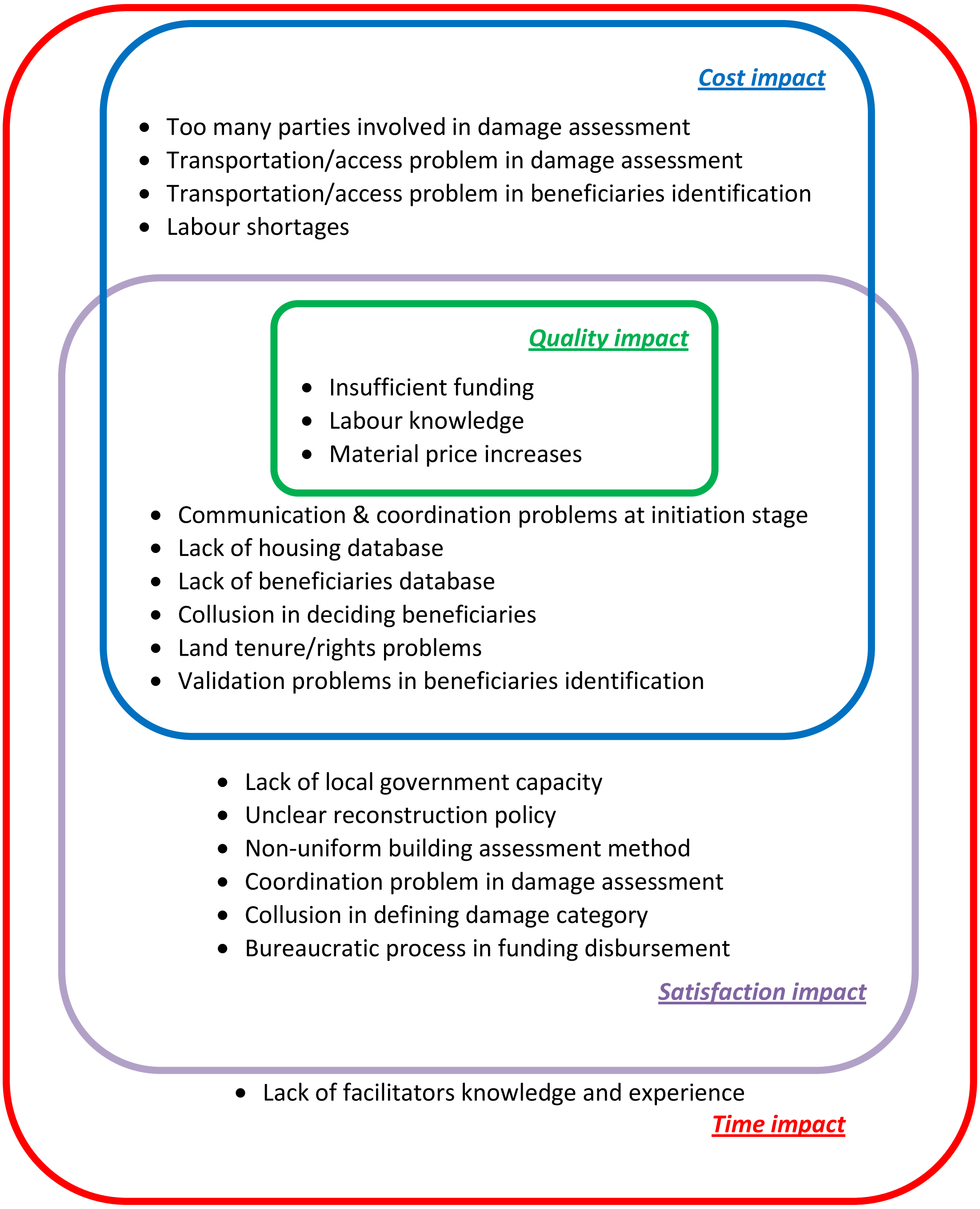


Figure 6.3 High-risk events and its impact on project objective

6.3.3 Risk response

The next step of project risk management is to establish a risk response for each high-risk event. As described in section 2.6.2, there are options available in dealing with risks, from maintaining to avoiding the risk. In this context, the high-risk event identified cannot be avoided, as it is an essential part of CPHRP process. Thus, reducing the probability of risk occurrence and its impact are the most appropriate ways of dealing with risk. All proposed responses have to be carried out prior to disaster. The suggested risk response for each high-risk event is presented in Table 6.2. Likewise in Table 6.1, the 'No' column on the left of the table indicates the number taken from the original source of risk events in Table 5.24.

Table 6.2 Risks response for high-risk events

No	High-risk events	Risk response
A	**INITIATION STAGES**	
2	Lack of local government capacity	• Increasing the capacity of human resources by conducting training programme on CPHRP • Designing curricula/syllabus for government training programme
3	Unclear reconstruction policy	• Increasing government capacity
7	Problems of communication and coordination	• Establishing clear and simple method of coordination and communication procedure. • Defining clear role and responsibilities of each stakeholder.
11	Insufficient funding	• Creating a special disaster account at country level. • Ensuring transparency and accountability was conducted in order to attract donors to provide funding. • Encouraging community to take insurance
B	**FACILITATORS RECRUITMENT AND TRAINING**	
2	Lack of facilitators' knowledge and experience	• Introducing a subject of disaster reconstruction, specifically on CPHRP, for built environment students in area prone to disaster.
C	**HOUSING DAMAGE ASSESSMENT**	
1	Lack of housing database	• Creating a digital database system by deploying a GIS method
2	Too many parties involved	• A strong policy in handling all stakeholders • Clear communication and coordination procedure
3	Non-uniform assessment method	• Establishing a standard method for housing damage assessment
4	Coordination problems	• Establishing clear and simple method of coordination and communication procedure. • Defining clear role and responsibilities of each stakeholder.
7	Transportation/access problems	• A strong cooperation with institution that has capability in providing

No	High-risk events	Risk response
		emergency/temporary access to affected community.
8	Collusion in defining damage category	• Ensuring transparency in every aspect of reconstruction • Involving all community member in reconstruction process
D	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**	
1	Lack of beneficiaries databases	• Creating a digital database system by deploying a GIS method
4	Transportation/access problems	• A strong cooperation with institution that has capability in providing emergency/temporary access.
5	Collusion in deciding beneficiaries'	• Ensuring transparency in every aspect of reconstruction • Involving all community member in reconstruction process
6	Problems with land tenure/rights	• Creating a digital database system by deploying a GIS method
7	Validation problems	• Creating a digital database system by deploying a GIS method
G	**Community/Labour Training**	
3	Labour shortages	• Bringing in labour from surrounding area to the disaster affected area. • Conducting a training for labour/community on how to construct earthquake resistance housing
4	Limited knowledge by labour of how to construct earthquake resistant houses	• Conducting a training for labour/community on how to construct earthquake resistance houses
H	**Housing Design AND MATERIALS**	
7	Material price increases	• Controlling material price • Supplying material • Creating a self material production in community
10	Too much paperwork prior to initial payment at start of construction work	• Creating a clear and simple funding mechanism for disaster reconstruction.

The first issue of risk is related to capacity. Low government capacity can influence the policy and strategy of a housing reconstruction programme. Thus, in reducing the likelihood of this event taking place, increasing government capacity is necessary. It can be done by creating a training programme of CPHRP. In this training, the fundamentals of general post-disaster reconstruction programmes are taught, and details of CPHRP are explained. Presenting a lesson learnt from selected case studies will also benefit. Accordingly, creating a curriculum/syllabus for increasing government capacity is needed. The resulting curriculum can be a model that can be applied in other disaster prone areas. Another capacity issue (facilitator and labourer) also can be reduced by providing training for them. Particularly for built environment students, where they can be trained to become a facilitator, by inserting a subject of post disaster reconstruction into their curriculum. It can be a compulsory or an optional subject, depending on the susceptibility of the area. For enhancing labour capacity, regular training for labourers has to be carried out. The training has to be designed in a more practical way and the proportion of theory has to be reduced.

Second is the aspect related to the policy/strategy established by the government. Events such as problems of communication and coordination, too many parties involved in damage assessment, non-uniform housing assessment methods occur because the policy/strategy of reconstruction is weak and unclear. The government should clarify the roles and responsibilities of each stakeholder involved in the reconstruction programme, establish clear and simple methods for coordination and communication, and prepare a standard method of assessment. A strong policy is required. With a strong policy, for example, government can push other organisations coming to the disaster-affected area to adopt the standard assessment method they provide. No other assessment method should be allowed to be implemented.

Furthermore, there is an aspect related to funding. As suggested by interviewees in the validation process (section 5.11), a special account for disaster reconstruction has to be created. In order to attract donors to provide grants for the reconstruction programme, the government has to convince donors that the grant will be spent with great transparency and accountability. The other way of reducing the impact of insufficient funding is by encouraging the community to take out insurance for their houses.

Thirdly, there are high-risk events related to the database system. Problems in database systems mainly occur because it is still done manually, and not all community members and houses are identified. Thus, creating a digital database system is essential. One method is to create a geographical information system (GIS) of the disaster prone area. A digital map would completely identify of all the houses and their owners, and should be updated regularly. Once a disaster had taken place, this data can easily be retrieved and given to the facilitator for assessment or beneficiaries' identification.

Furthermore, there are risks related to a collusion issue in defining beneficiaries and damage assessment. These risk events can be reduced by ensuring transparency is present throughout the process of the reconstruction programme, and by involving all stakeholders in every step of the reconstruction process.

Transportation/access problems to the disaster-affected area are a high event risk that cannot be avoided. The collapse of a bridge or road that suddenly disappears because of a landslide is normal after an earthquake. To reduce the impact, the government institution handling the reconstruction programme has to generate good cooperation with the technical institution that has the capability of providing emergency or temporary access, such as the department of public works or the army.

Problems of the increase in material price are an event that also normally happens after a disaster. This is mainly because the demand for materials is higher than the supply. Thus, the government is urged to control material price and ensure that demand and supply are balanced. For housing material that can be produced by home industry, such as bricks, providing community with equipment and training how to produce it will be an advantage.

Finally, there are risks related to bureaucracy. It is understood that the procedure to disburse the government budget is complicated and has to go through a long process. However, an exception has to be made for reconstruction programme. Thus, the government has to create a clear and simple funding disbursement mechanism specifically for post-disaster reconstruction.

6.4 Critical success factors

section 5.6.7 discussed the nominated CSFs identified from the interviews using data analysis. Added to relevant CSFs from the literature review a questionnaire was designed, and 32 selected success factors were identified. The success factors can be categorised into three different groups; first, CSFs relating to the capacity of stakeholders, second, CSFs relating to external factors, and third, CSFs relating to project design and implementation. The categorisation is shown in Figure 6.4. The analysis of quantitative data from the questionnaire survey in section 5.10.4 reveals that 12 factors can be classified as CSFs of the CPHRP. The CSFs are 'transparency and accountability', 'appropriate reconstruction policy/strategy', 'understanding the community based method', 'gathering trust from community', 'facilitator capacity', 'good coordination and communication', 'sufficient funding availability', 'implementer capacity', 'significant level of community participation/control', 'government support', 'involvement of all community members', and 'successful beneficiary identification'. Subsequently, in section 5.11.3 the finding is validated by implementing expert interviews.

Further, from Figure 6.4 it can be seen that the CSF is dominated by factors closely related to the community, where 33% of 12 CSFs originate. There are three factors related to capacity, the understanding of the community-based method, and the capacity of implementer and facilitator. Project design contributes two factors in CSFs, where the appropriate reconstruction policy/strategy and government support are necessary. The next CSFs, transparency and accountability, and good coordination and communication are factors that originated from the category of general implementation of the project. Finally, sufficient funding availability is the only external factor identified as a CSF of CPHRP.

The interaction between CSFs is presented in Figure 6.5. It can be seen from this model that the capacity of implementers is influenced by their understanding of the community-based method. Together with funding availability and support from the government, these factors produce the policy and strategy of CPHRP. The design of the policy includes guidelines on coordination and communication, how to involve the whole community in the reconstruction process and to what extent their involvement should be, the method for beneficiaries' identification, and how to ensure transparency and accountability in order to gain trust from the community. The design is to be implemented by facilitators, thus their capacity plays a critical role in contributing to the success of CPHRP.

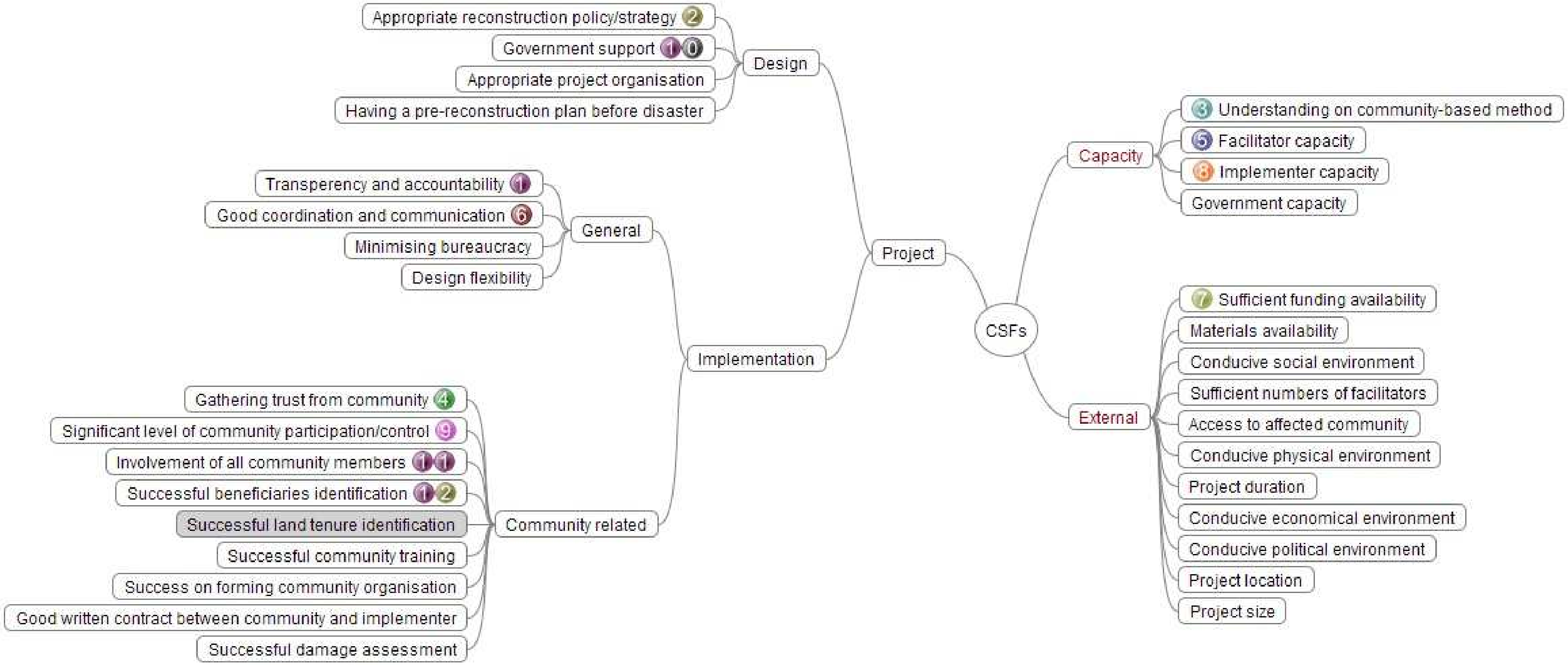


Figure 6.4 CSFs of CPHRP during pre-construction stage

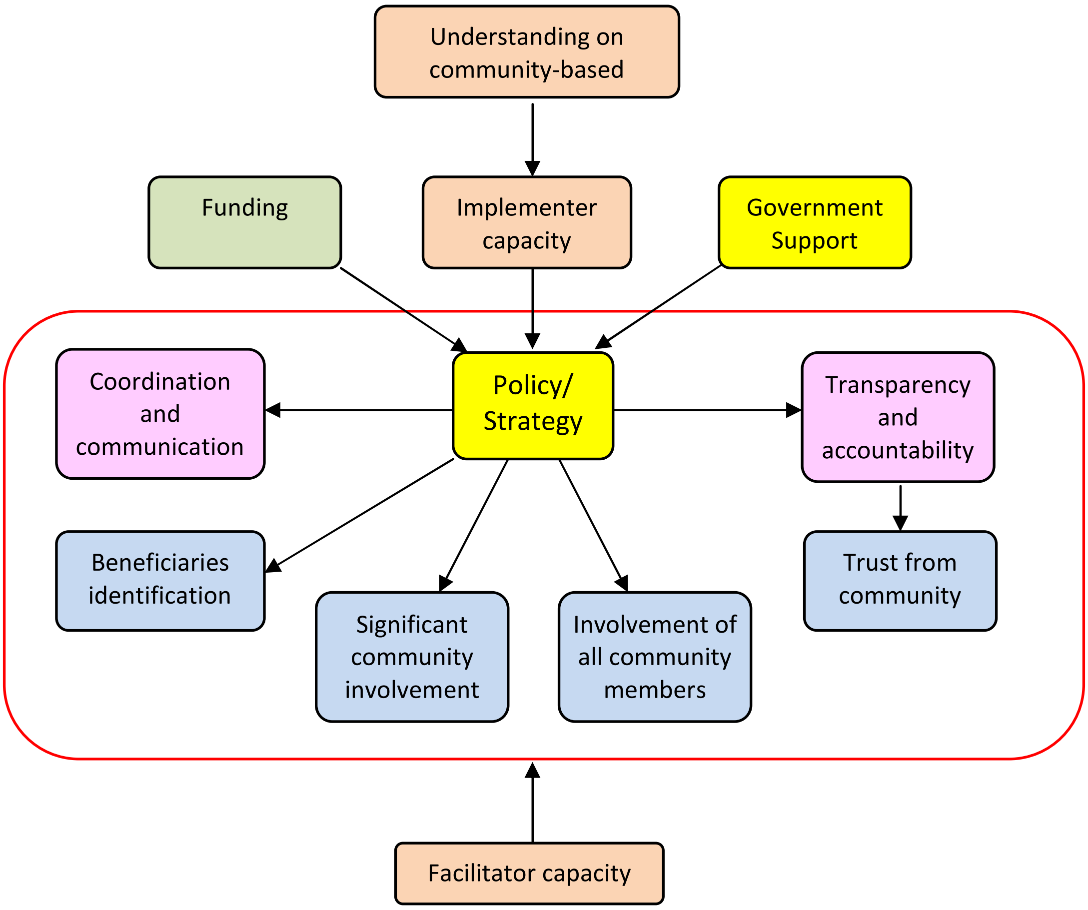


Figure 6.5 CSFs model for CPHRP

Respondents perceive transparency and accountability as the most critical factor for the success of CPHRP. Dasgupta and Beard (2007) and Labadie (2008) highlighted the importance of these factors in community-based projects. Moreover, Labadie (2008) argued that with transparency and accountability, the chance of success of post-disaster reconstruction could be increased. Transparency and accountability are required not only in terms of funding, but also in all aspects of the housing reconstruction. Transparency in information, programme details and objectives, decision-making processes, funding availability and its disbursement, and time scales, are some important aspects. It is also required in every stage of the reconstruction process, from planning to implementation.

In post-disaster reconstruction, traumatic conditions often make survivors suspicious of people coming from outside their community. Sometimes outside organisations bring hidden agendas and can manipulate the community in order to achieve their own objectives. Transparency and accountability can also minimize corruption. Failure to address this issue can lead to high levels of dissatisfaction from beneficiaries. Hence, it is not surprising that this is the highest critical factor in ensuring the success of CPHRP.

The second factor that contributes to the success of CPHRP is appropriate reconstruction policy and strategy. Inappropriate policy or strategy can be very costly and can waste time. One reason for this is that the government is forced into making quick decisions on reconstruction strategy in order to provide houses for beneficiaries as soon as possible. As suggested by Davidson *et al*. (2007), it is impossible to develop a single best approach of CPHRP that can be adopted universally, since it is contextual. The level of destruction, level of capacity of affected stakeholders, funding availability, and culture will be different from one affected area to another. Thus, da Silva (2010) highlighted that the key consideration in establishing a reconstruction strategy is an understanding of the geography, society, economics, politics, climate and hazards of the affected area.

The community-based method is a form of high-level community participation in a reconstruction programme. Reconstruction that only consults the community about their needs and expectations with no guarantee that these will be implemented, and with no contribution from the community afterwards, cannot be classified as community-based or community-driven methods.

External organisations sometimes underestimate the capacity of the affected community and often assume that they know what is best for the community. In reality, it is the community that knows what it needs. Thus, failing to involve the community from the very beginning of a reconstruction project makes its success very unlikely. As a result, the community should be engaged from the beginning through to the end of the CPHRP. Every effort of post-disaster reconstruction should benefit the beneficiaries; people should be at the heart of the programme.

As survivors in a community become passive in post-disaster situations, there four basic strategies are required in order to increase the level of participation (see

Johnston (1982) in section 2.5.2). These factors are immensely important for a community-based approach. The CPHRP requires external agencies to work closely together with the affected community. Without having mutual trust between parties involved in the reconstruction process, it would be unlikely that the programme would be successful. There are many ways to gather the community's trust, such as through transparency and accountability, understanding the local culture and religious aspects in the community, showing respect to the community, and by showing that the implementers are competent and capable of carrying out the programme successfully.

Success and failure of the housing reconstruction programme will also depend on the capacity of the facilitator. The facilitator is the one who is directly involved and works together with the community in the housing reconstruction project. Facilitators guide the community in the process of housing reconstruction, from the concept, planning, construction and through to completion. Facilitators are also responsible for upgrading community capacity through training programmes. It is not only technical skills required to become a good facilitator, soft skills are also important.

Coordination and communication have become one of the major issues in post-disaster reconstruction. This issue emerged in Aceh, Yogyakarta and Central Java, and West Sumatra reconstruction programmes (BRR, 2009a; MacRae and Hodgkin, 2011; Pranoto *et al*., 2011). MacRae and Hodgkin (2011) state that the greatest problem in post-disaster housing reconstruction is the coordination of three main stakeholders: international NGOs, local NGOs and governments.

Uncoordinated reconstruction can lead to programmes overlapping and competition between implementing agencies. In Aceh, for example, the availability of huge funding and lack of coordination have made some NGOs compete for beneficiaries, not for sources of funds. Thus, it is important to administer who is doing what, where, when and how. For effective coordination, Moe and Pathranarakul (2006) suggested grouping the coordination into five levels: international, national, regional, organisational, and project level. A mode of fast and effective communication between stakeholders also has to be established in order to ensure the success of CPHRP. As a result, the implementation of information systems for fast, accurate, reliable and up to date information is crucial.

Funding availability is obviously important in any kind of project. In a post-disaster housing reconstruction context, the amount of money available to be spent will determine the type of house that can be delivered and to what extent the government/organisation can provide assistance to beneficiaries. As described elsewhere, with sufficient funds, a full house reconstruction (more than US$4.500) can be provided to beneficiaries, while in Yogyakarta and West Sumatra, with a limited government budget, the amount of money that could be allocated was only around US$1.500 per household. The challenges in funding, according to da Silva (2010) are the total amount of availability, the timescales over which it can be spent and specific requirements from donors. Lloyd-Jones (2006) also highlighted that funding for reconstruction is too inflexible and focused on the short-term plan.

The huge funding availability in Aceh was a very rare case in a post-disaster situation (Steinberg, 2007; da Silva, 2010), as in normal scenarios funding is only sufficient for emergency and provision of temporary shelters (da Silva, 2010), such as in Yogyakarta and West Sumatra. To fulfil the post-disaster reconstruction needs, non-developed countries need loans or grants from donors (Freeman, 2004). As a result, governments should start designing an innovative way to fund post-disaster housing reconstruction.

The reconstruction of Aceh has witnessed many organisations failing to adopt the community-based approach. Excessive funding availability has led some organisations that originally were humanitarian organisations to get involved in housing reconstruction projects (Steinberg, 2007). For many organisations, it was their first experience and as a result, many of them stopped their programme during the process or failed in producing good quality houses (Dercon and Kusumawjaya, 2007). Kennedy *et al*. (2008) suggest that implementing organisations should evaluate their own capacity, and if found to be low then partnerships or collaboration with other organisations should be sought. This shows how important the implementer capacity is in CPHRP.

The role of the community in the post-disaster reconstruction process can vary, but they should be engaged at every stage of the reconstruction process. Their level of participation should be at the level of collaboration and empowerment. Davidson *et al*. (2007) in their research on four case studies, found that empowerment of the community in post-disaster housing reconstruction achieved higher satisfaction among beneficiaries compared to projects in which community participation was minimal.

However, assuming that the higher the level of community participation, the better the result of reconstruction can be misleading. The level of community control on post-disaster housing reconstruction will depend on the capacity of the community itself and on the local context. For example, it is inappropriate to engage all communities in constructing their own houses by themselves (as labourers) as there might be some of them willing only to supervise their house reconstruction. Moreover, Kennedy *et al*. (2008) suggest that community participation does not necessarily mean communities have complete control over the reconstruction process.

The support from government is very important. Inevitably, the reconstruction effort is within the government's domain and the government is responsible for providing better housing for beneficiaries. Hence, the government should support any effort to provide assistance for beneficiaries.

Involvement of community members is important in implementing CPHRP. Although the nature of community participation can reduce the possibility of marginalisation, sometimes it happens (Dercon and Kusumawijaya, 2007). All community members have to contribute in the reconstruction process, particularly in the pre-construction stage. The voice of vulnerable or marginalised groups such as women, orphans, the disabled or the elderly has to be heard in order to capture all community needs and expectations.

Although this factor was found to be the lowest ranked CSF, successful beneficiary identification is the path to producing speedy housing reconstruction and can lead to high satisfaction. Problems in beneficiary identification can be minimised if the government has an adequate database system, which can identify the owners of affected houses, the number of occupants, or the tenant of the house quickly and accurately. Yet, this type of system is not available. As a result, beneficiary identification and verification take a lot of time to be completed and can be costly.

In addition, the government also has to establish clear eligibility criteria for survivors to receive funding. In cases where the budget is limited and reconstruction has to be carried out in stages, other criteria on who is entitled first also has to be informed for community transparency. This can reduce conflict between community members.

6.5 Linking high-risk events and CSFs

Analysing the findings on high-risk events and CSFs of CPHRP, it can be seen that there are some similarities between them. Some high-risk events can actually be the CSFs of CPHRP, or the reverse, it has been suggested. Similar factors are related to the policy/strategy of a reconstruction programme, the facilitator's capacity, coordination and communication, the government/implementer's capacity, beneficiary identification, and funding. Accordingly, by paying due attention to these factors, it is expected that the success of CPHRP can be achieved.

6.6 Refinement of conceptual framework

The findings from the empirical analysis have contributed to the refinement of earlier conceptual framework in section 4.5. This expanded framework, which is presented in Figure 6.6, helps to provide best practice guidelines to ensure the success of the implementation of CPHRP.

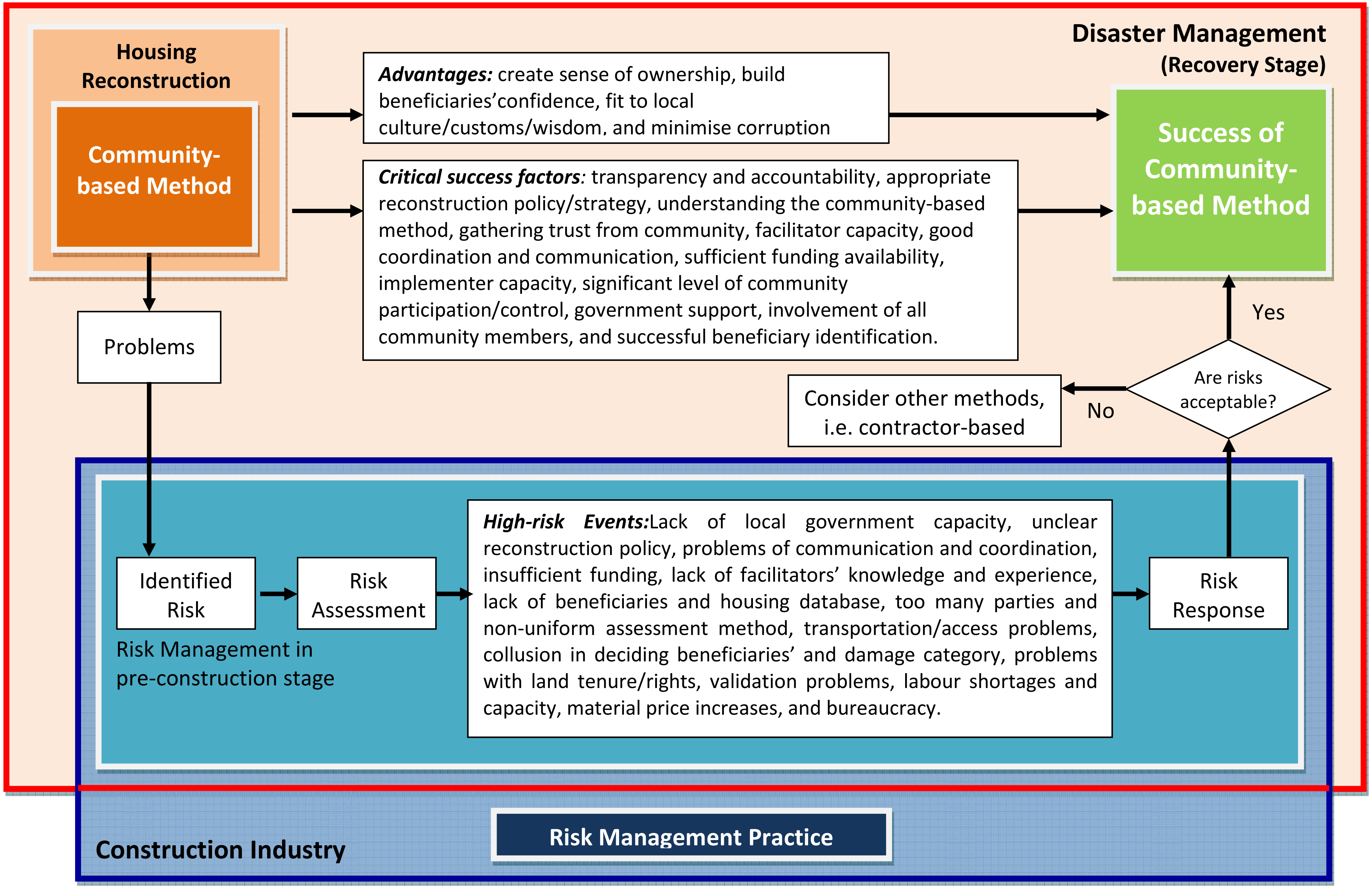


Figure 6.6 Expanded conceptual framework

6.7 Summary and the link

This chapter discusses the findings of the research, while triangulating with the literature and validation interviews in order to improve the validity of the research. Section 6.2 discusses the context of the community-based approach in post-disaster housing reconstruction. In section 6.3, the implementation of risk management process in CPHRP is presented. Some high-risk events are identified and suggested risk responses are proposed. Section 6.4 presents the CSFs of CPHRP, where 12 factors are identified and their interaction is described. Furthermore, the similarities between high risk events and CSFs are discussed in section 6.5. Finally, in section 6.6 the conceptual framework of the research is refined. The next chapter presents the summary of the research findings, limitations and future research that can be identified from this research.

Chapter 7 - Conclusions

7.1 Introduction

Chapter 1 of the thesis presents the background and justification of the research, including its aim and objectives. Chapter 2 critically examined literature related to research topic. In Chapter 3, the research methodology to achieve the aim and objectives of the research are discussed, followed by Chapter 4 where the conceptual framework is presented. Chapter 5 presents the primary data gathered from interviews and the questionnaire survey and its analysis. Chapter 6 presents the findings of this research. In this context, this chapter presents the conclusions by summarising the results of the study. Accordingly, the structure of this chapter first presents the findings of each objective of the study, second, discusses the contribution of the research to theory and practice, and third, presents the limitations of the study. Finally, a recommendation for further research is noted.

7.2 Summary of key findings

7.2.1 Objective 1: to understand the context of CPHRP

In order to acquire a better understanding on CPHRP, it is immensely important to establish a simple definition of 'community' and 'community-based' in the context of post-disaster housing reconstruction, because 'community' can be interpreted in many ways (see section 2.5.1). In this study, the researcher defines community as a group of beneficiaries of housing reconstruction whose houses have been affected by disaster.

Moreover, this research finds several forms of community participation (see section 2.5.2). In the context of post-disaster housing reconstruction, the researcher comes up with the meaning of community-based as an approach for a housing reconstruction programme in which participation of the community is at the level of collaboration or empowerment (see section 6.2.1).

The CPHRP can bring several advantages and this research reveals 22 advantages of CPHRP, both physical and psychological (see section 6.2.2 and Figure 6.2). It classifies four advantages as highly significant. The most significant is ‘create sense of ownership’, followed by ‘build beneficiaries’ confidence’, ‘fit to local culture/customs/wisdom’, and ‘minimise corruption’. Further, it found that psychological advantages are more dominant compared to physical advantages, particularly when comparing with construction advantages. Psychological advantages are a distinct advantage of CPHRP, and can contribute to the success of CPHRP.

7.2.2 Objective 2: to identify and analyse the limitations of CPHRP

There are two limitations to the implementation of the community-based method in post-disaster housing reconstruction (see section 6.2.3). The first relates to the system of CPHRP (see section 5.6.3.1). This method requires a long pre-construction process. In the implementation of real community participation, many activities during pre-construction stage, such as forming a community organisation, requires a long time to be completed. On the other hand, the nature of a post-disaster reconstruction project requires that the housing project be completed in the shortest time possible. Rushing the participatory process can hinder the real participation of beneficiaries. The second limitation relates to the capacity of stakeholders (see section 5.6.3.2). The understanding of stakeholders of the principle of the community-based approach, particularly at project level, is still very limited. The capacity of government, facilitators, and community itself need to be enhanced. This should be carried out long before a disaster takes place.

7.2.3 Objective 3: to establish the critical success factors of CPHRP

Twelve critical success factors that contribute to the success of CPHRP have been identified (see section 5.10.4). The most important factor is ‘transparency and accountability'. It is followed by 'appropriate reconstruction policy/strategy', 'understanding the community based method', 'gathering trust from community', 'facilitator capacity', 'good coordination and communication', 'sufficient funding availability', 'implementer capacity', 'significant level of community participation/control', 'government support', 'involvement of all community members', and 'successful beneficiary identification'. Further, the linkage between CSFs has also been established (see Figure 6.5.). By paying attention to the identified CSFs, it is expected that the success of CPHRP can be enhanced.

7.2.4 Objective 4: to establish a model of risk management guidelines to ensure the success of CPHRP

The implementation of a risk management process in post-disaster reconstruction programme is still uncommon. This research reveals some risks in the pre-construction stage of CPHRP that can negatively affect the project's objective. The probability and impact of these negative events is presented in Table 5.23. Furthermore, by carrying out risk assessment methods using probability impact factors, some high-risk events are identified (see Table 5.24). It was found that during the pre-construction stage of CPHRP, the objective most affected by high-risk events is time completion of housing reconstruction programme. It is followed by the possibility of dissatisfaction from community and cost escalation. The least affected is quality of housing.

In addition, high-risk events in CPHRP and affected objectives are presented in Figure 6.3. In order to reduce the possibility of risk occurrence and their impact, a guideline for risk response is proposed in Table 6.2. The identification of high-risk events, their possibility and impacts, and the suggested risk response are expected to ensure the success of CPHRP.

7.3 Contribution to theory and practice

The research findings detailed in Chapter 6 establish the contribution of this research both to theory and to practice.

7.3.1 Contribution to theory

This study merged literature from three main areas: post-disaster housing reconstruction (see section 2.4), community-based approach (see section 2.5), and project risk management (see section 2.6). By merging the concepts and theories on the subject areas, this study provided a better understanding of project risk management for a community-based post-disaster housing reconstruction project (CPHRP). The following provides details of how this study has contributed to theory in these areas.

This study has contributed to theory by establishing a simple definition of a community and a community-based approach in the context of post-disaster housing reconstruction (see section 6.2.1). The study also identified the advantages of CPHRP, which can be divided into physical advantages and psychological advantages (see section 6.2.2). Limitations of CPHRP also have been identified (see section 6.2.3).

This study further develops the project risk management model during the pre-construction of CPHRP. It reveals several high-risk events of CPHRP and their impact on project objectives (see section 5.10.2, 5.10.3 and 6.3.2). In order to increase the success of CPHRP, particular attention has to be paid to these risks. As a result, a risk response document is also proposed (see section 6.3.3).

The other contribution to theory of this research is the establishment of the CSFs of CPHRP (see section 6.4). The CSFs are not a stand-alone factor, but they are inter-related. The relation between them is shown in Figure 6.5. Moreover, there are several similarities between the high-risk events and the CSFs (see section 6.5).

7.3.2 Contribution to practice

The findings of this study have a number of important implications for the practice of CPHRP. First, the definition of CPHRP (see section 6.2.1) can guide practitioners to implement a real community-based programme. The establishment of CSFs (see section 6.4) can guide practitioners in ensuring that those particular factors are available or conducted during a housing reconstruction project. Further the establishment of the risk management model (see section 6.3.2 and 6.3.3) can act as a guideline in order to avoid or to reduce the possibility of high-risk events occurring, and to minimise the impact of high-risk events should they happen. Finally, the framework (Figure 6.6 in section 6.6) provides a guideline to ensure the success of CPHRP.

7.4 Study limitations

Several limitations need to be acknowledged in this research. The first regards the advantages of CPHRP. Due to time and resource limitations associated with a typical PhD research, interviewees of the semi-structured interview and the sample in the questionnaire survey were limited to non-beneficiary respondents. Thus, the results were based mainly on the perspectives of stakeholders outside the community.

This research was conducted using the multiple case study approach to ensure the external validity of the research. It represented three areas hit by disaster and experiencing massive housing reconstruction projects. As the external validity of the research was achieved, findings of the research may be generalised into a wider context. However, careful attention has to be paid when attempting to transfer the generalisation to developed and rich countries, as particular findings, such as funding problems, might be inappropriate. Thus, the researcher strongly suggests future research into this area.

7.5 Further research

As noted in the previous section, the research has a limitation in finding out the advantages of CPHRP. Therefore, the researcher strongly encourages future research focusing on the identifying of the advantages of CPHRP based on a community perspective. It would be interesting to analyse the possible similarities and differences between the perspective of the community and the people outside the community.

This study was based in Indonesia. In line with the limitation of the study, conducting a similar research in another developing country and/or in a developed country would be a challenging research topic.

Further, this research focuses on the pre-construction stage of CPHRP. In order to complete the research for all stages of CPHRP, this research could be expanded to encompass the construction stage of CPHRP.

This research employed the qualitative method (probability-impact method) as a method for risk assessment. As there are several other methods available for risk assessment, and it would be interesting to conduct research by implementing other risk assessment techniques, particularly by deploying a quantitative method.

7.6 Final note

This chapter summarises the main findings of the research obtained from the literature review, interviews, and questionnaire survey. All objectives of the research have been successfully achieved, ranging from the fundamental of understanding the context of the community-based method to the establishment of a risk management model and of the success factors of CPHRP. Thus, this research has contributed to the theory and practice of the community-based approach. Further, research limitations were revealed, and recommendations for future work were suggested.

APPENDIX A: LIST OF PUBLICATIONS

Book Chapters

Ophiyandri, T. (2011). Community Based Post Disaster Housing Reconstruction: Examples from Indonesia. In: Amaratunga, D and Haigh, R. (Eds) *Reconstructing for Resilience: Strategies for building sustainable communities after a disaster* (91-116). Chichester: Wiley-Blackwell.

Refereed Journal Publications

Ophiyandri, T., Amaratunga, D., Pathirage, C., & Keraminiyage, K. (2013). Critical success factors for community-based post-disaster housing reconstruction projects in the pre-construction stage in Indonesia. *International Journal of Disaster Resilience in the Built Environment*, *4*(2), 236-249.

Refereed Conference Publications

Ophiyandri, T., Amaratunga, D. and Pathirage, C. (2009). Managing Disaster in Indonesia. *Salford Postgraduate Annual Research Conference (SPARC) 2009*. University of Salford, UK, 7-8 May 2009.

Ophiyandri, T., Amaratunga, D. and Pathirage, C. (2010). Community Based Post Disaster Housing Reconstruction: Indonesian Perspective. In: Barrett, P., Amaratunga, D., Haigh, R., Keraminiyage, K., and Pathirage, C. (Eds). *CIB World Congress*, Salford Quays, UK, 10-13 May 2010.

Ophiyandri, T., Amaratunga, D. and Pathirage, C. (2010). Implementation of Project Risk Management on Community Based Post Disaster Housing Reconstruction Project. *COBRA 2010*, Paris, France, 2-3 September 2010.

Ophiyandri, T., Amaratunga, D. and Pathirage, C. (2011). Risk Identification on Community Based Post Disaster Housing Reconstruction Projects. *International Conference on Building Resilience: Interdisciplinary approaches to disaster risk reduction and the development of sustainable communities*. Kandalama, Sri Lanka, 20-22 July 2011.

Ophiyandri, T., Amaratunga, D. and Pathirage, C. (2012). Critical Success Factor for Community-based Post-disaster Housing Reconstruction Project (CPHRP). *Salford Postgraduate Annual Research Conference (SPARC) 2012*. University of Salford, UK, 30-31 May 2012.

Ophiyandri, T., Amaratunga, D. and Pathirage, C. (2012). Advantages of the Implementation of Community-based Post-disaster Housing Reconstruction in Inonesia. *College of Science and Technology (CST) Research Showcase 2012*. University of Salford, UK, 20 June 2012.

Ophiyandri, T., Amaratunga, D. and Pathirage, C. (2012). Critical Success Factor for Community-based Post-disaster Housing Reconstruction Project (CPHRP) in Pre-construction stage in Indonesia. *6th International Conference and Workshop on the Built Environment in Developing Countries (ICBEDC-2012).* Adelaide, Australia. 4-5 December 2012

Ophiyandri, T., Amaratunga, D. and Pathirage, C. (2013) Risk Assessment for Community-based Post-disaster Housing Reconstruction Project (CPHRP). *11th International Post Graduate Research Conference*. Salford, UK, 8-10 April 2013

Magazine Publications

Ophiyandri, T., and Amaratunga, D. (2011) Community Involvement in Post Disaster Housing Reconstruction. *Crisis Response Journal*, Vol. 6 No. 4, pp. 46-47

APPENDIX B: SEMI-STRUCTURE INTERVIEW GUIDELINE

Project Risk Management for Community-based Post-disaster Housing Reconstruction

Section 1: Time and location

Date	:	
Time	:	
Location	:	

Section 2: Interviewee Data

Name	:			
Current Job designation	:			
Organisation	:			
Address	:			
	:			
Contact Details	:	Telephone	:	
		Email	:	
Stakeholders group	:	€ Academia	€ Government	€ Community
	:	€ NGO	€ Practitioner	€ Other,............
Working Experience (general)		:	Years	
Working Experience (Housing Reconstruction)		:	Years	

<u>Year</u>	<u>Location</u>	<u>Position</u>
• to		
• to		
• to		
• to		

Section 3: Questions

Part A: Community Based Housing Reconstruction

1. Are you familiar with Community Based Post Disaster Housing Reconstruction (CASING)?
2. Is this method important to be applied on post disaster housing reconstruction?
3. What are the advantages of it (for community, government, and donor)?
4. Do you think this method have disadvantages? If yes, what are they?
5. What is the limitation/constraint in implementing this method?
6. What should be the role of community in this method?
    - In the initiation stage?
    - In the design stage?
    - In the construction stage?
7. What should be the role of government in this method?
8. What should be the role of donors/implementing agency in this method?

Part B: Project Risk Management

1. Are you familiar with the term of Project Risk Management?
2. Do you have any experience on project risk management process?
3. Have you ever implemented risk management process on CASING?
4. During the pre-construction stage of CASING, have you identified the possible problems that might emerge in each activity (for example in policy setting, program socialisation, house design, etc) before executing it?
5. If yes, how do you do it? Is it well documented?
6. After identifying the risk, have you thought about the probability of those problems to be happened and their impact?
7. Have you also considered how to overcome those problems and who should handle them?
8. Is the process above (which is the risk management process) well documented?
9. Do you think risk management is appropriate to be applied on CASING?
10. If yes, what do you think the benefit of it?

11. Do you agree that pre-construction stage carry more risk than the construction stage?
12. In pre-construction stage, which activity carries more risk than others? Why?
13. If risk management process to applied in CASING, who should initiate this? How to do it? What instruments have to be provided?

Part C: Community Based Problems

What are the problems during the below activity, why they emerged and the possible solutions?

1. Policy setting
2. Building assessment
3. Beneficiaries identification
4. Facilitators recruitment
5. Program socialisation
6. Establishing community organisation
7. Community training
8. Housing design
9. Finance

Part D: Success Factor

1. What is the key success factor of CASING?

APPENDIX C: QUESTIONNAIRES

PhD QUESTIONNAIRE SURVEY

REF: | | | |

SURVEY ON RISK MANAGEMENT FOR COMMUNITY-BASED POST-DISASTER HOUSING RECONSTRUCTION PROJECT

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Research overview:
This survey is based on an on-going PhD research project which aims to develop a model for community based post disaster housing reconstruction with the emphasis on project risk management during the pre-construction phase of the planned project.

Definition used for the study:
- Community based method: housing reconstruction procurement methods in which the community has a significant amount of power to control the project, where they can act as owner, supervisor or even contractor of their own housing reconstruction project.
- Risk: combination of the probability of an event and its negative consequences.
- Project risk management: process of risk identification, risk analysis, risk response, and risk review and communication.
- Pre-construction stage: a period before the physical construction of housing

Questionnaire instructions:
- There are no right or wrong answers to questions in this survey. Select the most appropriate answer by placing a tick (✓) or cross (X) for each question based on your view and experience in post-disaster housing reconstruction projects.
- There may be questions which appear irrelevant or impertinent. However, it is necessary for this study that all questions are answered, as the questionnaire is designed to achieve particular research objectives. If there are questions which you are unwilling or unable to answer, please ignore them and continue with the remaining questions.
- Please remember that your **identity** and that of your organisation will remain **strictly confidential**.

SECTION I. GENERAL INFORMATION

1. Please place tick (✓) or cross (X) in the box which best represents your organisation

☐ Academia/University ☐ Donor ☐ Community (organisation)
☐ Central Government ☐ International NGO ☐ Consultant
☐ Local Government ☐ National/local NGO ☐ Contractor
☐ Other, please specify ....

2. How long have you been working?

☐ <3 years ☐ 6-10 years ☐ 16-20 years
☐ 3-5 years ☐ 11-15 years ☐ >20 years

3. How long have you been working on post disaster reconstruction projects?

☐ <3 years ☐ 6-10 years ☐ >20 years
☐ 3-5 years ☐ 11-20 years ☐ not applicable

4. Have you been involved in community based post disaster housing reconstruction projects?

☐ Yes, I have been involved in (place and year of disaster)? ☐ No (please go to page 2, Q6)
(you may select more than one answers)

☐ Aceh, 2004 ☐ Yogyakarta, 2006 ☐ Gujarat, India, 2001
☐ Nias, 2005 ☐ Padang/W. Sumatera, 2009 ☐ Sri Lanka, 2004
☐ Other, please specify ....

5. What was your role on the above project(s)? (you may select more than one answers)

☐ Project owner ☐ Facilitator ☐ Consultant
☐ Project manager ☐ Supervisor ☐ Advisor
☐ Project staff ☐ Other, please specify ....

SECTION II. RISK MANAGEMENT

1. In your working experience, have you carried out 'project risk management' processes?
   ☐ Yes ☐ No

2. Have you applied it to 'post disaster housing reconstruction projects'?
   ☐ Yes ☐ No

3. A project can be divided into pre-construction stage and construction stage. Do you think the risk at the **pre-construction stage** of 'community based post disaster housing reconstruction project' is **higher** than at the **construction stage**?
   ☐ Yes ☐ No

SECTION III. ADVANTAGES

4. Please indicate by placing a tick (✓) or a cross (X) how significant the level of advantage of 'community based post disaster housing reconstruction projects'

	Advantages	1	2	3	4	5
		Not significant at all	Slightly significant	Significant	Very significant	Extremely significant
1	Ease the trauma of beneficiaries	☐	☐	☐	☐	☐
2	Re-establish trust in the community	☐	☐	☐	☐	☐
3	Rebuild norms in the community	☐	☐	☐	☐	☐
4	Rebuild community networking	☐	☐	☐	☐	☐
5	Build confidence of beneficiaries	☐	☐	☐	☐	☐
6	Create a sense of ownership	☐	☐	☐	☐	☐
7	Create pride among beneficiaries	☐	☐	☐	☐	☐
8	Fit to local culture/customs/wisdom	☐	☐	☐	☐	☐
9	Meet beneficiaries needs and expectations	☐	☐	☐	☐	☐
10	Involve marginalised groups (women, orphans, elderly, disabled, etc)	☐	☐	☐	☐	☐
11	Create jobs for beneficiaries' so they can make income	☐	☐	☐	☐	☐
12	Strengthen community organisation/institution	☐	☐	☐	☐	☐
13	Greater satisfaction	☐	☐	☐	☐	☐
14	Faster reconstruction	☐	☐	☐	☐	☐
15	Cheaper reconstruction	☐	☐	☐	☐	☐
16	Better quality	☐	☐	☐	☐	☐
17	Fewer problems	☐	☐	☐	☐	☐
18	More accountability	☐	☐	☐	☐	☐
19	Minimize corruption	☐	☐	☐	☐	☐
20	More funding goes to community	☐	☐	☐	☐	☐
21	Implementer can obtain good impressions	☐	☐	☐	☐	☐
22	Project is well accepted	☐	☐	☐	☐	☐
23	....	☐	☐	☐	☐	☐
24	....	☐	☐	☐	☐	☐
25	....	☐	☐	☐	☐	☐

SECTION IV. RISK PROBABILITY AND IMPACTS

1. Please indicate by placing a tick (✓) or cross (X) the level of probability of an event happening and its impact on community based post disaster housing reconstruction projects.
   - Please use Table 1 below as guidance in judging the probability and impact of risks.
   - You can leave the impact of risk if you think it is not relevant.

Table 1. The scaling of risk probability and impact

Variables	Relative scales				
	Very low	**Low**	**Moderate**	**High**	**Very high**
Probability	Very unlikely to happen	Unlikely to happen	Fairly to happen	Likely to happen	Very likely to happen
Impact on project **Time**	Insignificant time increase	<5% time increase	5-10% time increase	10-20% time increase	>20% time increase
Impact on project **Cost**	Insignificant cost increase	<10% cost increase	10-20% cost increase	20-40% cost increase	>40% cost increase
Impact on project **Quality** (housing)	Quality degradation barely noticeable	Only very demanding applications are affected	Quality reduction requires sponsor approval	Quality reduction unacceptable to sponsor	Project end item is effectively useless
Impact on (beneficiaries) **Satisfaction**	Very low dissatisfaction	Low dissatisfaction	Moderate dissatisfaction	High dissatisfaction	Very high dissatisfaction

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
A.	**INITIATION STAGES**							
1.	Lack of central government capacity	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
2.	Lack of local government capacity	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
3.	Unclear reconstruction policy	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
4.	Lack of implementers/NGOs reconstruction knowledge (in general)	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
5.	Lack of implementers/NGOs community based knowledge (on how it should be done)	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
6.	Failure to manage stakeholders	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
7.	Problems of communication and coordination	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
8.	Unclear roles and responsibilities of stakeholders	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
9.	Inappropriate reconstruction organisations	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
10.	Lack of government support	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
11.	Insufficient funding	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
12.	Tight schedule	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
B.	**FACILITATORS RECRUITMENT AND TRAINING**							
1.	Shortage of facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
2.	Lack of facilitators' knowledge and experience	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
3.	Lack of trainers' knowledge and experience	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
4.	Insufficient training materials and unclear outcomes	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
5.	Tight schedule	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
C.	**HOUSING DAMAGE ASSESSMENT**							
1.	Lack of housing database	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
2.	Too many parties involved	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
3.	Non-uniform assessment method	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
4.	Coordination problems	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
5.	Insufficient numbers of surveyors/facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
6.	Inexperienced surveyors/facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
7.	Transportation/access problems	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
8.	Collusion in defining damage category	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
D.	**BENEFICIARIES IDENTIFICATION AND LAND TENURE**							
1.	Lack of beneficiaries databases	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
2.	Insufficient numbers of surveyors/facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
3.	Inexperienced surveyors/facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
4.	Transportation/access problems	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
5.	Collusion in deciding beneficiaries'	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
6.	Problems with land tenure/rights	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
7.	Validation problems	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
E.	**PROGRAMME SOCIALISATION**							
1.	Shortage of facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
2.	Inexperienced facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
3.	Lack of local government support	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
4.	Competition between donors/implementers/NGOs	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
5.	Community resistance	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
6.	Failures in community meetings	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
7.	Tight schedule	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
F.	**FORMING COMMUNITY ORGANISATION**							
1.	Inexperienced facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
2.	Failure to establish community organisations	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
3.	Community resistance	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
4.	Community leader too dominant	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
5.	Community is manipulated by other parties	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
6.	Disagreement on community contract/consensus	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
7.	Tight schedule	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
G.	**COMMUNITY/LABOUR TRAINING**							
1.	Facilitators shortages	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
2.	Inexperienced facilitator	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
3.	Labour shortages	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
4.	Limited knowledge by labour of how to construct earthquake resistant houses	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
5.	Insufficient training materials and unclear outcomes	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
H.	**HOUSING DESIGN AND MATERIALS**							
1.	Inexperienced facilitators	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
2.	Lack of facilitators' technical knowledge	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
3.	Unclear building code	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
4.	Too many variations put forward by the community	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
5.	Too many cultural considerations	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
6.	Unconfirmed source/type of materials	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
7.	Material price increases	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐
8.	Tight schedule	Probability		☐	☐	☐	☐	☐
		Impact on:	- Time	☐	☐	☐	☐	☐
			- Cost	☐	☐	☐	☐	☐
			- Quality	☐	☐	☐	☐	☐
			- Satisfaction	☐	☐	☐	☐	☐

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
9.	Limited budget	Probability						
		Impact on:	- Time					
			- Cost					
			- Quality					
			- Satisfaction					
10.	Too much paperwork prior to initial payment at start of construction work	Probability						
		Impact on:	- Time					
			- Cost					
			- Quality					
			- Satisfaction					

If you think there are some risks that have not been included above, please include them in the table below.

No	Event/Risk	Probability and Impact		Probability and impact scale				
				Very Low	Low	Moderate	High	Very High
1.	....	Probability						
		Impact on:	- Time					
			- Cost					
			- Quality					
			- Satisfaction					
2.	....	Probability						
		Impact on:	- Time					
			- Cost					
			- Quality					
			- Satisfaction					
3.	....	Probability						
		Impact on:	- Time					
			- Cost					
			- Quality					
			- Satisfaction					

SECTION V. SUCCESS FACTORS

1. Please indicate by placing a tick (✓) the level of influence the following factors could have in successful community-based post-disaster housing reconstruction projects

	Factors	Level of Influence				
		Not influential at all	Slightly influential	Influential	Very Influential	Extremely influential
1	Government support	☐	☐	☐	☐	☐
2	Government capacity	☐	☐	☐	☐	☐
3	Understanding of community based methods	☐	☐	☐	☐	☐
4	Appropriate reconstruction policy/strategy	☐	☐	☐	☐	☐
5	Appropriate project organisation	☐	☐	☐	☐	☐
6	Good coordination and communication	☐	☐	☐	☐	☐
7	Implementer capacity	☐	☐	☐	☐	☐
8	Facilitator capacity	☐	☐	☐	☐	☐
9	Sufficient numbers of facilitators	☐	☐	☐	☐	☐
10	Sufficient funding availability	☐	☐	☐	☐	☐
11	Having a pre-reconstruction plan (scenario based) before disaster	☐	☐	☐	☐	☐
12	Success in forming community organisation	☐	☐	☐	☐	☐
13	Involvement of all community members	☐	☐	☐	☐	☐
14	Significant level of community participation/control	☐	☐	☐	☐	☐
15	Gaining the trust of the community	☐	☐	☐	☐	☐
16	Transparency and accountability	☐	☐	☐	☐	☐
17	Good written contract between community and implementer	☐	☐	☐	☐	☐
18	Minimising bureaucracy	☐	☐	☐	☐	☐
19	Project duration	☐	☐	☐	☐	☐
20	Project size	☐	☐	☐	☐	☐
21	Project location	☐	☐	☐	☐	☐
22	Access to affected community	☐	☐	☐	☐	☐
23	Successful damage assessment	☐	☐	☐	☐	☐
24	Successful beneficiary identification	☐	☐	☐	☐	☐
25	Successful land tenure identification	☐	☐	☐	☐	☐
26	Successful community training	☐	☐	☐	☐	☐
27	Design flexibility	☐	☐	☐	☐	☐
28	Materials availability	☐	☐	☐	☐	☐
29	Conducive political environment	☐	☐	☐	☐	☐
30	Conducive economical environment	☐	☐	☐	☐	☐
31	Conducive social environment	☐	☐	☐	☐	☐
32	Conducive physical environment	☐	☐	☐	☐	☐
33	....	☐	☐	☐	☐	☐
34	....	☐	☐	☐	☐	☐
35	....	☐	☐	☐	☐	☐

SECTION VI. CLOSING AND END

1. Please add any further comments relating to this questionnaire or the area of the study in the space below

……..
……..
……..
……..

Thank you very much for taking the time to complete this questionnaire. If you have any queries, please contact Taufika by telephone +447540947632 or email t.ophiyandri@edu.salford.ac.uk

If you would like to receive the results of the survey and summary of the research, please include your contact details below:

Name : ……………………………………………

Email : ……………………………………………

APPENDIX D: VALIDATION INTERVIEW GUIDELINE

Risk Management for Community-based
Post-disaster Housing Reconstruction Project (CPHRP)

Purpose of the interview:

1. To validate findings from questionnaire survey

Section A : Advantages

1. Four from twenty two advantages (Create sense of ownership, fit to local culture/customs/wisdom, build beneficiaries' confidence, and minimize corruption) can be categorised as very significant. What do you think about this?
2. Result shows that 'create sense of ownership' is the most significant advantage of CPHRP. Why do you think this advantage is so significant?
3. The traditional objectives of construction project (such as faster and cheaper reconstruction, and better quality housing) seems not to be the main objective of CPHRP. Results show that psychological advantage is more significant compared to physical advantage. Do you think it is the real case in CPHRP? Why?

Section B : Critical Success Factors (CSFs)

1. Twelve factors have been found to be the CSFs of CPHRP. What is your opinion about the findings?
2. Transparency and accountability is the most critical factor of CPHRP. What is the reason behind this?
3. Transparency and accountability is very close related to the other factor, which is gathering trust from community. Why do you think this factor is also very important in CPHRP?
4. Three factors are related to the capacity: implementer's capacity, facilitator's capacity, and their understanding on CPHRP. Thus, increasing their capacity is imperative. So, how to increase their capacity?
5. It is understood that coordination and communication is a big challenge during disaster reconstruction. Why this problem seems really difficult to overcome? What is the solution to this problem?
6. Funding availability is clearly one of the CSFs in any project. However, except in Aceh case, budget for housing reconstruction is almost very limited and not sufficient. How to overcome this problem?

Section C :   Risk Analysis

1. Some negative events are categorised as ‘high risk’. They dominantly affect time of reconstruction, followed by beneficiaries’ satisfaction, cost escalation and quality degradation. What is your opinion about these findings?
2. It seems that housing database play an important role on the pre-construction stage. What do you think about this? How to build housing database, which institution has to do this?
3. Labour shortages, both in term of availability and capacity, can affect the reconstruction objective. How to overcome this problem?
4. Bureaucracy is another issue on CPHRP. It can affect time and satisfaction. Any barrier because of government regulation? How to minimize it?

Thank you very much for your valuable time

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