A FRAMEWORK TO MANAGE POST DISASTER RECONSTRUCTION PROJECTS IN SRI LANKA

Ubesingha Archchige Buddhinie Kaushalya

158817V

Degree of Master of Science

Department of Building Economics

University of Moratuwa

Sri Lanka

February 2020

A FRAMEWORK TO MANAGE POST DISASTER RECONSTRUCTION PROJECTS IN SRI LANKA

Ubesingha Archchige Buddhinie Kaushalya

158817V

Dissertation submitted in partial fulfillment of the requirement for the degree Master of Science in Project Management

Department of Building Economics

University of Moratuwa

Sri Lanka

February 2020

DECLARATION

I declare that this is my own work and this dissertation dose not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works, such as articles or books.

Signature: Date:

The above candidate has carried out research for the Masters Dissertation under my supervision.

Name of the supervisor:

Signature of the supervisor: Date:

ABSTRACT

World is facing an increasing number of natural disasters and Sri Lanka is no exception. Sri Lanka continues to experience deadly natural disasters in the past and post disaster reconstruction projects carried out so far in Sri Lanka have been poorly responsive due to poor management and have failed in meeting their objectives. The aim of this research is to investigate and explore a specific process to successfully manage post disaster reconstruction projects in Sri Lanka. The methodology adopted was qualitative. An extensive literature review was carried out to obtain a comprehensive knowledge about disasters, life cycle of post disaster reconstruction projects, project management methodologies of post disaster reconstruction projects. Case studies were used to obtain an in-depth understanding of post disaster reconstruction projects in Sri Lanka and Semi-structured interviews were the primary method of data collection. Content analysis, theme identification, cognitive mapping and cross-case analysis were incorporated to analyze the collected data. Findings revealed that post disaster reconstruction projects are distinct due to its nature and the chaotic context they get executed during the unique six staged life cycle of post disaster reconstruction projects. Six stages of project life cycle identified are: 1) assessing and designing, 2) common planning, 3) phase planning, 4) phase implementation, 5) phase closure) and 6) complete closure. Stages identified, proceeded to successive phases in both linear sequential manner and cyclic repetitive manner. Accordingly, a mixed Tradi-Agile project management approach was disclosed to manage post disaster reconstruction projects. Further, a unique an effective management framework for post disaster reconstruction projects was synthesized which contained 52 managerial processes that require to get carried out during six staged life cycle of post disaster reconstruction projects. Key considerations for each managerial process were also identified and incorporated.

Key words: project management, post disaster, project life cycle, housing

ACKNOWLEDGEMENT

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

Abbreviation	Description
BBB	Build Back Better
DRR	Disaster Risk Reduction
GN	Grama Niladari (Village officer)
GoSL	Government of Sri Lanka
HDCT	Housing Design and Construction Technology
KC	Key Consideration
MP	Managerial Process
PDR	Post Disaster Reconstruction
PLC	Project Life Cycle
PMI	Project Management Institute
TO	Technical Officer
UDA	Urban Development Authority

LIST OF APPENDICES

1   CHAPTER 1 – INTRODUCTION

1.1   Background

Disasters are multidimensional and all related incidences of it affect many facets of human life (Oliver-Smith, 2004). The natural forces at play, control the existence and destiny of a certain part of the global population (Kozák & Cermák, 2010). Disaster occurred worldwide have increased significantly (Haigh & Amaratunga, 2011; Hidayat & Egbu, 2010; Ismail, Majidb, Rooslic, & Samahd, 2014; Mucke, 2016) and estimated damage levels due to these disasters continue to reach new peaks (Mucke, 2016). In globally recorded disasters, about 42 million years of life were lost each year between 1980 and 2012, which is a developmental setback comparable to diseases such as tuberculosis (UNDRR, 2015).

O'Keefe, Westgate and Wisner (1976) argues that disasters are induced by socio-economic conditions than natural factors and UNISDR (2019) states that there is no such thing as a natural disaster, only natural hazards. However, according to Shaluf, (2007) both man-made and natural disasters are catastrophic events. Man-made disasters are caused as a result of human decisions and natural disasters are caused as a result of natural causes which man has no control over. He further elaborated that there are disasters caused as a results of both human error and natural forces.

Meanwhile, UNDRR (2015) stated that most disasters that could happen, have not happened yet. The frequency, scale and distribution of natural disasters in recent years is a threat and clatter communities in developed, newly industrialized and developing countries (Ahmed, 2011; Bilau, Witt & Lill, 2018; Haigh & Amaratunga, 2011). It is unfortunate that developing countries are situated in regions that are particularly vulnerable to natural hazards (Barakat, 2003; Haigh & Amaratunga, 2011; Keller & DeVecchio, 2016; Lennard, 2015). Asia suffered higher economic losses than any other region of the world in 2016 due to natural and man-made disasters and economic losses from disasters of that year in Asia amounted to USD 83 billion (Bevere, Sharan, Barrett, & Honegger, 2017). Sri Lanka, along with Puerto Rico and Dominica were the top three countries in the world that was affected by impacts of weather-related loss events in 2017 and Sri Lanka ranked second highest on the Climate Risk Index (Eckstein, Hutfils, & Winges, 2019; UNDRR, 2019).

Impact of disasters on the built environment is immense (Barakat, 2003; Bilau, Witt, & Lill, 2017; Hidayat & Egbu, 2010). When elements of the built environment are damaged or destroyed, the capacity of society to function economically and socially is undermined (Haigh & Amaratunga, 2011). Further, the damage on housing after a disaster is extensive and is often the largest share of losses in the overall impact of a disaster on a national economy (Ahmed, 2011; Lyons, 2009).

Post Disaster Reconstruction Projects

Rebuilding after disaster is a complex process (Ismail et al., 2014; Silva, 2010). Post Disaster Reconstruction (PDR) extends beyond the mere fact of delivering and constructing houses and towns, therefore it should be approached as a socio-cultural reconstruction (Oliver-Smith, 1991). Wide range of skills, significant amount of resources, multi-sectoral involvement are essential to reconstruct after a disaster (Silva, 2010).

Widespread approach in disaster recovery is to restore household, business and government activities to the 'normal' patterns that existed prior to a disaster. Hence, typical assumption is to restore the buildings and infrastructure as they were before (Lindell, 2013; Schwab, 2014). However, by restoring the community to the state it was before, communities get re-exposed to the same hazards, physical and social vulnerability, that led to the disaster (Haigh & Amaratunga, 2011; Lindell, 2013; Schwab, 2014). Therefore, if reconstruction after disaster is not addressed effectively, an opportunity for development will be lost (Hidayat & Egbu, 2010) and subsequently, communities will be more vulnerable in the future (Haigh & Amaratunga, 2011).

Unlike providing shelter immediately after disaster, PDR is usually slow, expensive and complex (Hidayat & Egbu, 2010). PDR projects often fails in achieving its objectives (Ismail et al., 2014; Koria, 2009; Lyons, 2009) due to many issues and challenges associated with it. Some of the challenges identified by Hidayat and Egbu, (2010) and Ismail et al. (2014) were: meeting time targets, lack of resources, poor preliminary assessment, lack of coordination, corruption, land issues, cost overruns, shortage of staff, poor quality, etc. In addition, interventions of politicians and mass media also generate an additional pressure on PDR projects (Norling, 2013; Schwab, 2014).

A disaster removes all the anchor points of daily life and creates a new degree of freedom to residents who is overwhelmed by a need for answers. The resulting asymmetry of supply and demand of information, creates the phenomenon of post disaster rumors, which extend into the recovery phase (Olshansky, Hopkins, & Johnson, 2012). Therefore, post disaster rumors are another unique challenge that PDR projects encounter.

Better planning and management is needed to overcome these challenges (Amaratunga, Haigh, Kermainiyage, & Malalgoda, 2017; Kim & Choi, 2013; Steinfort, 2017). Use of generic solutions to manage PDR projects has its limitations due to unique nature of PDR projects and the chaotic context that they operates on (Haigh & Amaratunga, 2011).

<u>Project Management</u>

Project management generally consists of planning, organizing, executing and controlling to allow the successful achievement of specified goals (Atkinson, 1999; PMI, 2013). PDR projects operates in a unique context, therefore, in order to manage PDR projects and rebuild the built environment of affected community to an appropriate standard, it is essential to ensure that all challenges are adequately addressed (Crawford, Langston, & Bajracharya, 2013; Kulatunga, 2011; Steinfort, 2017; Vahanvati & Mulligan, 2017).

Project management have evolved substantially over the past (Charvat, 2003). The use of traditional project management practices under circumstances of high uncertainty has been highly criticize (Steinfort, 2017). Current project management approach, published by Project Management Institute (PMI) for PDR work also has been criticized due to its limitations such as inflexibility, focusing on a single project life cycle, excluding complex challenges, etc.   (Vahanvati & Mulligan, 2017).

From 2004 to end of 2016, Sri Lanka experienced natural disasters such as tsunami, flood, cyclone, landslide, strong wind etc. Total of 31,648 people have died due to these natural disasters during the said period and 98,781 number of houses has been destroyed completely. Over 300,000 people have been reported to be living in camps due to natural disasters in year 2016 in Sri Lanka (DMC, 2017). PDR projects has not progressed in Sri Lanka, as anticipated due to many managerial issues such as management structure, managerial practices, competence, etc. (Koria, 2009).

Therefore there is a need to explore an appropriate managerial framework to better manage PDR projects in Sri Lanka.

1.2   Problem Statement

Collaborative Action towards Disaster Resilience Education (CADRE), which is in correlation with Sendai framework for disaster risk reduction 2015–2030 (UN, 2015) identified thirteen key knowledge gaps among construction professionals. Post disaster project management has been identified as one of the key knowledge gaps amongst them (Amaratunga et al., 2017). Lack of knowledge in the area of post disaster project management is well identified and is a timely need to address the knowledge gap in the current context of rising disasters. Sri Lanka is a developing country (UN, 2019), who is unfortunate in being located on a disaster prone region (Barakat, 2003; Haigh & Amaratunga, 2011; Keller & DeVecchio, 2016; Lennard, 2015) and had experienced deadly natural disasters (DMC, 2017). Furthermore, Sri Lanka was among the top three countries in the world that was affected by impacts of weather-related loss events in 2017 (Eckstein, Hutfils & Winges, 2019; UNDRR, 2019). However PDR projects carried out so far in Sri Lanka were poorly responsive (Kennedy, Ashmore, Babister, & Kelman, 2008; Koria, 2009;) due to poor management (Koria, 2009).

Generic project management methodology is not a universal solution to manage all projects (Charvat, 2003). Current project management methodologies are one size fits for all (Alsaadi & Acar, 2016; Steinfort, 2017;) and do not accommodate unpredictable high risk situation such as disasters (Steinfort, 2017). According to Olsen (1971) project management require to be reformed to fit the task environment and life cycle of the task. PDR projects are unique due to chaotic context they operate (Amaratunga & Haigh, 2011; Bilau et al, 2018; Kulatunga, 2011; Olshansky et al., 2012), thus has a distinct task environment. Due to unique nature of PDR projects, project life cycle of PDR projects and its stages are also distinct (Adams & Brandt, 1988; Baroudi & Rapp, 2012; Cleland & Ireland, 2002; Vahanvati & Mulligan, 2017).

Use of traditional project management methodologies on post disaster context has been criticized due to its poor responsiveness to the chaotic nature of the context (Alsaadi & Acar, 2016; Alsaadi & Acar, 2018; Steinfort, 2017). Project management methodologies published by PMI for PDR and other related limited guidelines

published to manage PDR projects also has been criticized (Alsaadi & Acar, 2016; Steinfort, 2017; Vahanvati & Mulligan, 2017).

Further, scale and impact of recent disasters have challenged project management approaches of PDR projects (Steinfort, 2017; Vahanvati & Mulligan, 2017). Therefore managing PDR projects sits on a significant knowledge gap and there is a need to investigate and develop a set of guidelines to successfully manage PDR projects.

1.3   Aim and Objectives

Aim:

The aim of this research is to explore a specific process to successfully manage PDR projects in Sri Lanka. In order to achieve the above aim, the following objectives have been formulated:

Objectives:

1. To review,
    a. The need for Post Disaster Reconstruction (PDR), Post Disaster Reconstruction implementation methods and associated challenges.
    b. The concept of project management, project management methodologies and their applicability to Post Disaster Reconstruction context.
2. To identify Project Life Cycle (PLC) of Post Disaster Reconstruction projects in Sri Lanka
3. To investigate Managerial Processes (MP) of Post Disaster Reconstruction projects in Sri Lanka.
4. To investigate Key Considerations (KC) of Managerial Processes of Post Disaster Reconstruction projects in Sri Lanka
5. To synthesis a framework to successfully manage PDR projects in Sri Lanka.

1.4   Research Methodology

A literature survey by referring to journal articles, books, conference proceedings, reports etc. was carried out to identify the research problem. An extensive literature review was carried out to obtain a comprehensive knowledge about disasters, disaster

management, PDR and project management of post disaster resettlement. The literature review was further extended to identify PLC, disaster recovery process and challenges of PDR projects.

Due to exploratory nature of the research problem a qualitative approach was adopted for the study. During the field survey, case study research design which was multi case holistic was executed to obtain an in-depth understanding of PDR projects in Sri Lanka. Semi-structured interviews as well as project documents review were used as data collection methods. Content analysis, theme identification, cognitive mapping and cross-case analysis were incorporated as data analysis methods. Finally an effective management framework for PDR projects was developed based on findings of the research.

1.5   Scope and Limitations

The scope of the research was to study about project management aspects of PDR projects. Subsequently, with use of case studies, developed a project management framework for PDR projects in Sri Lanka.

Due to increasing number of natural disasters and Sri Lanka being unfortunate to have experienced devastating natural disasters, the scope of this study was limited to natural disasters only. Thus, it did not attempt to study about reconstruction projects occurred after man-made disasters. Housing being the most extensively damaged element after disasters and PDR projects often facing wide spectrum of challenges and failing to meet project objectives, the scope of this study was limited to PDR housing projects only and did not address PDR infrastructure projects. Further, due to importance of providing permanent houses for victims of disaster and many challenges associated with it, this study focused on post disaster permanent housing reconstruction only and it do not focus on immediate shelter and transitional shelter in the context of post disaster. Due to limited availability of PDR projects initiated by various types of natural disasters the study focused on PDR housing projects initiated by landslides only. Following reconstructions after tsunami 2004 in Sri Lanka, donor-driven approach for PDR was the natural choice among many donors, therefore the study focused on donor driven PDR projects only and it did not attempt to study owner-driven PDR projects.

1.6   Chapter Breakdown

Chapter 1 – Introduction

Introduction presented an overview of the research background, problem statement, aim and objectives of the research, research methodology, scope and limitations and the chapter breakdown.

Chapter 2 – Literature review

This chapter coverers literature findings of PDR implementation methods, associated challenges, review of the concept of project management, project management methodologies and their applicability to PDR context. It further review the Project Life Cycle (PLC) of PDR projects, Managerial Processes (MP) of PDR projects and Key Considerations (KC) of MPs of PDR projects.

Chapter 3 – Research methodology

This chapter consists of the methods that is used to find the relevant data in order to conduct the research and also describe techniques used for data analysis.

Chapter 4 – Data analysis and research findings

This sections presents research findings from cases studied and tests variables in the framework through collected data.

Chapter 5 – Discussion

This chapter consists of analyzed data by matching patterns emerged across cases. Discusses the results of the study and suggests a mechanism to manage PDR projects in Sri Lanka.

Chapter 6 – Conclusion and recommendations

The final chapter concludes the research with conclusion, recommendations and suggests future research avenues.

2 CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

The research gap identified in chapter one initiated a strong foundation to proceed with this research. This chapter initially review disasters and their impact, PDR projects and their associated challenges. Thereafter, the literature presented in this chapter review project life cycles, the concept of project management, project management methodologies and their applicability to PDR projects. Finally, Managerial Processes of PDR and key consideration of managerial processes were recognized.

Thereby, objectives 1 of this study was met by this chapter and objectives 2, 3 and 4 (refer section 1.3) were partially met:

Objective 1- To review,

a. The need for PDR, PDR implementation methods and associated challenges.
b. The concept of project management, project management methodologies and their applicability to PDR context.

Objective 2- To identify Project Life Cycle of PDR projects in Sri Lanka

Objective 3- To investigate Managerial Processes of PDR projects in Sri Lanka.

Objective 4- To investigate Key Considerations of Managerial Processes of PDR projects in Sri Lanka

2.2 Disasters

Asian Development Bank defined disasters as "An event, natural or man-made, sudden or progressive, which impacts with such severity that the affected community has to respond by taking exceptional measures is a disaster" (Carter, 2008, p.XIX). According to UNISDR (2015), "A disaster is a hazardous event that occurs over a limited time span within a defined geographic area. Criteria for a natural disaster are: 10 or more people are killed, 100 or more people are affected, a state of emergency is declared, and International assistance is requested. If any one of these applies, an event is considered a Natural Disaster" (p.9).

A natural hazard is a natural process and event that is a potential threat to human life and property (Keller & DeVecchio, 2016). Natural disasters revisit the same geographic zones (Barakat, 2003; Haigh & Amaratunga, 2011) and make a greater impact on the built environment (Barakat, 2003). Poor nations in the world are disproportionately affected by natural disasters and the most vulnerable and marginalized people in these nations suffer the worst (Barakat, 2003; Carter, 2008; O'Brien, O'Keefe, Rose, & Wisner, 2006).

Even though, Sri Lanka was considered safe from adverse natural disasters (Wickramaratne, et al., 2012), tsunami 2004 took lives of more than 30,000 people living in the coastal zone of Sri Lanka (DMC, 2017). Following this devastation, it was identified that Sri Lanka is vulnerable to numerous natural hazards. Most hazardrous natural disasters to Sri Lanka were tsunami, flood, landslide, drought and cyclones (Wickramaratne, et al., 2012).

2.2.1 Impact of Disaster

Disasters make a significant impact on many aspects and its significance on human beings, economy and build environment is discussed below:

2.2.1.1 On Human beings

Average of about 80,000 people die each year in natural disaster (Keller & DeVecchio, 2016). Average of 23.9 million people displaced per year by disasters from 2008- 2018 (UNDRR, 2015) and it is equivalent to one person per every second (Lennard, 2015). Even though Asia holds only 60 % of the world's population, 87% of the people displaced by natural disasters globally in 2014 was in Asia (Lennard, 2015). Medium income countries suffered the greatest losses, with over 90% of all deaths and about 40% of all economic losses (Keller & DeVecchio, 2016).

Since year 1974 Sri Lanka encountered many natural disasters such as tsunami, landslides, cyclones, flood, etc. A total of 34,268 number of people have lost their lives due to natural disasters from 1974 -2017 and a total of 7,189.931 people have been affected due to natural disasters from 2000 – 2017 in Sri Lanka (DMC, 2017).
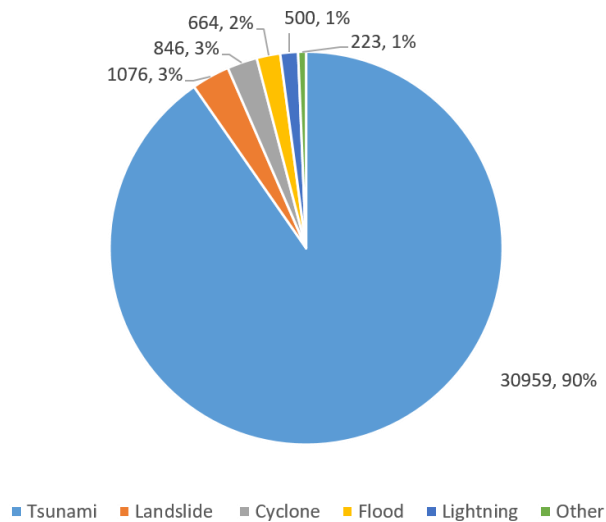
Figure 2-1: Deaths due to Natural Disasters in Sri Lanka form 1974-2017

Source: (DMC, 2017)

2.2.1.2 On Economy

Financial loss from natural disasters exceeds US$50 billion per year, which excludes social losses such as loss of employment, mental anguish and reduced productivity (Keller & DeVecchio, 2016). Economic losses due to natural disasters have increased at a faster rate than the number of deaths (Keller & DeVecchio, 2016). Global average annual loss (AAL) in the built environment related to tropical cyclones, earthquakes, tsunamis and floods estimated at US$314 billion (UNDRR, 2015).

Disasters disrupt the economic growth and obstruct the ability of people to emerge from poverty (Haigh & Amaratunga, 2011). The May 2003 floods that affected the districts of Ratnapura, Kalutara and the Southern Province of Sri Lanka resulted in total damage of US$ 76.8 million (Wickramaratne, et al., 2012). Economic losses following the 2017 flooding increased by 50% when compared to the previous decade between 2007 and 2016 (UNDRR, 2019).

2.2.1.3 On Built Environment

Reported damages to housing has a drastic increase after 2004 (UNDRR, 2015). Homeless people due to natural disasters-average annual per million people 2005-2015 was 5,380 (UNDP, 2016).

In Sri Lanka 435,136 houses has got damaged and 152,554 no. of houses got completely destroyed since 1974. Flood alone destroyed a total of 53,953 houses in Sri Lanka from year 2000–2017 (DMC, 2017). In the context of post disaster, the loss of critical buildings and infrastructure can greatly increase a community's vulnerability to hazards in the future (Amaratunga & Haigh, 2011).
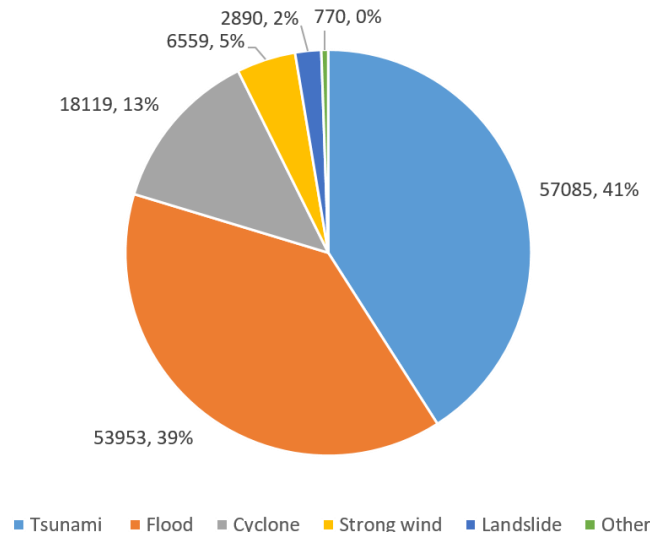
Figure 2-2: Houses Destroyed due to Natural Disasters in Sri Lanka form 1974-2017
Source: (DMC, 2017)

2.2.2   Post Disaster Context

Post disaster context, that PDR operates is markedly different (Fayazi, et al., 2017), chaotic and dynamic (Amaratunga & Haigh, 2011; Bilau et al., 2018; Davidson, Johnson, Lizarralde, Dikmen, & Sliwinski, 2007) than the context a regular construction project get executed. There are many environmental factors such as political, economic, and social elements which influence the post disaster context (Chang, Wilkinson, Potangaroa, & Seville, 2011).

Key characteristic of the post disaster context, which makes it differentiate from normal times is 'time compression' (Chang et al., 2011; Fayazi, et al., 2017; Olshansky et al., 2012). According to Olshansky et al. (2012) post disaster recovery is just real life, in all its complexities, on fast forward. Therefore, post disaster context consists of a compression of urban development activities in time, in a limited space, which is called as the phenomenon of 'time compression' (Olshansky et al., 2012). It affects the recovery process in different ways. Asymmetry of supply and demand (Chang et al.,

2011; Olshansky et al., 2012) increased shortage of resources (Amaratunga & Haigh, 2011; Le Masurier, Rotimi, & Wilkinson, 2006; Olshansky et al., 2012) local community organizations, group politics, resultant phenomena of post disaster rumors (Olshansky et al., 2012) are some consequences which exacerbates the post disaster context.

In addition, political influence (Olshansky et al., 2012), the influence of media where the context get exaggerated by frames created by media (Norling, 2013; Tierney, Bevc, & Kuligowski, 2006), the resultant stress (Olshansky et al., 2012) are also identifiably high in post disaster context.

2.2.3 Disaster Management

Emergency planning is a moral and legal responsibility of people involved with the safety of the public. Disasters tend to be repetitive events, they form a cycle that can be divided into phases (Alexander, 2002). According to Alexander (2002) and Schwab (2014) phases of disaster management are: mitigation, preparedness, response, recovery while Asian Development Bank identified: prevention, mitigation, preparedness, disaster impact, response, recovery, development as the basic format of disaster management (Carter, 2008).
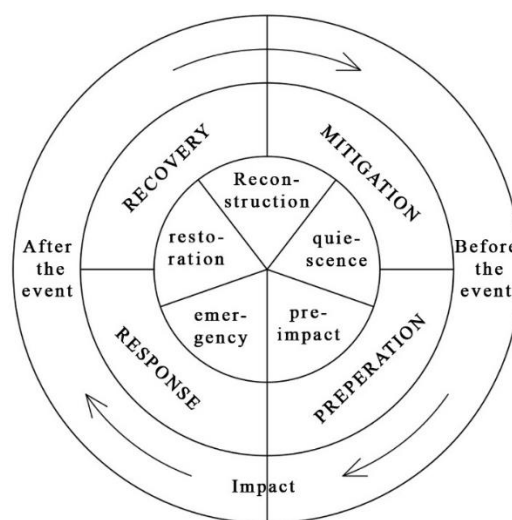
Figure 2-3: Disaster Cycle

Source: (Alexander, 2002)

Within the disaster cycle, PDR is considered a part of recovery (Alexander, 2002) and many authors have discussed about the importance of it. Schwab(2014) explained that

12

recovery includes restoring houses, transportation, public services, restarting economic activity, fostering long-term community redevelopment and improvements. Kates and Pijawka (1977) described four principle periods that encompass recovery. They are: emergency, restoration, replacement reconstruction, commemorative betterment and developmental reconstruction period. Similarly, Carter (2008) explained three main categories of recovery. They are restoration, rehabilitation, and reconstruction.

Further, it is considered that recovery phase is least understood and it includes complex management processes (Schwab, 2014; Sword-Daniels, Twigg, & Loughlin, 2015). Therefore, PDR projects, which is part of the recovery phase of disaster cycle require high level of management (Le Masurier et al., 2006).

2.3 Post Disaster Reconstruction Projects

With rapidly increasing number of disasters (UNISDR, 2015) and its adverse effect on built environment (Baroudi & Rapp, 2012; Bilau et al., 2017; Hidayat & Egbu, 2010) resettling communities affected by disasters is inevitable (Amaratunga & Haigh, 2011; Hidayat & Egbu, 2010). Resettling people often get prioritized over restoring infrastructure, thus become the priority of governments (Hidayat & Egbu, 2010). This process is long-term, significant, complex and diverse (Barakat, 2003; Siriwardena & Haigh, 2011). PDR extend beyond rebuilding structures out of bricks and mortar (Andrew, Arlikatti, Long, & Kendra, 2013; Barenstein & Leemann, 2013). It resettle affected communities both physically and socially (Amaratunga & Haigh, 2011) while rebuilding lives (Barenstein & Leemann, 2013) and livelihoods (Hidayat & Egbu, 2010).

Rebuilding after disaster provide a window of opportunity to 'build back better' (Amaratunga & Haigh, 2011; Kennedy et al., 2008; Mannakkara, 2014; Rahmayati, 2016). It's an opportunity to provide better living conditions, mitigate and prepare for next disaster (Barakat, 2003; Hidayat & Egbu, 2010; Siriwardena & Haigh, 2011) and an opportunity to ensure that resettled communities are less vulnerable in the future (Amaratunga & Haigh, 2011; Hidayat & Egbu, 2010).

The process of housing the displaced people after a disaster occurs in various stages. According to Ingirige, Haigh, Malalgoda, and Palliyaguru (2008) and Johnson, Lizarralde and Davidson (2006) they are: immediate relief (within hours), immediate

shelter (within a day or two), temporary housing (preferably within weeks), permanent housing reconstruction (probably within a few years). Similarly, studies of Quarantelli (1995) discussed about four different types of shelter and housing that is encountered after disaster. They are: emergency sheltering, temporary sheltering, temporary housing, and permanent housing.

Providing permanent houses after a disaster can be implemented in many different ways. They are discussed in below section 2.3.1.

2.3.1   Implementation Methods of PDR

Many approaches to execute PDR exist. According to Jha, Barenstein, Phelps, Pittet, & Sena (2010) there are five approaches: cash approach, owner driven approach, community driven approach, agency driven approach in-Situ, agency-driven reconstruction in relocated sites. Further, Silva (2010) discussed about 4 methods. They are: self-build, community build, contractor build, and direct implementation. According to Barakat (2003), there are two implementation methods: self-build model (owner driven), contractor model. Similarly, Andrew et al. (2013) described about donor-assisted approach and owner-driven approach. A summary of various implementation methods of PDR projects can be found in table 2-1.

Table 2-1: Implication methods of Post Disaster Reconstruction projects

Authors	PDR Implementation Method	Description
(Jha et al., 2010)	i. Cash approach	Unconditional financial assistance without technical support
	ii. Owner driven approach	Conditional financial assistance accompanied by regulations and technical support
	iii. Community driven approach	Financial and/or material assistance through community organizations who actively make decisions and manage reconstruction
	iv. Agency driven approach in-Situ	Governmental or nongovernmental agency hires a construction company to replace damaged houses in their pre-disaster location
	v. Agency-driven reconstruction in relocated site	Governmental or nongovernmental agency hires a construction company to build new houses in a new site

(Silva, 2010)	i. Self-build	Agency provide cash, materials, training and technical expertise and design and built by the house owner
	ii. Community build	Agency provide cash, materials, training and technical expertise and design and built by the community
	iii. Contractor build	Agency design and hire a contractor to construct
	iv. Direct implementation	Agency provide materials, hired skilled labour and managed the construction process themselves
(Barakat, 2003)	i. Self-build model (owner-driven)	Financial support, material and exert advice provided and built by community
	ii. Contractor model	Financed by donors and built by contractor implemented via agency
(Andrew et al., 2013)	i. Donor-assisted approach	Donor or government agencies take full responsibility of relocating,
	ii. Owner-driven approach	Technical and financial assistance provided by the government or aid agencies and built by community

The construction of permanent housing, after natural disaster in Sri Lanka, follows two different approaches: owner–driven approach and donor-driven approach (Fernando & Kumari, 2019; Ingirige et al., 2008; Karunasena & Rameezdeen, 2010; Lyons, 2009). Donor driven approach seems to be the natural choice amongst many donors in Sri Lanka especially during reconstruction efforts that became active after the tsunami 2004. However, owner driven approach has been more satisfactory to beneficiaries on parameters such as durability, incorporations of user requirements, location etc. and donor driven approach has been satisfactory on functionality of houses (Karunasena & Rameezdeen, 2010).

2.3.2 Challenges of PDR Projects

PDR projects have been challenging due to many reasons and key challenges identified by literature are tabulated in table 2.2

Table 2-2: Challenges of PDR Projects identified by literature

No.	Challenge and Issues	References										occurrences
		1	2	3	4	5	6	7	8	9	10	
1	Inadequate knowledge about local culture and tradition	✓								✓		2/10
2	Limited community involvement with reconstruction / Lack of Community Participation	✓	✓		✓	✓	✓		✓	✓	✓	8/10
3	Corruption by contractors	✓										1/10
4	Inappropriate Housing allocation process/ Poor beneficiary identification	✓		✓			✓				✓	4/10
5	Poor Coordination		✓	✓	✓	✓	✓	✓	✓	✓	✓	9/10
6	Not considering community needs		✓				✓		✓	✓	✓	5/10
7	Lack of technical knowledge of community		✓								✓	2/10
8	Community unacceptance to relocation sites		✓							✓		2/10
9	Inflexible/unrealistic deadline /delays		✓				✓		✓	✓		4/10
10	Frauds and corruption		✓				✓				✓	3/10
11	Poor management/lack of resources		✓		✓	✓	✓	✓	✓	✓		7/10
12	Lack of Transparency		✓								✓	2/10
13	Slow progress		✓				✓		✓			3/10
14	Lack of local government capacity			✓	✓		✓	✓		✓	✓	6/10
15	Unclear/inconsistent reconstruction policy			✓			✓	✓		✓	✓	5/10
16	Poor communication			✓		✓	✓			✓	✓	5/10
17	Insufficient funding			✓				✓				2/10
18	Lack of facilitators' knowledge and experience. Technical and Managerial			✓			✓	✓			✓	4/10
19	poor damage assessment			✓				✓				2/10
20	Involvement of too many parties			✓								1/10
21	Non- uniform assessment methods			✓						✓		2/10
22	Transportation/access problems			✓								1/10
23	Labour shortage			✓						✓		2/10
24	Limited knowledge on resilient construction techniques			✓	✓	✓						3/10
25	Material price increase			✓			✓			✓		3/10
26	Inflexible payment procedures			✓								1/10
27	Poor supply chain management				✓	✓						2/10
28	Poor partnerships with local communities and institutions				✓	✓	✓		✓	✓	✓	6/10
29	Poor pre-event planning and preparedness				✓					✓		2/10
30	Too much community involvement/ community control					✓						1/10
31	Not considering a long-term shelter process					✓				✓		2/10
32	Poor trust						✓				✓	2/10
33	Unclear project scopes						✓	✓				2/10
34	Political Agendas						✓				✓	2/10
35	Poor use of previously obtained knowledge/experience						✓					1/10
36	Cost overrun						✓	✓				2/10
37	Shortage of qualified people						✓	✓			✓	3/10
38	Inflexible consent process							✓		✓		2/10
39	Scarcity of land for relocations									✓	✓	2/10
		1	2	3	4	5	6	7	8	9	10	occurrences

1. Jordan & Javernick-Will (2014) 2. Sadiqi , Coffey, & Trigunarsyah (2012) 3. Ophiyandri, Amaratunga, & Pathirage (2013) 4. Chang et al. (2011) 5. Kennedy et al. (2008) 6. Koria (2009) 7. Le Masurier et al. (2006) 8. Nazara & Resosudarmo (2007) 9. Manatunge & Abeysinghe (2017) 10. Sadiqi, Trigunarsyah, & Coffey (2017)

According to above tabulation, poor coordination has caused a significant challenge to PDR projects (Le Masurier et al., 2006; Nazara & Resosudarmo, 2007; Ophiyandri, Amaratunga, Pathirage, & Keraminiyage, 2013). Lack of community participation was also identified as a challenge faced by PDR projects (Jordan & Javernick-Will, 2014). Sadiqi , Coffey and Trigunarsyah (2012) elaborated that in a PDR case at Bangladesh, building toilets adjacent to neighboring dwellings without prior community consultation caused severe tension among the neighbors. Lack of resources and poor management of resources has also been a key challenge of PDR projects (Chang et al., 2011).

In Sri Lankan context the poor capacity to coordinate among government institutes, NGOs and community were key challenges of PDR projects identified by literature (Kennedy et al., 2008; Koria, 2009; Manatunge & Abeysinghe, 2017). Lack of beneficiary participation or consultations during planning and/or implementation stages led to many issues and failures, during post tsunami reconstruction (Koria, 2009; Manatunge & Abeysinghe, 2017). Similarly, inability to acquire resources, compromised donors' efforts in achieving a successful recovery and managing available resources during the aftermath of the tsunami 2004 (Kennedy et al., 2008; Koria, 2009). Escalation in construction costs due to shortages of land, labour and materials also added to vast array of challenges PDR projects faced in Sri Lanka (Manatunge & Abeysinghe, 2017).

It is also noteworthy to understand that poor supply chain management, unclear or inconsistence reconstruction policy, poor communication, poor management of resources, fraud and corruption, unclear project scopes (Ophiyandri et al., 2013), political agendas, poor use of previously obtained knowledge/experience, cost overrun, shortage of qualified people, inflexible consent process were also been significant challenges experienced during PDR projects in Sri Lanka (Koria, 2009; Manatunge & Abeysinghe, 2017).

2.4   Project Life Cycle (PLC)

Understanding the project's life cycle is of paramount importance to understand the managerial processes of projects (Baroudi & Rapp, 2012; Cleland & Ireland, 2002). All projects go through a series of phases in their life cycle as they progress from inception to completion (Cleland & Ireland, 2002; Kerzner, 2017), transforming the project resources to a product, service or an organizational process (Cleland & Ireland, 2002). Similarly, PMI (2013) described PLC as a series of phases that a project passes through from its initiation to its closure. Adams and Brandt (1988) elaborated that, these phases are distinguishable from each other by the type of tasks' characteristic of each phase. In addition, phases can be distinguished by formal decision points at which it determine that the project has been sufficiently successful in the earlier phases to continue on into the next (Adams & Brandt, 1988).

Variety of PLC phases which are briefly different to one another were described by various authors and are summarized in table 2-3.

Table 2-3: Compilation of Phases of Project Life Cycle

Source	Phase I	Phase II	Phase III	Phase IV	Phase V
PLC of Generic Projects					
Adams, Barndt (1983) King; Cleland (1983)	conceptualization	planning	execution	termination	
Cleland and Ireland (2002)	conceptual	definition	production	operational	disinvestment
PMI, 2013	starting the Project	organizing and preparing	carrying out the work	closing the project	
Kerzner (2017)	concept	planning	define and design	implementation	conversion
PLC of PDR projects					
Jha et al. (2010)	assessment and policy making	planning	implementation		
Silva (2010)	planning	design	construction		
IFRC (2012)	initial assessment	planning	implementation and monitoring	evaluation	
Bilau et al. (2015)	enabling	planning	implementation		
Vahanvati & Mulligan (2017)	assessment	planning	funding	implementation	evaluate & exit

Adams and Brandt (1988) and Pinto and Prescott (1988) described four phases of PLC: conceptual, planning, execution, termination. The generic model of PLC identified by Cleland & Ireland (2002) described phases as: conceptual, definition, production, operational and divestment. Phases identified by Kerzner (2017) were: concept, planning, define and design, implementation and conversion. Similarly, PMI (2013) defined a generic PLC structure as: starting the project, organizing and preparing, carrying out the project work, closing the project.

PLC stages of PDR projects were less disussed in litreature. However, Vahanvati and Mulligan (2017) suggested a specific five staged PLC for PDR and stages of it were: assessment, planning, funding, implementation and evaluate & exit. The World Bank in their handbook for reconstruction after disasters identified three principal stages of reconstruction. They are: assessment and policy making, planning, and implementation (Jha et al., 2010). International Federation of Red Cross identified four interrelated stages where each one leads to the next. They are: initial assessment, planning, implementation and monitoring, and evaluation (IFRC, 2012). Similarly, Silva (2010) recognized three stages: planning, design, and construction. He further stated that planning and design development of PLC of PDR is an iterative process. Bilau, Witt and Lill (2015) also identified three differentiable phases of the post disaster housing reconstruction. They are: enabling, planning, and implementation.

Accordingly, the study identified four significant stages of PLC of PDR projects. They are 1) assessment and conceptualization 2) planning, 3) designing and implementation, and 4) closure.

Resources requirement of a project, vary throughout stages of PLC of a project and it is illustrated in figure 2-4 below. Requirement of resources is minimal at the beginning of a project and gradually ascends to its peak during implementation phase and then descend towards the end of PLC (Adams & Brandt, 1988; Cleland & Ireland, 2002; Kerzner, 2009; Pinto & Prescott, 1988; PMI, 2013).

Though most projects proceed through a series of sequential phases, PMI, (2013) explained that iterative and incremental life cycles can occur, when a project is phased out; (This phasing out refers to breaking the project in to portions and carry a different meaning to phases of PLC explained above). Iterations develop the product, through a series of repeated cycles, whilst increments successively add to the functionality of the

product. Iterative and incremental life cycles has distinct advantages such the ability to manage changing project objectives and scope, the ability to obtain a partial delivery of a product and to reduce the complexity of a project (PMI, 2013).
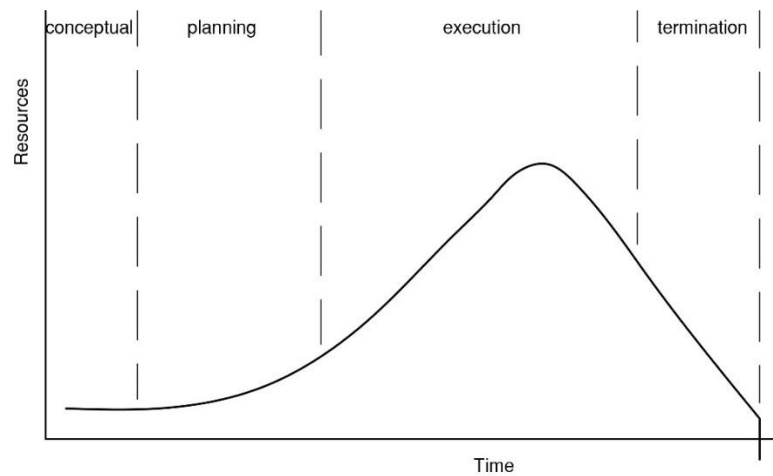
Figure 2-4: Resources over phases of project life cycle adopted from Pinto & Prescott (1988), Kerzner (2009) and PMI (2013)

In addition, it is the distinctive nature of a project that determines phases of a PLC and what happens to the project during its life cycle (Cleland & Ireland, 2002). PLC of PDR projects are significantly different to conventional projects, where the initiating and planning phases can go on indefinitely without being able to carry out any execution of construction works (Baroudi & Rapp, 2012). Despite most PLCs being closed-loop, an open-ended PLC approach was suggested by Vahanvati and Mulligan (2017) for PDR projects.

2.4.1 Relationship between Project Life Cycle and Project Management

The context of a PLC, and the conceptualization and development of that life cycle provide a useful model for project management (Cleland & Ireland, 2002).

PLC stages are the key work elements around which the project is managed and involves different management considerations (Adams & Brandt, 1988). Therefore, it is important to identify the management functions involved in each stage of the PLC (Cleland & Ireland, 2002). As the project progresses through its life cycle, changing levels of cost, time, and performance is experienced (Cleland & Ireland, 2002) and in response, the project manager must change the mix of resources assigned (Cleland & Ireland, 2002; Kerzner, 2017). This constantly changing picture of the PLC is an

underlying structural rationale for project management (Cleland & Ireland, 2002). Therefore, understanding the PLC is the key to manage projects sucessfully (Adams & Brandt, 1988; Cleland & Ireland, 2002; Kerzner, 2017; PMI, 2013).
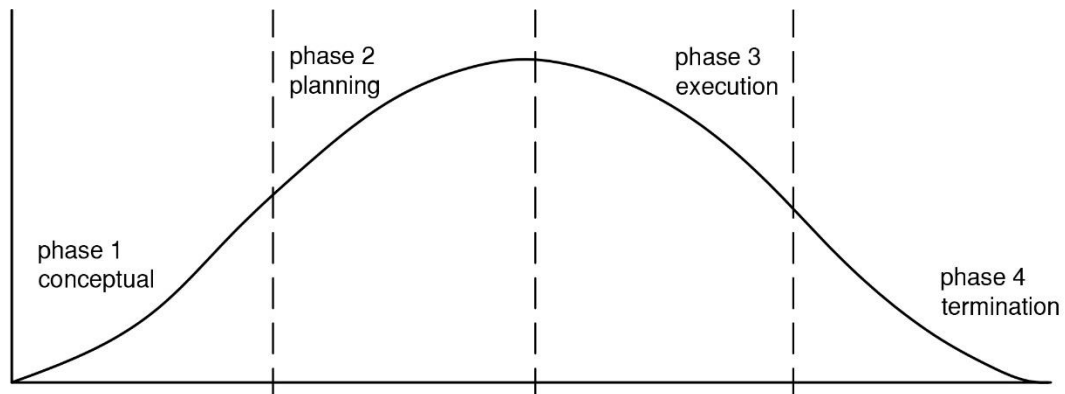
phase 1 conceptual	phase 2 planning	phase 3 execution	phase 4 termination
• Determine that a project is needed. • Establish goals. • Estimate the resources that the organization is willing to commit. • 'Sell' the organization on the need for a project approach. • Make key personnel appointments	• Define the project organization approach. • Define project targets. • Prepare the schedule for execution phase. • Define and allocate tasks and resources. • Build the project team	• Perform the work of the project (design, construction, production, site activation, testing, delivery, etc.).	• Assist in transfer of project product. • Transfer human and nonhuman resources to other organizations. • Transfer or complete commitments. • Terminate project. • Reward personnel.

Figure 2-5: Managerial Processes by project phases adopted by (Cleland & Ireland, 2002; Adams & Brandt, 1988)

Therefore, as explained, examining PLC offers the possibility of dividing the required managerial processes of the project, into PLC stages within the project (Baroudi & Rapp, 2012). Thus, viewing PDR management in terms of PLC is useful. **In order to manage projects, PLC can be looked along with managerial processes (MP)s that has to be performed at each stage of PLC** (Adams & Brandt, 1988; Cleland & Ireland, 2002).

2.5 Project Management

Projects get initiated to accomplish a specific goal. A project organizes tasks of it to focus the responsibility and authority and then, let an individual or a small group to achieve the goal (Meredith & Mantel, 2009). In order to achieve the goal of the project, managing the projects is important, thus, many authors have discussed about project management. According to Cleland and Ireland (2002), project management is a series of activities embodied in a process of getting things done on a project by working with project team members and other stakeholders to attain project schedule, cost, and technical performance objectives (Cleland & Ireland, 2002). Similarly PMI (2013) explains that project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Olsen (1971) stated that project management is the application of a collection of tools and techniques to direct the use of diverse resources toward the accomplishment of a unique, complex, one-time task within time, cost and quality constraints. He further enhanced that each task requires a particular mix of these tools and techniques, structured to fit the task environment and PLC.

2.5.1 Managing PDR projects

PDR projects deal with enormous level of uncertainty and complexity (Hidayat & Egbu, 2010; Kalkman & de Waard, 2017), compete for scarce resources (Hidayat & Egbu, 2010), battle through a time compression due to demand for quick results (Kalkman & de Waard, 2017; Hidayat & Egbu, 2010). Therefore a high level of management capacity is required for the management of a PDR project in terms of both the efficient use of scarce resources and addressing the peculiarities of these projects (Alsaadi & Acar, 2016).

It's been identified that the current project management training is a one size fits all approach based on project practices (Steinfort, 2017) and those project management methodologies do not cater for the largely unpredictable or high risk situation such as disaster (Alsaadi & Acar, 2016) . Scale and impact of recent disasters have challenged project management preparedness and response in a significant manner (Steinfort, 2017; Vahanvati & Mulligan, 2017). Adaptation of the common project management

approaches and tools to the disaster recovery context have not been adequately addressed (Alsaadi & Acar, 2016). Further, Vahanvati and Mulligan (2017) highlighted that the project management approach to PDR work has been criticized due to many limitations; Such as: it's focus on a single PLC or inflexible timeframe for project completion, it's tendency to identify PDR work as a technical challenge to the exclusion of other complex challenges and finally it's measure of project effectiveness in terms of project outcome rather than on-going processes (Vahanvati & Mulligan, 2017).

In the context of Sri Lanka, Siriwardena, Haigh and Ingirige (2010) stated that Sri Lanka lacks strategies to deliver PDR projects effectively while managing related resources. Koria (2009) identified many managerial issues related to tsunami reconstruction in Sri Lanka; they are: the structure or set-up that was used to manage projects, the managerial practices linked to the management, the competence and ability to manage. He further emphasized, that Sri Lanka lacked skills to manage large scale PDR projects and struggled to build skills from scratch while PDR projects are in progress.

2.5.2   Project Management Methodologies

A formal project methodology lead the work throughout the life cycle of a project; and a methodology is a set of guidelines or principles that can be tailored and applied to a specific situation (Charvat, 2003). According to Chin and Spowage (2012) project management methodology is a comprehensive set of best practices, tools and techniques that are dynamic, flexible, adaptive and customizable to suit different projects within a specific environment. It consists a set of processes, templates, techniques and tools to assist planning and managing the project throughout its entire life cycle. Kerzner (2017) stated that project management excellence or maturity can be achieved with a repetitive process that can be used on each and every project and that repetitive process was referred to as the project management methodology.

Due to differences in PLCs, market sector, product, size, technology, situation, etc. there is no generic methodology that can be universally applied to all projects (Charvat, 2003). However, a good methodology is flexible to apply for all projects, flexible for rapid improvements and uses standardized PLC phases (Kerzner, 2017).

There are many types of project management methodologies and can be broadly classifies as heavy-weighted traditional methodologies, light-weighted agile methodologies and mixed project management methodology. They can be explained as follows:

2.5.2.1 Heavy-weighted Traditional Project Management Methodologies

Traditionally practiced project management methodologies were heavy-weighted and sequential. They were based on the conception that projects are simple, predictable, linear, has clearly defined project boundaries; thereby, which is easy to plan, detailed and follow the plan without much change (Charvat, 2003; Kerzner, 2017; Špundak, 2014; Wysocki, 2014). Therefore, it contain rigid policies, procedures with limited flexibility (Kerzner, 2017), linear hierarchical relationships, thus, considered bureaucratic (Charvat, 2003). These rigid, sequential approaches are commonly called waterfall approach, where budget and schedule of deliverables are decided upon well-defined requirements (Kerzner, 2017).

The waterfall model originated in 1970s as an aid to software development (Charvat, 2003), it later led the construction industry (Demir & Theis, 2016). It is largely documentation-driven, time consuming, proceed to the following phase only after the completion of previous phase and the user receive the product only after the completion of the entire project (Charvat, 2003).
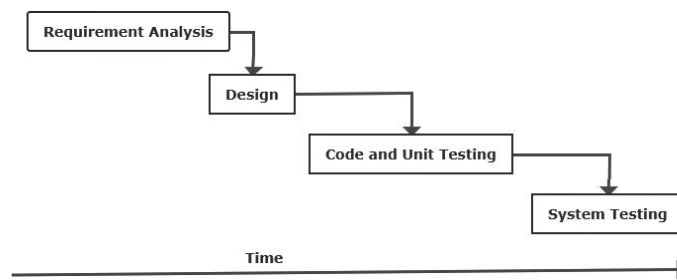
Figure 2-6: Waterfall development methodology adopted from (Charvat, 2003).

Heavy weighted traditional approach is more appropriate for projects where a very low level of uncertainty is expected, where there are clear user requirements and clear project goals, at the initial stage itself (Špundak, 2014). Despite being time consuming with heavy and detailed planning, practicing this in context where there are difficulties to obtain user requirements comprehensively at the beginning of the project, have made projects unsuccessful (Charvat, 2003; Kerzner, 2017).

2.5.2.2 Light-weighted Agile Project Management Methodologies

As a refinement to heavy weighted sequential management method, risk driven spiral model which do not require to obtain comprehensive user requirements at the beginning of the project was developed, which allows product development to be broken into portions (Boehm, 1988). Each cycle of the spiral begins with the identification of the objectives of the portion of the product being elaborated (Boehm, 1988). Spiral model developed by Boehm (1988) is illustrated in figure 2-6.
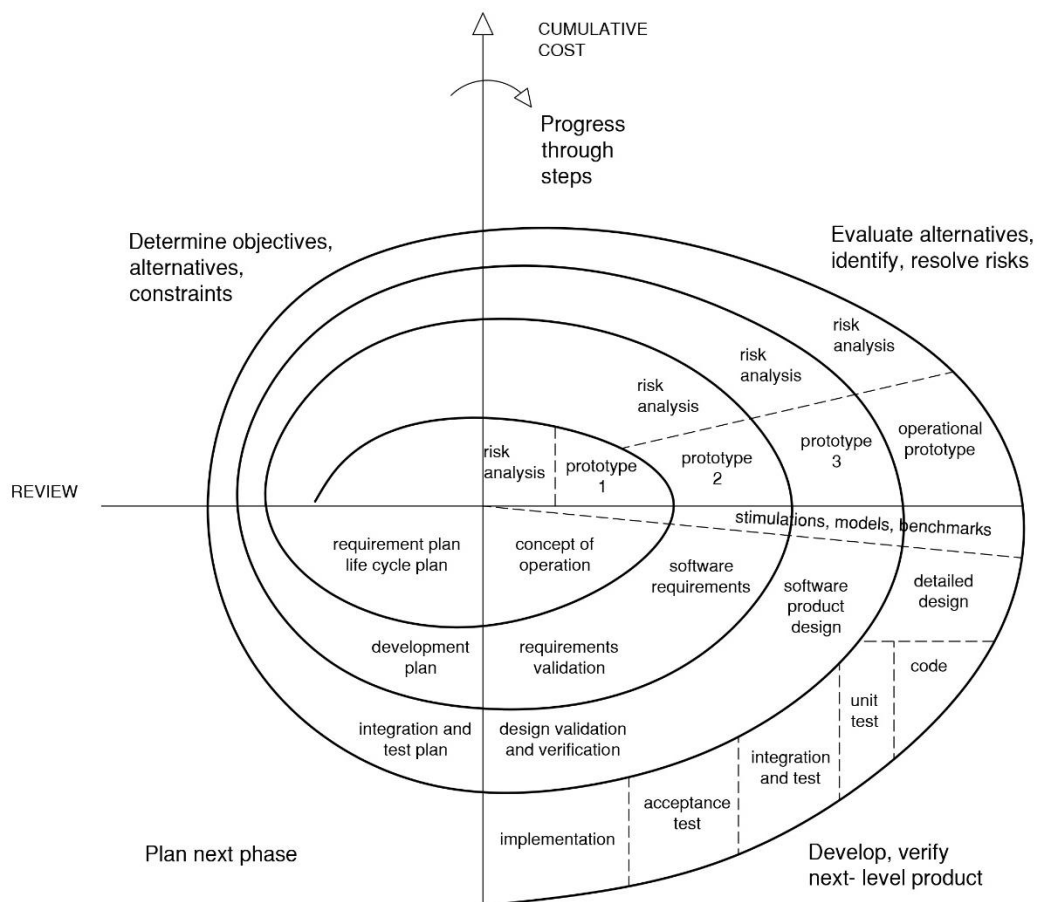
Figure 2-7: Spiral methodology adopted from Boehm (1988)

Light-weighted and agile project management methodology which is incremental, iterative and do not require to define detailed project boundaries at the beginning (Charvat, 2003), surfaced in with the introduction of agile manifesto (Highsmith & Cockburn, 2001; Highsmith, 2004). Agile methodology is a nontraditional way of building complex products and systems. It breaks the project in to series of 'mini projects', where each mini project is a valuable piece of the final product, hence, it

satisfies the customer by providing a usable piece of the final product, early in the development lifecycle than handing in a finished product towards the end of the contract (Misra, Vinod, Kumar, Fantazy, & Akhter, 2012). Therefore it is an iterative incremental model with phased delivery and the system grows by adding new functions to each iteration (Charvat, 2003; Highsmith, 2004). Every iteration is short, comprised of all phases and final project scope is dynamically built (Highsmith, 2004; Špundak, 2014).

The Manifesto for Agile Software Development established a set of four core values which makes project management more light-weighted compared to heavy-weighted project management approaches:

Individuals and interactions	over	processes and tools
Working products	over	comprehensive documentation
Customer collaboration	over	contract negotiation
Responding to change	over	following a plan

(Highsmith, 2004; Highsmith & Cockburn, 2001)

Changes in the initial plan are inevitable due to adjustments to unpredictable and dynamic changes in the project environment or within the project itself (Špundak, 2014). Agile methodology embrace changes during the project, works with people rather than against them (Charvat, 2003), help faster execution of the project by delivering early benefits, help achieve better control of the uncertain projects (Špundak, 2014). Nevertheless, Misra et al. (2012) explained that there are criticisms on this methodology which appears debatable due to data in the literature on support of criticisms is insufficient and the number of success stories reported is considerable, considering the age of the agile paradigm since its comeback.

Agile project management which surfaced with the agile manifesto was also developed in software industry (Highsmith, 2004; Highsmith & Cockburn, 2001; Kerzner, 2017; Misra et al., 2012) and adopting it to construction industry carry a great potential and suggest to be successful (Demir & Theis, 2016; Ribeiro & Fernandes, 2010; Straçusser, 2015; Streule, Miserini, Bartlomé, Klippel, & Soto, 2016) further, it is promising to cope with complexity of construction projects and improve project performance (Sohi, Hertogh, Bosch-Rekveldt, & Blom, 2016). In addition, Kerzner (2017) believes that agile project management practices will eventually replace traditional project

management practices. He further explains that in order to ensure successful implementation of agile management it is best to have some form of traditional project management in place at the beginning of the project.

2.5.2.3 Mixed Project Management Methodologies

Projects that follow neither extremely agile nor extremely rigid do exist and they can form into a perfect tailor-made methodology; further, it is more feasible to dynamically build a methodology from other methodologies (Charvat, 2003). Mixed methodologies contain some degree of flexibility and are more informal than formal. Amount of flexibility is case sensitive and this approach is sometimes called a framework which is a basic conceptual structure that is used to address an issue, such as a project (Kerzner, 2017). The best would be neither fully agile nor fully traditional project management methodology but one that is a combination of both agile and traditional approaches (Špundak, 2014).

2.5.2.4 Heavy-weighted Traditional vs. Light-weighted Agile Project Management Methodologies

It is beneficial to understand the difference between the two main methodologies of project management. A comparison of heavy-weighted traditional project management and light-weighted agile project management methodologies are summarized in table 2-4.

Table 2-4: Comparison of heavy-weighted traditional vs light-weighted agile project management

Characteristic	Heavy-weighted Traditional project management	Light-weighted Agile project management
Requirements	Clear initial requirements, low change rate	Creative, innovative, unclear requirements
Scope	Scope is clearly defined at the beginning of the project	Scope is iteratively decided as the project progresses
Completion focus	Paperwork and contractual documentation. user receive the product only after the completion of the entire project	Results and deliverables. Breaks the project in to series of 'mini projects', and each mini project is a valuable piece of the final product, hence customer get a usable piece of the final product, early.

Leadership style	Authoritarian	Participative
User involvement	Not involved	Close and frequent collaboration
User feedback	Minimal, mostly at project termination only	Throughout the project
Documentation	Heavy documentation	Minimal
Project direction	Follow the plan exactly	Respond to changes
Project solution	Follow the contractual requirements exactly	Constantly evolving solution
Organizational support	Use existing processes; bigger organizations	Prepared to embrace agile approach
Delivery	Often a late delivery	Shorter delivery time
Project plan	Linear	Iterative and incremental
Acceptance	Often a high rejection of deliverables	Minimal number of rejected deliverables
Best practices and lessons learned	Discovered from successes	Discovered from successes and failures

(Kerzner, 2017; Špundak, 2014)

2.5.3 Project Management Methodologies of PDR projects

In a post-disaster situation, there is a compression of responsibilities. Therefore, it is essential to consider whether traditional project management methodologies and approaches are adequate to address varying expectations of enormous number of stakeholders of PDR projects (Chang-Richards, Rapp, Wilkinson, Meding, & Haigh, 2017). While recent disasters and their impacts have challenged project management in many ways, it was identified project management methodologies for PDR situations are limited (Steinfort, 2017).

Even though the current literature available on project management methodologies for PDR context is limited, emerging ideas and suggestions on the PDR management in literature are tabulated in table 2-5.

Table 2-5: Suggested management approaches by various authors for PDR projects

Author	Suggestions for PDR project management methodology/approach
Jha et al. (2010)	An integrated approach to harmonize different project cycles that occur simultaneously at different levels.
Silva (2010)	An integrated and multi-sectoral approach
Ohlson & Melich (2014)	Traditional management methodology combined with agile concepts
Vahanvati & Mulligan (2017) Chang-Richards et al. (2017)	An agile or incremental strategy

To manage PDR projects, an integrated approach was suggested by Jha et al. (2010) and Silva (2010). In addition Ohlson and Melich (2014) suggested an agile or a combination of traditional and agile management. According to Vahanvati and Mulligan (2017) and Chang-Richards et al. (2017) there is a need for an 'agile' or incremental strategy to manage PDR projects which can address changes caused by the volatility of post disaster environments and gain and maintain the trust of affected communities (Chang-Richards et al, 2017). Further Vahanvati and Mulligan (2017) elaborated that traditional "closed loop" lifecycle approach cannot ensure good long-term outcomes for PDR projects thus the project management methodology should not get limited to a single PLC. Similarly, Alsaadi and Acar (2018) explained that when managing projects during post disaster, where project managers have a limited control over the external factors and project contains unique feature, a context-specific and agile approach is needed.

Further Ohlson and Melich (2014) stated, in an attempt to build better houses for families living in disaster areas, traditional management methodology combined with agile concepts was used and achieved better outcome. Therefore, it can be stated that a new non-traditional thought of project management methodology has to be considered to manage PDR projects. Further as Alsaadi and Acar (2018) also suggested, understanding the peculiarities of PDR in relation to project management methodology is of particular value for the managers of future PDR projects.

2.6   Managerial Processes (MPs) of PDR Projects

In order to understand peculiarities of PDR in relation to project management methodology, it is important to apprehend managerial process of PDR projects. There are several MP groups formed around different management considerations (Adams & Brandt, 1988). Managerial Process groups are different to PLC phases discussed in section 2.4 and contain distinct yet overlapping MP or functions (Cleland & Ireland, 2002).

Inherent in such a process group is a series of actions, changes or operations that bring about an end result. MP groups identified by Cleland and Ireland (2002) are: planning,

organizing, motivating, directing and controlling. Similarly, PMI (2005) and PMI (2013) identified initiating, planning, executing, monitoring, closing as distinct MP groups and Jha et al. (2010) identified assessment, planning, project development, implementation, and monitoring as main MP groups.

A managerial process is a set of interrelated actions and activities performed to create a pre-specified product, service, or result (PMI, 2005; PMI, 2013). In order to manage a project successfully, it is important to determine which MPs are appropriate for the particular project (PMI, 2013). All MPs cannot be uniformly applied for all projects (PMI, 2013).

In a post-disaster environment, MPs such as procurement and contract management; sourcing of labour, material and plant; resource management; quality control; financial management; governance; and risk reduction are vital (Kulatunga, 2011). Further, Bilau et al. (2017) identified four managing measures that are important to post disaster housing reconstruction and they are: conducting assessments to determine the management needs, establishing and/or strengthening institutional and organizational structures and arrangements, building the capacities of the participants involved in the reconstruction process, construction of resilient and acceptable housing to ensure disaster risk reduction.

Depending on nature, context, etc. of the project, a variety of new processes also would require to effectively manage a project (Cleland & Ireland, 2002). The conventional MPs are inadequate to address the peculiarities of PDR projects (Alsaadi & Acar, 2018). Literature available on MPs of PDR were limited and concentrated mostly on assessment, planning and implementation of PLC only. Nevertheless, literature review carried out identified 49 MPs related to PDR projects. It is noteworthy to realize that MPs suggested for PDR by PMI were discussed in terms of MP groups only. Thus, they have not looked at MPs with their relevance to stages of PLC. However, in order to manage a projects successfully, as discussed in section 2.4.1, it is important to identify the MPs involved in each stage of the PLC (Cleland & Ireland, 2002). Accordingly, identified 49 MPs related to PDR projects are summarized in table 2-6 and categorized in to four PLC stages of PDR projects identified by section 2.4.

Table 2-6: Managerial processes of PDR projects

PLC Stages of PDR	Managerial processes of PDR projects
Assessment and Conceptualization	1. **Understand the context** 2. **Assess impact of the disaster** 3. **Understand local governance structures, regulatory framework** 4. **Set reconstruction policy** 5. **Assess local needs and capacities** 6. **Establish the lead coordination and communication agency and the strategy** 7. **Understand funding steams and timescales** 8. **Identify beneficiaries** 9. **Decide whether to relocate or not to relocate** 10. **Land selection and resolve issues of land tenure** 11. **Decide on reconstruction approach** 12. **Establishing partnerships with other stakeholders** 13. **Develop project charter** 14. **Develop preliminary project scope statement**
Planning	15. **Recognize potentially risky natural hazards** 16. **Time schedule development (milestone based)** 17. **Scope management Planning** 18. **Planning fund distribution** 19. **Cost budgeting** 20. **Cost estimating** 21. **Resource planning** 22. **Risk management planning** 23. **Plan purchases and acquisitions** 24. **Stakeholder management planning** 25. **Land use and physical planning** 26. **Environmental planning** 27. **Cultural heritage conservation planning** 28. **Infrastructure and services delivery** 29. **Quality planning** 30. **Planning for monitoring and control**
Design and Implementation	31. **Establish quality of reconstruction** 32. **Design houses and communal buildings** 33. **Incorporate disaster risk reduction strategies** 34. **Community organizing and participation** 35. **Institutional options for reconstruction management** 36. **International, national and local partnership in reconstruction** 37. **Mobilizing financial resources and other reconstruction assistance** 38. **Direct and manage project execution** 39. **Acquire project team** 40. **Develop and train project team** 41. **Information distribution** 42. **Request sellers response and select sellers** 43. **Implement monitoring and controlling**
Closure	44. **Close the project** 45. **Implement demobilization** 46. **Handover to beneficiaries** 47. **Closeout reports with lessons learned** 48. **Contract closure** 49. **Post occupancy evaluation**

(Jha et al., 2010; Silva, 2010; PMI, 2005; Amaratunga & Haigh, 2011; Alsaadi & Acar, 2016; Schwab, 2014; Barakat, 2003; Baroudi & Rapp, 2012; Bilau et al. 2017; Boyd & Hofknecht, 2012; Hidayat & Egbu, 2010; Ismail et al., 2014; Schwab, 2014; Vahanvati & Mulligan, 2017)

Further, it is vital to understand key considerations of MPs. They are discussed in below section 2.7.
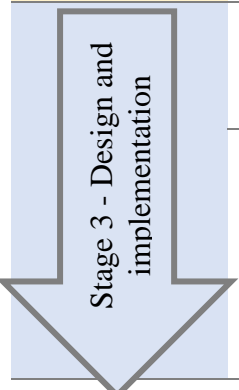
2.7 Key Considerations (KCs) of Managerial Processes of PDR Projects

In order to ensure successful implementation of MPs, it is important to understand key considerations of each MP (Jha et al., 2010; Silva, 2010) that should be comprehended. Accordingly, KCs of each MP identified from literature are summarized in table 2-7 below.

Table 2-7: Managerial process of PDR projects and their key considerations

	Managerial Process	Key Considerations
Stage 1- Assessment and Conceptualization	1. Understand the context	Understand the geography, society, economics, politics, climate and hazards
	2. Assess impact of the disaster	Define guidelines for assessment
		Assess housing conditions
		Assess social conditions
		Identify Victims
		Assess the state of infrastructure systems
	3. Understand local governance structures, regulatory framework	Understand the responsible group for disaster reconstruction, regulatory framework, standards, etc.
	4. Set reconstruction policy	Designate the agency responsible for reconstruction policy
		Consult stakeholders
		Establish basic parameters of the reconstruction policy
	5. Assess local needs and capacities	Understand particular needs of groups and individuals (men, women, elderly, children)
		Assess locally available human resources
		Assess locally available materials
	6. Establish the lead coordination and communication agency and the strategy	Decide on the lead agency to develop communications strategy
		Plan for the project communications strategy
		Develop stakeholder communication plans
		Establish effective stakeholders communication channels
		Agree on feedback mechanism
	7. Understand funding steams and timescales	Search for donors and determine the total amount of money available
		Understand the timescale it can be spent.
		Understand other donor requirements
	8. Identify beneficiaries	Determine eligibility criteria
		Identify eligible beneficiaries
		Obtain approval from the government for list of beneficiaries.
	9. Decide whether to Relocate or Not to Relocate	Initiate an analysis of disaster risk management
		Identify whether relocation is needed to mitigate the risk
		Define the policy framework for relocation
		Quantify the population subject to relocation
		Obtain community opinion on relocations
	10. Land selection and resolve issues of land tenure	Follow an adequate site selection procedure
		Plan to restore livelihoods and social conditions.

		Incorporate beneficiaries to identify relocation sites
		Identify relocation sites
		Access land ownerships
	11. Decide on Reconstruction Approach	Decide on level/method of assistance to provide
		Decide and agree on benchmarks for all reconstruction approaches
		Decide which reconstruction approach/s (method of implementation) is/are most suitable
	12. Establishing partnerships with other stakeholders	Make partnerships with government, other agencies or local organizations.
		Request support from other partners
	13. Develop Project Charter	Define Project authority (sponsor, project manager)
		Define purpose.
		Define key assumptions, constraints & risks.
		Define stakeholders.
		Define Resources and budget
		Define milestones.
		Define prediction of benefit.
	14. Develop Preliminary Project Scope Statement	Identify preliminary project scope (objectives, boundaries, deliverables, constraints, milestones)
Stage 2 - Planning	15. Recognize potentially risky natural hazards	Understand what natural hazards are likely to occur and their potential impact
	16. Time Schedule Development (milestone based)	Determine milestone dates and establish project time frame
	17. Scope Planning	Set up Change management plan, reporting process, communication plan, logistic plan, and a demobilization plan
	18. Planning Fund distribution	Decide on a system for delivering funds
		Designate the agency to manage and monitor reconstruction financing
		Develop a viable reconstruction finance strategy
		Establish an expenditure tracking system at the national level, integrated with tracking at the project level
	19. Cost Budgeting	Assign cost to each milestone.
	20. Cost Estimating	Identify cost for labour,
		Identify cost for material,
		Identify cost for travel
	21. Resource Planning	Identify HR/construction team
		Staffing management plan
	22. Risk Management Planning	Identify the treats to the project,
		Build a contingency plan
	23. Plan Purchases/procurement and Acquisitions	Engage qualified and dedicated procurement experts to manage resource procurement
		Assess resource requirements based on sufficient quality, availability, supply point and time of resource need
		Map resource markets and make provision for price variations due to seasonal variations and changing market conditions
		Identify sellers and Identify distribution channels
		Identify a methods to expedite the approval process.
	24. Stakeholder management planning	Decide on a plan to manage stakeholders
		Study land use plan and assess available land

	25. Land use and Physical planning	Decide whether revisions to existing land use plan, regulations needed
		Decide whether existing land use plan contributed to the disaster
		Determine how land use should be revised to mitigate future disaster risk
		Assess available land
		Plan land allocation
		Plan road layout
		Plan plot layout
		Plan for infrastructure and services
		Plan for public buildings and social infrastructure
	26. Environmental planning/ minimize the environmental impact of reconstruction	Decide on the legal framework for environmental management
		Plan and coordinate the debris management
		Provide environmental guidance to all institutions active in reconstruction
		Evaluate the ecological footprint of a relocation site
		Develop mitigation measures for the project and construction
	27. Cultural heritage conservation planning	Appoint an agency to address damage to resources of national significance
		Ensure cultural resources are considered in post-disaster damage and loss assessments
		Identify cultural resources that require conservation during recovery and reconstruction
	28. Infrastructure and services delivery	Assess the state of infrastructure systems
		Assess capability to restore/provide infrastructure services,
		Publicize the infrastructure standards
		Decide how to ensure interim and permanent infrastructure to reconstruction sites
		Build back better and conform to standards
	29. Quality planning	Provide quality management plan
		Provision of special training workshops for supervisory(including beneficiary) and management personnel on project inspection, supervision and enforcement
		Provision of capacity development workshops for management personnel
	30. Planning for monitoring and control	Establish multi-tiered institutional arrangements
		Include a dedicated management agency
		Decide on area authority
		Local monitoring and control units at all organizational and geographical levels
Stage 3 - Design and implementation	31. Establish quality of reconstruction	Understand the quality from the occupant's perspective.
		Provide new/improved building codes and construction guidelines
	32. Design houses and communal buildings	Analyze the disaster impact on common housing designs and construction technologies (HDCT)
		Select the HDCTs to be used in reconstruction
		Ensure that they are fully integrated into the reconstruction policy
		Design fit for purpose schools, health centers etc.

33.	Incorporate disaster risk reduction strategies	Adhere to international standards and best practice guidelines
		Influence local building practices and planning processes so that they support safer construction in the long term.
34.	Community Organizing and Participation	Analyze the community's capacity and preferences for participation
		Define the role of communities in planning and managing reconstruction
		Agree with the community on the activated and outcomes they deliver
		Decide how to support and empower communities to contribute for reconstruction
		Decide how to monitor and evaluate the involvement
35.	Institutional options for reconstruction management	Design the outline of the institutional mechanism
		Equipped with a structure, a mandate, a policy, and a plan
		Strengthened the central and local governments, so that they can adequately manage reconstruction
		Set up reliable monitoring and evaluation procedures to guarantee accountability and transparency.
36.	International, National and local partnership in reconstruction	Request support from the UN or other partners
		Identify the roles best suited to the UN, other humanitarian agencies, NGOs, and civil society organizations (CSO)s,
		Establish a monitoring and evaluation system for all NGO and CSO activity and mechanisms
37.	Mobilizing financial resources and other reconstruction assistance.	Design the assistance delivery system
		Activate delivery system for cash that is accessible for recipients/suppliers
38.	Direct and Manage Project Execution	Setout buildings and execute construction
39.	Acquire Project Team	Mobilize and/or recruit local artisans, construction workers, volunteers and beneficiaries
		Import workers
		Engage construction industry actors
40.	Develop and Train Project Team/ Training requirements in reconstruction	Decide how reconstruction training will be managed
		Ensure that adequate staff and resources are available for the lead training agency
		Design the training program
		Recruit the core team, the trainers, and the field teams
		Set standards and procedures for monitoring and evaluation of training activities
		Obtain expertise support from civil society organizations, building trades and academic institutions
		Train on general management skills, technical skills and ground rules
		Educate and develop skills and capacity of recruited workers
		Develop and utilize multi-skilled workers

		Activity reporting
		Provide technical guidance to community participants
	41. Information Distribution	Distribute drawings, schedules, specifications, etc. on time
	42. Request Sellers Response and Select Sellers	Obtain quotes and detains from sellers
		Implement the select seller process
		Letter of agreement with partners and sellers
	43. Implement monitoring and controlling	Daily/weekly/monthly activities including changes
		Recruit and deploy experienced management personnel or experts with requisite technical managerial skills to adequately monitor and apply control measures in reconstruction
		Deploy professionals and trained personnel and local representatives to monitoring units
		Set-up monitoring committees/work groups at local community level
		Ensure beneficiary participation in monitoring process to ensure that housing aligns with community needs and expected standards
		Establish monitoring and control and evaluation systems
		Establish project communication mechanism during construction
		Monitor and control the project team
		Manage stakeholders
		Risk monitor and control
Stage 4 - Closure	44. Close the project	Implement exit strategy
		Handover assets, activities, functions etc. to correct agency
		Close internal activities that the implementing agency has established
		Close internal activities that the implementing agency has established with other parties
	45. Implement demobilization	Ensure safety and demobilize human resources
		Ensure safety and demobilize equipment, non-consumable goods
	46. Handover to Beneficiaries	handover of the houses to their future owners and end-users
		Agree on a finite period during which the agency is responsible for defects
	47. Closeout reports with lessons learned	Collect knowledge acquired during the project.
		Prepare close-out report with lessons learned
		Provide feedback report to donors
	48. Contract closure	Close contracts that are applicable to internal support
		Close contracts that were established with outside parties
	49. Post occupancy evaluation	Conduct post occupancy survey
		Evaluate whether reconstruction acted as a catalyst for recovery

(Jha et al., 2010; Silva, 2010; PMI, 2005; Amaratunga & Haigh, 2011; Alsaadi & Acar, 2016; Schwab, 2014; Barakat, 2003; Baroudi & Rapp, 2012; Bilau et al., 2017; Boyd & Hofknecht, 2012; Hidayat & Egbu, 2010; Ismail et al., 2014; Schwab, 2014; Vahanvati & Mulligan, 2017)
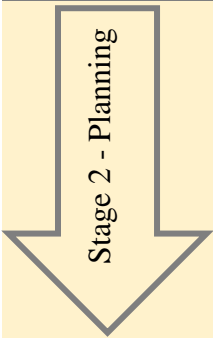
2.8   Conceptual Framework to Manage PDR projects

The conceptual framework for a research study is something that is constructed, not found, thus it incorporates pieces that are borrowed from elsewhere and structured with an overall coherence (Maxwell, 2013).

In order to manage a project successfully, it is vital to identify MPs that are appropriate for the particular project (Adams & Brandt, 1988; Alsaadi & Acar, 2018; Baroudi & Rapp, 2012; Cleland & Ireland, 2002; PMI, 2005; PMI, 2013). It is also vital to identify stages of a PLC as it depend on the distinctive nature of the project (Adams & Brandt, 1988; Baroudi & Rapp, 2012; Cleland & Ireland, 2002; Vahanvati & Mulligan, 2017). PDR projects are unique due to nature of the project, and due to chaotic context they operate (Amaratunga & Haigh, 2011; Bilau et al., 2018; Kulatunga, 2011; Olshansky et al., 2012). In order to explore a framework to manage PDR projects, it is of paramount importance to identify MPs and PLC of PDR project.

Therefore, a framework to manage PDR projects is attempted to achieve by exploring PLC stages of PDR projects and corresponding MPs of PDR projects in the context of Sri Lanka. An outline proposal to arrive at a specific process to manage PDR projects is illustrated in figure 2-8.

Figure 2-8: Outline proposal to arrive at a framework to manage Post disaster Resettlement projects

Conceptual framework to manage PDR projects is illustrated in figure 2-9.

STAGES OF PROJECT LIFE CYCLE (PLC) OF PDR PROJECTS

MANAGERIAL PROCESSES (MPs) OF PDR PROJECTS

ASSESSMENT AND CONCEPTUALISATION

KEY CONSIDERATIONS IN TABLE 2.3

- Understand the context
- Assess impact of the disaster
- Understand local governance structures, regulatory framework
- Set reconstruction policy
- Assess local needs and capacities
- Establish the lead coordination and communication agency and the strategy
- Understand funding steams and timescales
- Identify beneficiaries
- Decide whether to Relocate or Not to Relocate
- Land selection and resolve issues of land tenure
- Decide on reconstruction Approach
- Establishing partnerships with other stakeholders
- Develop project charter
- Develop preliminary project scope statement

PLANNING

KEY CONSIDERATIONS IN TABLE 2.3

- Recognize potentially risky natural hazards
- Time Schedule Development (milestone based)
- Planning Fund distribution
- Cost Budgeting
- Cost Estimating
- Resource Planning
- Risk Management Planning
- Plan Purchases and Acquisitions
- Stakeholder management planning
- Land use and Physical planning
- Environmental planning
- Cultural heritage conservation planning
- Infrastructure and services delivery
- Quality planning
- Planning for monitoring and control

DESIGN AND IMPLEMENTATION

KEY CONSIDERATIONS IN TABLE 2.3

- Establish quality of reconstruction
- Design houses and communal buildings
- Incorporate disaster risk reduction strategies
- Community organizing and Participation
- Institutional options for reconstruction management
- International, national and local partnership in reconstruction
- Mobilizing financial resources and other reconstruction assistance.
- Direct and manage Project execution
- Acquire project team
- Develop and train project team
- Information distribution
- Request sellers response and select sellers
- Implement monitoring and controlling

CLOSURE

KEY CONSIDERATIONS IN TABLE 2.3

- Close the project
- Implement demobilization
- Handover to beneficiaries
- Closeout reports with lessons learned
- Contract closure
- Post occupancy evaluation

Figure 2-9: Conceptual framework to Manage PDR projects.

38

Red rectangles indicate PLC stages of PDR as described in section 2.4. Arrows between Red rectangles indicate the linear relationship between stages where one stage proceed to the following stage after the completion of the previous stage. Black rectangle under each Red rectangle indicate MPs of PDR that corresponds to each PLC stage. Thereby, it suggests that project MPs stated in each Black rectangle should be carried out during the respective stage of PLC it corresponds to. Gray rectangles adjacent to each Black rectangle indicates that there are KCs that should be adhered to when carrying out MPs of PDR. KCs relates to each MPs of PDR were summarized in table 2-7.

2.9   Summery

This chapter comprehensively reviewed available literature on disasters, PDR projects and management of PDR projects. Natural disasters are increasing in number and their impact and destruction on human beings, economy and built environment is immense. PDR projects operates on a chaotic context and face many challenges. Therefore, high level of management capacity is required. PDR projects can be implemented in many ways and donor-driven approach is the most popular in Sri Lanka. There are many types of project management methodologies and they can be broadly classified as Heavy-weighted traditional project management and Light-weighted agile project management methodology. Adaptation of conventional one size fit management methodology for PDR projects, has been criticized and an emergence of a concept of an agile project management was imperceptible in available literature.

Findings of literature further identified that understanding PLC and MPs that has to be performed at each stage of PLC, provides an underline rationale for project management. Accordingly, literature identified four staged PLC for PDR projects and 49 MPs that has to be carried out during PLC of PDR. In addition, in order to successfully manage PDR projects, 210 KCs that should be adhered while carrying out managerial process of PDR projects were also identified. Based on literature findings a conceptual framework was developed to address the research problem. The next chapter describes the research methodology of this study.

3   CHAPTER 3 – RESEARCH METHODOLOGY

3.1   Introduction

This chapter discuss the research methodology used to achieve the aim of the research discussed earlier in section 1.3. The chapter describes the research approach, research design, research method: data collection and data analysis, research validity and ethical considerations.

3.2   Research Process

The research process consists of six steps: identifying a research problem, specifying a purpose for research, reviewing literature, collecting data, analyzing and interpreting data and finally, reporting and evaluating research. The research process adopted in this research is summarized in figure 3-1.

Research Problem	• identified the reserch problem and the importance of addressing it. • justifyed the research problem • identified the specific audience that would make a benifit out of it.
Purpose of the reserch	• created a specific focus within the broader topic • identifyed the research question • identified objectives and limitations
Litreture Review	• located books, journals, indexed publications, reports, etc. on the topic. • chose the appropriate litreture and reviwed. • summerized them to acceptable formats
Data Collection	• identified that the Qualitative reserch approach is most suitable. • identified that the reseach design is case study. • semi-strucured interviews, reviwe of case documents were identified for data collection
Data Analysis	• content analysis, cognitive mapping and cross case analysis were identified as data analysis tools
Reporting	• reserch findings were tabulated and presented in acceptable formats • a framework to sucessfully manage PDR projects was achived. • conclusions were drawn and future recommendations were specified.

Figure 3-1: The research process adopted in this study

3.3 Identifying the Research Problem

In order to identify the research problem, it is essential to specify a question to study, justify the study question and identify the importance of the study for a selected audiences. Specifying the 'problem' help limit the research to the subject matter and focuses the attention on a specific aspect of the study.

Study Question: Research questions is what wants to be specifically learn or understand by doing the study (Maxwell, 2013). It refers to a theoretical or practical difficulty that the researcher experiences (Kothari, 2004). Research questions that starts with the words 'what' or 'how' to convey an open and emerging design, associated with qualitative approach (Creswel, 2014; Yin, 2009). The word 'why' try to explain why something happens, and is related to a quantitative research which limits the explanations without opening them up for deeper views (Creswel, 2014).

Increasing number of natural disasters that Sri Lanka faced, the chaotic nature the PDR projects got executed, length of time took to reconstruct, yet, failing to meet quality, poor user satisfaction, etc. interested the researcher to explore how to manage PDR projects in a better manner. Initial literature survey was carried out prior considering a specific research question which helped to narrow down the research interest. Consequently the final research problem of this research got rationalized to 'how to successfully manage PDR projects in Sri Lankan context'.

3.4 Literature Review

Initial literature survey was carried out to obtain an overall idea about the field of study. Thereafter a comprehensive literature review was conducted to review PDR implementation methods and associated challenges, to explore concept of project management, project management methodologies and their applicability to PDR context. Consequently, the literature review was extended to explore PLC of PDR and MPs of PDR. In addition KCs of MPs were also identified from available literature. During this process, books, journals, indexed publications, reports etc. on the topic were located and selectively chose literature to include in the review and summarized literature to acceptable formats.

3.5   Research Approach

Research approaches are plans and procedures for research and it includes broad assumptions to detailed methods of data collection, analysis and interpretations. In this regards, three research approaches can be identified. They are qualitative, quantitative, and mixed methods (Creswel, 2014; Flick, 2009; Kothari, 2004).

Qualitative research is an approach to explore and understand the meaning of individuals or groups related to a social or human problem. The process involves emerging questions and procedures, data is typically collected in the participant's setting, data analysis inductively get built from particulars to general themes and the researcher makes interpretations of the meaning of the data (Creswel, 2014). This enables to understand how events, actions and meanings are shaped by the unique circumstances in which it occurs (Maxwell, 2013).

Quantitative research is an approach to test objective theories by examining the relationship between variables. These variables, in turn, can be measured by instruments and statistical procedures and can be used to analyze the numbered data (Creswel, 2014). This approach is applicable to phenomenon that can be expressed in terms of quantity and it involves the generation of data in quantitative form (Kothari, 2004). Mixed method research is an approach to inquiry, which involved collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks (Creswel, 2014).

The appropriate approach to research relates to research problem (Creswel, 2014; Kothari, 2004; Yin, 2009). The research in subject intend to develop a framework to successfully manage PDR projects in Sri Lanka. Hence the research problem, the emerging question was, 'how to successfully manage PDR projects in Sri Lankan context'.

In the current context where available wealth of information is limited for PDR projects, it was deemed inappropriate to choose a research approach to test objective theories by examining relationships between variables. In order to explore 'how' to successfully manage PDR projects within its chaotic nature, require in-depth understanding of PLC of PDR projects and MPs of PDR projects. Accordingly, ability to understand how events, actions and meanings are shaped by the unique circumstances in which these

occur was required. It has been argued that when detailed and in-depth understanding is needed for a phenomena, a qualitative research approach provides distinct advantages (Creswel, 2014; Silverman, 2011; Yin, 2009). Therefore in order to explore and understand the existing problem, which is exploratory in nature, qualitative approach was executed throughout the study.

3.6   Research Design

Research designs are types of inquiry within qualitative, quantitative and mixed method approaches that provide a specific direction for procedures in a research design (Creswel, 2014). As summarized in table 3-1, there are different research designs frequently used in research.

Table 3-1: Types of Research Designs

Quantitative	Qualitative	Mixed Methods
Experimental Designs Non Experimental designs (Ex. Survey)	Narrative research Phenomenology Grounded theory Ethnographic Case study	Convergent Explanatory Sequential Exploratory Sequential Transformative, Embedded or Multiphase

Source: (Creswel, 2014)

According to Creswel (2014) five research designs are apparent for qualitative approach. They are: narrative research, phenomenology, grounded theory, ethnographic and case study. Narrative research is an inquiry from the humanities where lives of individuals studied and asks one or more individuals to provide stories about their lives. Gathered stories are then retold or re-stored by the researcher into a narrative chronology. Creswel (2014) further explains that phenomenological research is a design of inquiry coming from philosophy and psychology where the researcher describes the lived experiences of individuals about a phenomenon as described by the participants. Grounded theory is a design of inquiry from sociology where the researcher derives a general, abstract theory of a process, action or interaction grounded in the views of participants. Ethnography is a design of inquiry coming from anthropology and sociology where the researcher studies the shared patterns of behavior, language and actions of intact cultural group in a natural setting over a prolonged period of time.

A case study is 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 (Yin, 2009). Case studies design allows to develop an in-depth analysis of a case, often a program, event, activity, process or one or more individuals. Cases are bounded by time and activity and detailed information is collected with use of variety of data collection procedures over a sustained period of time (Creswel, 2014).

The research problem of this study which is exploratory in nature is attempted to find 'how' to manage PDR projects, thus qualitative research approach was chosen. The nature of the problem do not require to study lives of individuals and ask for more individuals to provide stories about their lives. Therefore this research did not require a narrative design. Further it did not require to describe lived experiences of individuals about a phenomenon. Therefore a phenomenological research design was not necessary. There was no need to derive a process, action or an interaction grounded in the views of participants. Thus the research design was not grounded theory. Further the nature of the research problem did not require to study patterns of behaviors, language, and an action of a cultural group in a natural setting. Hence the ethnography was also not suited as the research design. However, the research problem demanded to develop an in-depth analysis of PLC of PDR projects and MP of PDR projects where there was a need to investigate a contemporary phenomenon in-depth and within its real-life context. A case study approach is often chosen for qualitative research approach and it is a method of in-depth study and places more emphasis on the full analysis of a limited number of events or conditions and their interrelations. The case study deals with the processes that take place and their interrelationship. Thus, case study is essentially an intensive investigation of the particular unit under consideration (Kothari, 2004). Case study method is most appropriate for 'How' and 'Why' questions (Yin, 2009). Hence the case studies were the best suited to explore how to successfully manage PDR projects in Sri Lanka. Therefore the research which has a qualitative approach used case study as the research design.

3.6.1 Case Study Design

According to Yin (2014) there are four types of designs for case studies. They are: 1) single-case holistic design, 2) single-case embedded design, 3) multiple-case holistic design and 4) multiple-case embedded design. Therefore, this research which uses case studies as the research design can have a single case or multiple cases. In a context where choice is available, multiple-case designs are preferred over single-case design and multiple case design provides better analytical benefits (Yin, 2014) .
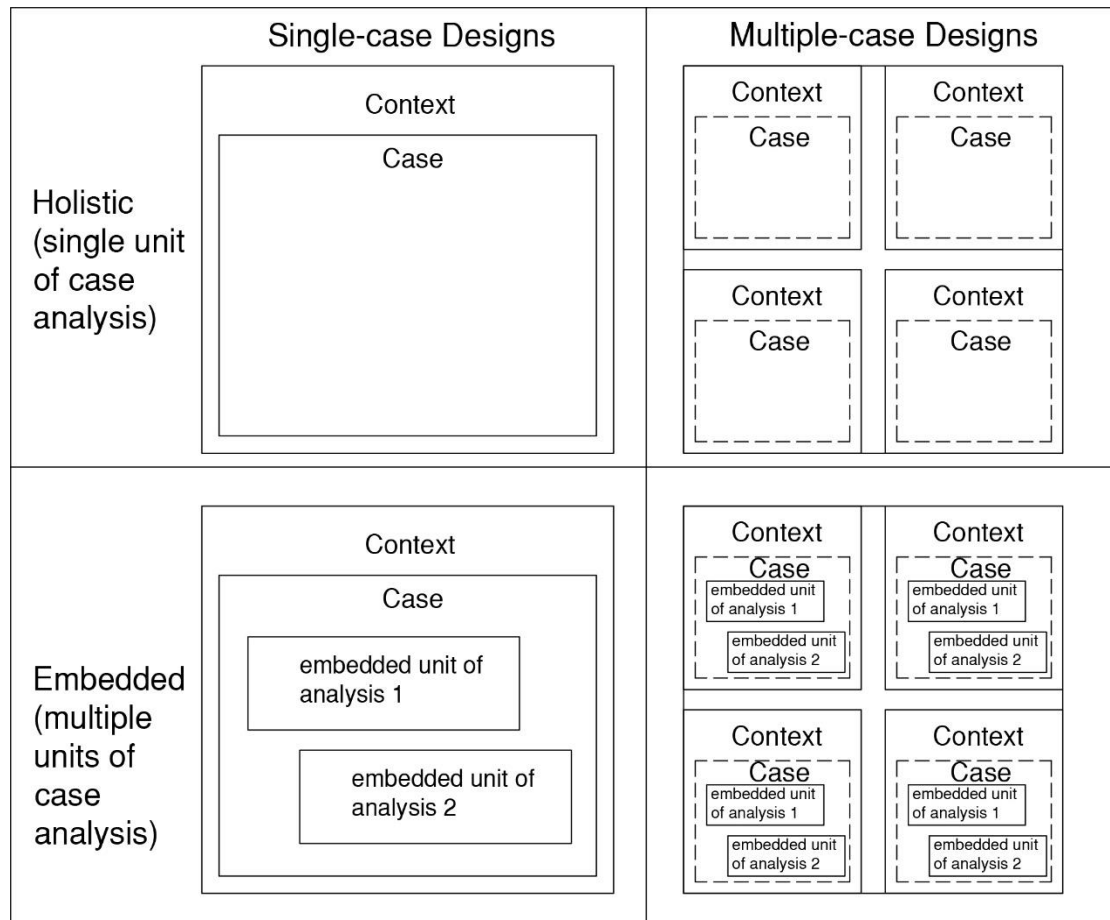
Figure 3-2: Basic types of case study designs (Yin, 2014)

Cases that is appropriate to study PDR project management practices in Sri Lankan context was limited, yet choice was available. Thus, in order to provide better analytical benefits the study comprised of two cases. As explained in section 3.6.2 below, the primary research question bring forward only one unit of analysis. Therefore the case study design of this research was multiple-case holistic.

3.6.2 Identification of Unit of Analysis

Unit of study is related to the fundamental problem of defining what the "case" is. A case can be an implementation process or an organizational change. Tentative definition of the unit analysis is related to the definition of initial research question. The appropriate unit of analysis occur after accurately specifying primary research questions (Yin, 2009). In this study, the research question is 'how to successfully manage PDR projects in Sri Lankan context'. Therefore the Unit of Analysis in this study was management processes within PDR project life cycle stages.

3.6.3 Selection of Cases

When there are many cases that qualify as candidate cases, final single case or multiple cases should be selected systematically. Screening procedure assures that the proper cases were selected prior commencing formal data collection (Yin, 2009). It can be done in two ways. a) One phase approach is used if only a dozen of cases are available to screen. The screening consists of querying people knowledgeable about cases. b) When the eligible number of candidates are large, a two-stage procedure can be used to screen cases. Stage one is obtaining relevant quantitative data about the entire pool from an archival source, followed by defining relevant criteria to reduce or stratify the number of candidates. On stage two, people knowledgeable about the each candidate get queried and collect limited documentation about each candidate (Yin, 2014).

Prior processing with screening cases of this research, a set of operational criteria was defined to identify cases that would believe to qualify. Having contacted multiple organizations that execute PDR projects in Sri Lanka it was realized that only a few number of eligible candidates were available to study PDR project management practices. Therefore one phase approach was used to screen candidate cases. Subsequently, knowledgeable people at Disaster Management Centre, National Building Research Organization, Ministry of Disaster Management, National Disaster Relief Center, District Secretariat of Rathanapura, District Secretariat of Kaluthara, Habitat for Humanity and Un-Habitat of Sri Lanka were queried and limited documentation about candidate cases were collected.

Case study selection criteria was used to screen candidate cases. The criteria considered were: a) PDR housing projects were considered and PDR public buildings,

infrastructure projects, etc. were screened out as housing is the most critical component in reconstructions after disaster. b) PDR permanent housing projects were considered and building immediate and transitional shelter were screened out as providing permanent housing was the most challenged component. c) PDR housing projects with relocations were considered thus, projects where houses were rebuilt on the same place where victims used to live were screened out. Thereby, the increased complexity due to relocation was given emphasis. d) Projects that followed donor-driven approach was considered and owner-driven projects were screened out as donor-driven approach were the most popular PDR in Sri Lanka. e) In order to study projects that are complex in nature PDR permanent housing relocation projects that comprised more than 50 number of houses in one relocation site were considered. f) Finally, projects executed only during last 5 years were considered. Older PDR housing projects such as flood-2003 relocations in Rathnapura, tsunami-2004 relocations in coastal zones, etc. were screened out due to considerable amount of professionals involved in those projects were currently inaccessible and their ability to recall management processes executed more than a decade ago was poor. In addition, project documents of such PDR were also not readily available.

Accordingly two cases were screened and selected to explore and develop a framework to successfully manage PDR projects in Sri Lanka.

<u>Case A</u>

The project was located in Badulla district and it was initiated due to landslide that occurred in the same district in 2014. The direct impact of the disaster was on 1875 people and 66 houses got destroyed (DMC, 2017).

Families affected were people whose livelihoods were attached to the plantation estate adjacent to where disaster occurred and were living in 'line houses' located in the vicinity. The area was identified as a 'high risk' area in terms of disaster and National Building Research Organization (NBRO) recommended to relocated people in to no risk locations. Government of Sri Lanka (GoSL) provided alternative lands in safer locations and National Housing Development Authority provided loan facilities to people who had the capacity to repay. Families who didn't had such capacity remained to live in same line houses. Some families who obtained loans, built new houses on

safer lands and moved into them, whilst some others, built new houses on safer lands, yet, continued to live in the same unsafe line house they used to live.
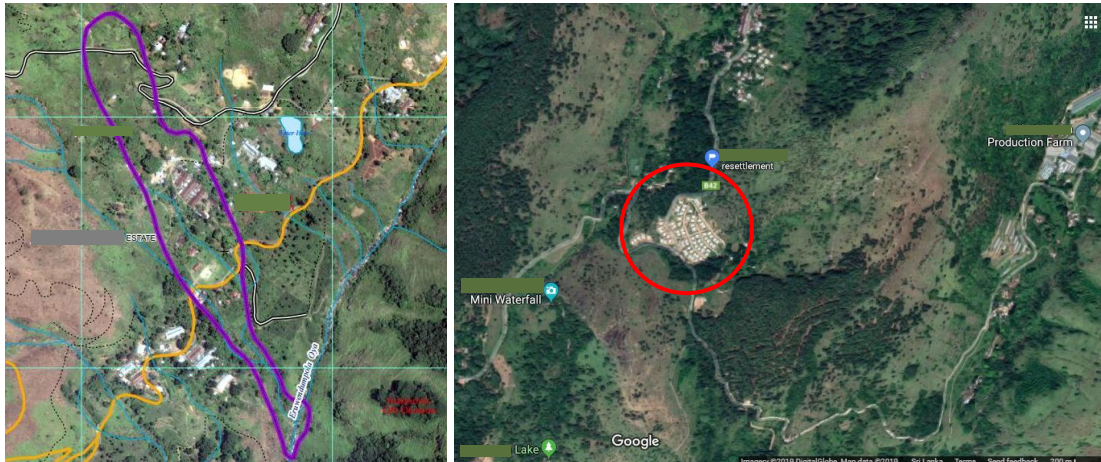
Figure 3-3: Affected area from landslide (left). Relocated site (right)
Source: Surveyor Department, 2014

Figure 3-4: Images of completed houses of Case A

Nevertheless, soon after the disaster GoSL initiated a reconstruction project to relocate victimized families and decided to construct 75 housing units in a chosen safe land nearby. Ministry of Plantation Industries was instructed to a) identify a suitable land in consultation with the Ministry of Livestock & Rural Community Development and NBRO. b) Formulate a program to build houses to affected families in collaboration with the relevant plantation companies and other authorities. Ministry of Livestock and Rural Community Development commenced housing construction through the Plantation Human Development Trust in collaboration with Ministry of Defense & Urban Development.

Having experienced slow progress in construction, GoSL handed over the supervisions and monitoring of the programme to Ministry of Disaster Management in coordination with the Ministry of Plantation Infrastructure Development and the District Secretary-Badulla.

Case B:

The project was located in Kegalle district and multiple landslides occurred within the district in 2016. The direct impact of the main landslide was on 10,625 people. 163 houses got completely destroyed and 414 houses got damaged. In addition, due to several other landslides occurred simultaneously in the same district with no loss of lives, 72 houses got destroyed and 1,251 houses got damaged (DMC, 2017). Due to the impact caused by multiple disasters the district faced, initiated the PDR project was initiated.
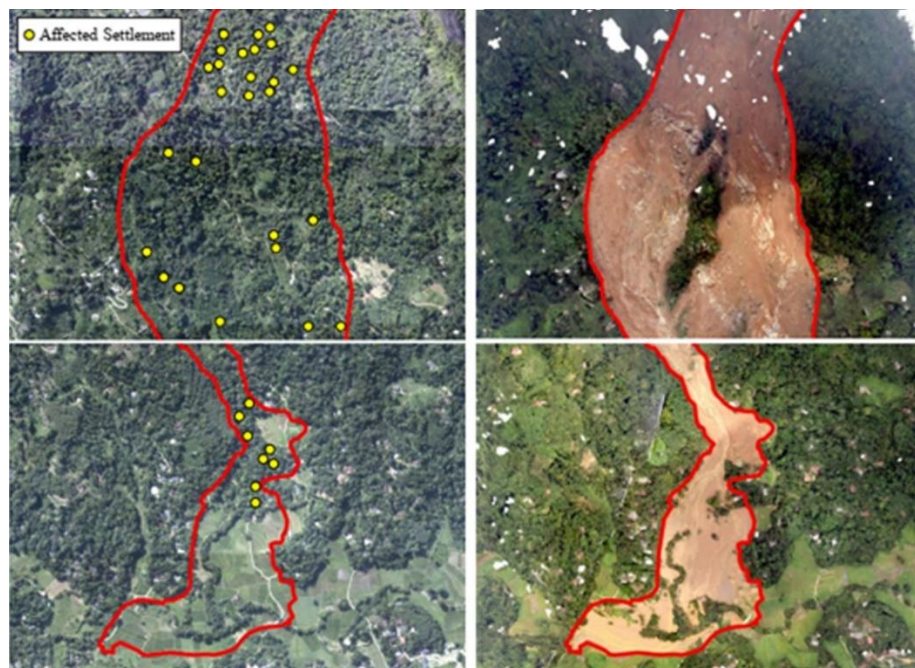
Figure 3-5: Impact of the main landslide occurred in 2016 in Kegalle Disaster
Source: JICA, 2016

Subsequent to the landslides, geological conditions of the surrounding got affected and total of 1962 families were identified to be living in high risk areas. Accordingly GoSL decided to initiate a mega project which included two componennts. They are: a) PDR – to relocate direct victims of landslide b) relocating indirect victims who were living in righ risk areas. After many dicussions, GoSL decided to follow donor-driven apprach to the PDR component of the project and owner-driven approach to relocate indirect vicitms. Total project comprised of 48 government relocation sites and 500 individually

selected land plots. The donor-driven PDR project, that was initiated to relocated direct vicitms of the disaster was considered for this study. It was located on a government relocation site.

Figure 3-6: a) relocated site of Case B, b)completed house. c) ongoing construction of case B. c) completed community center of case B
Source: a and c images- NBRO

Ministry of Disaster Management under instructions of GoSL initiated the reconstruction project with the key participation of District Secretariat Kegalle and NBRO. Case B, the selected PDR subproject, followed donor-driven approach where two private corporate donors provided building materials. GoSL provided human resources both professional and labour from state organizations and Tri-forces. Ministry of Disaster Management constructed a Community center for case B which also serves as an evacuation center. It was funded by Asian Development Bank.

Summary of selected two cases are in Table 3-2.

Table 3-2: Summary of cases selected

		Case A	Case B	
Location		Badulla District	Kegalla District	
Disaster		Landslide	Landslide	
Date of disaster strike		2014	2016	
Total No. of people affected		1875	24,782	
Total houses affected	destroyed	66	235	
	damaged	0	1665	
			Total Project	Selected Donor driven Project
Total houses reconstructed		75	1962	56
No. of houses constructed in Government given resettlement sites		75	1462	56
No of houses constructed in individually selected land plots		0	500	0
Reconstruction Approach	Donor Driven	75	237	56
	Owner Driven	0	1687	0
	Other	0	38	0
Cost per house		1.2 million (material cost only)	-	1.2 million (material cost only)
Status of the project at the time of conducting the filed study		Completed and occupied	93% Completed and occupied.	Completed and occupied

3.6.4 Case study Protocol

A case study protocol contains procedures and general rules to be followed and instruments to use during the study. A case study protocol is essential when multiple cases are studied within the research. A protocol increase the reliability of case study and guide the investigator in carrying out the data collection from a single case (Yin, 2009).

Case study protocol adopted for the study was as follows:

Table 3-3: Case study protocol adopted

Overview of the case study	Data collection	Data analysis	Case study report
• study questions • conceptual framework	• data collection plan • preparation prior field work	• content analysis • cognitive mapping • cross case analysis	• guideline • format for the data

3.7   Research Methods

Research method is a specific method that involves the forms of data collection, data analysis, and interpretation of the study (Creswel, 2014). They are explained in sections 3.7.1 and 3.7.2 below.

3.7.1   Data collection methods

Data collection methods are the means to answer research questions and it is not a logical transformation of the research questions (Maxwell, 2013). Three major data collection methods in qualitative approach are interviews, documents and observations and they have their distinct strengths and weaknesses (Creswel, 2014; Flick, 2009; Yin, 2014). They are summarized in table 3-4.

Table 3-4: Qualitative data collection methods adopted from Creswel (2014), Flick (2009) and Yin (2014).

Data collection method	Key particulars
Interviews	• Types: Face-to-face interviews, telephone, skype interviews, focus group interviews. • Unstructured open-ended questions thus allow fluidity • Could be filtered information through views of interviewees
Documents	• Types: meeting minutes, reports, letters, emails, etc. • Stable and specific information • Could be difficult to retrieve.
Observations	• Types: field notes on the behavior and activities of individuals. • First-hand real-time experience. • Time consuming and broader coverage by an individual is difficult.

This research adopted two data collection methods. Primary method of data collections was interviews and documents review was also used subjected to availability and accessibility

A key problem associated with qualitative data collection methods is the validity of data and triangulation can be used to overcome the issue. It involves integration of multiple methods of data collection. There by, it reduces limitations of a specific method and arriving at systematically biased conclusions. Therefore triangulation allows to gain a better validity for the research (Creswel, 2014; Maxwell, 2013; Silverman, 2011; Yin, 2014). Data collection of this research was augmented by triangulation where interviews and document review were used to avoid arriving at based conclusions.

3.7.1.1 Interviews

Interviews are the most important method of data collection for case studies (Mason, 2002; Yin, 2014) and three types of interviews can be carried out. They are summered in table 3-5. Interviews were used as the primary method of data collection within cases. They were face-to-face in nature with guided conversations rather than structured queries. Thus, interviews carried out were in-depth and semi-structured.

Table 3-5: Types of Interviews in data collection

Structured	Semi- structured	Unstructured
• Focused interviews	• Focused interviews	• Response dependent questions
• Predetermined/ close ended questions	• Open ended questions	• Time consuming
• Quick and easy to administer	• Time consuming	• Detailed discussions
• Limited responses / lacks details	• Encourages probing	• Expensive to employ and train interviewers
• Cheaper to obtain info	• Expensive to employ and train interviewers	

Selection of respondents:

Selection of participants determine who to interview from selected groups. In qualitative research selection is a purposeful decision for specific case (Flick, 2009). Four groups of stakeholder were purposefully identified to interview. They are: project managers and coordinators, other consultants involved who were professionals, beneficiaries and constructors. Accordingly following 18 profiles were interviewed and details of them are summarized in table 3-6.

Table 3-6: Profiles of interviewees

Interviewee groups	Case study A		Case study B	
	Description	Interviewee Code	Description	Interviewee Code
Project Managers and Coordinators	District Coordinator - Disaster Management	APC	Assistant Director – Disaster Management	BPC
	Divisional Secretariat	ADS	Divisional Secretariat	BDS
	Project Director	APM	-	-
Other Consultants	Planner I	APi	Planner	BP
	Planner II	APii	-	-
	Architect	AA	Architect	BA
	-	-	Quantity Surveyor	BQS

Beneficiaries	Beneficiary I	ABi	Beneficiary I	BBi
	Beneficiary II	ABii	Beneficiary II	BBii
	Beneficiary III	ABiii	Beneficiary III	BBiii
Constructor	Project Director	AC	-	

Prior carrying out interviews of Case A, a director of a key consultation organization of the case was contacted and upon the discussion had, one professional involved with the project was introduced as the key contact person to organize interviewees. Accordingly, three consultants who played key roles in the project were interviewed. Based on the information obtained from the first three interviews, project managers and coordinators involved with the project was also contacted and three more interviews were conducted. One organization contacted of the same group declined to provide an interviews due to unavailability of key personnel involved with the project. Thereafter key personnel of the constructor was also interviewed. Finally, having visited the relocated site three beneficiaries were selected and carried out interviews with them. Majority of beneficiaries were conversant in language of Tamil only, which the researcher was not conversant with. Therefore, selection of beneficiaries for interviews were narrowed down by language barrier. Thus, convenience selection took place.

Prior carrying out interviews of Case B, guidelines published and followed by the project was first studied and accordingly suitable positions to interview were identified. Consequently, three consultants who played key roles in the project were interviewed and two more who were key personnel of management and coordination were also interviewed. Two key people who represented the same group were reluctant to take part. Construction of Case B was also done by the same organization who constructed Case A. Therefore, interviewee of Case A, who represented constructor, readily provided details related to Case B at the time of conducting the interview for Case A. Thus, there was no necessity to interview a representative of constructor for Case B. Finally, having visited the relocated sites, three beneficiaries were selected on the basis of convenience selection and carried out interviews.

Each participant was provided a letter (refer appendix-A) which contained an introduction to the research and the obligation of the researcher to respect confidentiality of participants. Total of 18 interviews were carried out and length of each interview varied from 30 mins to 2.5hrs. Having obtained consent form each

participant, 17 interviews were voice recorded and 1 was not voice recorded as consent to voice record was not received. Notes of the particular interviews was handwritten in a comprehensive manner. In addition, important facts of voice recorded interviews were also handwritten and noted by the researcher.

Interview Protocol

According to Creswel (2014) interview protocol can be used to ask questions and record answers during a qualitative interview. Protocol carried out during the research was as follows:

Table 3-7: Interview Protocol of the research

Interview Protocol
• Introduction to the interview and interviewer
• Heading and date, place, time, name of interviewee
• Section A – General Information (ice-breaker)
•   Basic details of the interviewee
•   Basic details about the case/project
•   Involvement of the interviewee
• Section B – open ended questions on Stage 1 – Assessment and conceptualization
• Section C – open ended questions on Stage 2 – Planning
• Section D – open ended questions on Stage 3 – Designing and implementation
• Section E - open ended questions on Stage 4 – Closure

3.7.1.2 Documents Review

Documents play an explicit role in case study data collection due to their overall value. It helps to corroborate and argument evidence from other sources (Yin, 2014). This study collected data from documents relevant to PDR of two cases. Collected documents include, letters, emails, minutes of meetings, written reports, evaluations and other studies, etc. on both cases. Many documents were obtained through case study participants and others were obtained from internet searches.

3.7.2 Data Analysis Methods

The purpose of data analysis is to make sense out of text and image data. It involves segmenting and taking apart the data as well as putting it back together (Creswel, 2014). Data analysis consists of examining, categorizing, tabulating, testing or otherwise recombining evidence, to draw empirically based conclusions (Yin, 2009). Multiple ways of analysis were in practice and content analysis, thereby theme identification,

cognitive mapping, tabulation and cross-case analysis were used in this study to analyze collected data.

3.7.2.1 Content Analysis

Content analysis is an accepted method of textual investigation and it involves establishing a set of categories (Silverman, 2011). Content analysis is exploratory in process and predictive or inferential in intent (Krippendorff, 2012). Main categorizing strategy in content analysis was coding (Maxwell, 2013; Silverman, 2011). Many software such as ATLAS.ti, MAXQDA, NVivo were available to assist the complex process of content analysis and this study used NVivo due to its availability and accessibility.

Prior to proceeding with coding all voice recoded interviews were transcribed. All other handwritten notes taken during interviews were organized. Coding frame was prepared relating to theoretical considerations and materials. All transcribed interviews and documents collected were coded. Three types of coding was used to analyze data in this study. Initially, open coding was carried out and secondly, a more refined version, axial coding was executed. Finally, further refined selective coding was performed. This iterative process allowed the creation of new and revised categories based on how well the available data conformed to the initial categories used for coding. Coding as suggested by Miles and Huberman (1994) led to new ideas on what should go in to matrix.

3.7.2.2 Cognitive Mapping

Cognitive mapping method is a supporting tool to carry out qualitative data examination and facilitates field work data organization and reduction, particularly concerning data from interviews, documents, observation notes etc. (Vasconcellos, 2014). It can be seen as a picture or visual aid in comprehending the mappers' understanding of particular and selective elements of the thoughts, and when the map is completed distinct clusters of concepts can be identified (Eden, 1992). Therefore, this research used cognitive mapping to understand particular thoughts of PLC of PDR and MPs of PDR and finally to understand themes and concepts related to project management.

As explained by Vasconcellos (2014) cognitive mapping provided flexibility in data organization, it facilitated representation of ideas and improved data consistency. However, one of the limitations experienced was reduction of data by reducing complex events and simplifying the respondents' views into a single word, phrase or concept (Vasconcellos, 2014). In contrary, Miles and Huberman (1994) explained that data reduction is a form of analysis that sharpens, sorts, focuses, discards and organizes data to draw and verify conclusions.

3.7.2.3 Cross Case Analysis

Cross case analysis applies to multiple cases. According to Yin (2009) it comprises of creation of word tables that display data from individual cases according to some uniform framework. An analysis of entire collection of word tables and cognitive maps enabled the study to draw cross-case conclusions. Cross case analysis enhance generalizability and deepens the understanding and explanation (Miles & Huberman, 1994). Within-case analysis is important prior to cross case analysis (Miles & Huberman, 1994).

Accordingly, in this research, within case analysis was first carried out. Thereafter, analyzing cross case networks help understand PLC of PDR projects and MPs of PDR projects. MPs of PDR projects in Sri Lanka, that got executed within each stage of PLC of PDR project was also understood. Matrices were used to analyze KCs of each managerial process.

3.7.2.4 Developing the Framework

As suggested by Miles and Huberman (1994) in order to draw conclusions, patters were formed, clarified relationships and built a coherent understanding. Accordingly, developed a framework to successfully manage PDR projects in Sri Lanka.

3.8 Research Validity

Qualitative research, rarely get the opportunity for formal comparisons, sampling strategies or statistical manipulations that 'control for' the effect of particular variables. Therefore qualitative research must rule out most validity threats by using evidence collected during the research (Maxwell, 2013). Quality of case study designs can be

maximized through four critical conditions related to design quality. They are construct validity, internal validity, external validity and reliability (Yin, 2009), and are summarized in table 3-8.

Table 3-8: Four critical conditions related research validity

Critical conditions	Description
Construct validity	Identify correct operational measures for the concepts being studied. How: With uses of multiple sources of evidence, establish chain of evidence during data collection and get key informants to review draft case study report.
Internal validity	Seeks to establish a causal relationship. How: with use of pattern matching, explanation building, address rival explanations and use of logic models during data analysis
External validity	Define the domain to generalize study findings. How: Use theory in single-case studies and use replication logic in multiple-case studies during research design
Reliability	Demonstrate that the operations of a study, such as the data collection procedures, can be repeated, with the same results. How to: During data collection use case study protocol and develop case study database.

Source: Adopted from Yin (2014)

In order to ensure construct validity triangulation was practiced during data collection. Accordingly interviews and case documents were used as data collection methods. Pattern matching with coding, explanation building and use of logic models during analysis were practiced to ensure internal validity. Replication was used among two cases studies attempting to generalize study findings, thus to ensure external validity. Case study protocol used to help repeat data collection procedure, ensuring reliability of the research.

3.9 Ethical Considerations

There are extensive ethical considerations to be anticipated, and they are reflected through the research process. It is important to protect research participants; develop a trust with them; promote the integrity of research; guard against misconduct and impropriety that might reflect on organizations or institutions; and cope with new, challenging problems (Creswel, 2014). In order to meet ethical requirement, interviewees were invited to participate, information about the research was provided, consent to participate was obtained. Confidentiality and privacy was guaranteed by agreeing that any material written and published containing the collected data include

the names of organizations only and interviewees would be referred to using codes with no other information presented such as names of individuals or positions.

3.10 Summery

This chapter discussed research methodology carried out in the research in detail. Due to exploratory nature of the research problem, qualitative approach was selected to carry out the research. Case study research design was selected to explore how to successfully manage post disaster reconstruction projects in Sri Lanka. Multiple-case holistic study design was used to obtain better analytic benefits, where two candidate cases were selected by case study selection criteria. Semi-structured interviews was the primary data collection method in this research and document review was also used subjected to availability and accessibility. Content analysis, theme identification, cognitive mapping and cross-case analysis were incorporated to analyze the collected data and to draw conclusions. Finally, the chapter discussed about steps taken to enhance validity and ethical considerations of this research. The next chapter describes about data analysis and research findings of this study.

4   CHAPTER 4 – DATA ANALYSIS AND RESEARCH FINDINGS

4.1   Introduction

The empirical study focused on two PDR projects which followed donor driven construction approach. In this section, the gathered empirical data relevant to PDR projects are discussed. Stages of PLC of PDR projects are discussed first and then MPs of PDR projects are presented along with the project life cycle stage they correspond to. Thereafter, KCs of each MP were discussed in detail.

Thereby, following objectives were met:

   Objective 2 - To identify project lifecycle of PDR projects in Sri Lanka
   Objective 3 - To investigate managerial processes of PDR projects in Sri Lanka.
   Objective 4 - To investigate key considerations of managerial processes of PDR projects in Sri Lanka

4.2   Findings from Case Study Analysis

Empirical findings revealed that due to extensive nature of PDR projects and chaotic context they operated, both cases got carried out in phases. It is important to understand that these phases identified were different to phases of PLC discussed in literature and summarized in table 2-3. These phases were closely related the notion of 'phasing out' of a project discussed at the latter part of section 2.4. **Therefore, hereafter in this dissertation, the term 'Phase' refer to 'phased out portion of a projects'; and term 'Stage' refer to a 'stage of PLC'.**

It was also identified that multiple stages of PLC got carried out during phases of projects. They are discussed in section 4.2.1 below.

4.2.1   Stages of PDR Projects

4.2.1.1   Case A

Empirical findings revealed that Case A comprised of 5 distinct phases. They are: Start (S), Model Houses (MH), Housing Phase I (HP-I), Housing Phase II (HP-II), and the End (E). During Phase 1 the project got started soon after the strike of the disaster and

then moved to the Phase 2 which concentrated on model houses. Thereafter the project moved to Phase 3 where the primary focus was towards providing houses on originally acquired land. Having realized originally acquired land was insufficient to provide agreed number of houses, project moved to Phase 4 where an adjoining piece of land was acquired and provided remaining houses on that particular land. Finally, it reached Phase 5 which was the end of the entire PDR project. Refer table 4-1.

Table 4-1: Stages PLC of Case A

Project Phase	Project Stage	Corresponding PLC Stage
Phase 1 - Start (S)	Stage 1	Assessing, Designing
	Stage 2	Planning
Phase 2 - Model Houses (MH)	Stage 3	Planning
	Stage 4	Implementation
	Stage 5	Closure
Phase 3 - Housing Phase 1 (HP-I) on originally acquired land	Stage 6	Planning
	Stage 7	Implementation
	Stage 8	Closure
Phase 4 - Housing Phase 1I (HP-II) on later acquired land	Stage 9	Planning
	Stage 10	Implementation
	Stage 11	Closure
Phase 5 - End (E)	Stage 12	Closure

Empirical findings further revealed that 12 stages can be identified within the five phased project studied. Theme identification of Case A (illustrated in figure 4-4) revealed that during Stages 1 and 2, the project was focusing on the assessing and designing of the entire project. However, during Stages 3, 4, 5, the project was respectively focusing on planning, implementation and closure of Phase 2, MH only. Thereafter, during Stages 6, 7, 8 also the project was focusing on planning, implementation and closure of Phase 3, HP-I only. Subsequently, during Stages 9, 10, 11 the project was focusing on planning, implementation and closure of Phase 4, HP-II only. However, finally during stage 12, the project concentrated on closure of the entire project.

Throughout Case A, the project moved from one stage to the other sequentially. However, it was identified that some linkages between stages were linear, while others were cyclic. Refer figure 4-1.

Legend:
- - - - - - - - - - Linear linkage
——————— Cyclic linkage
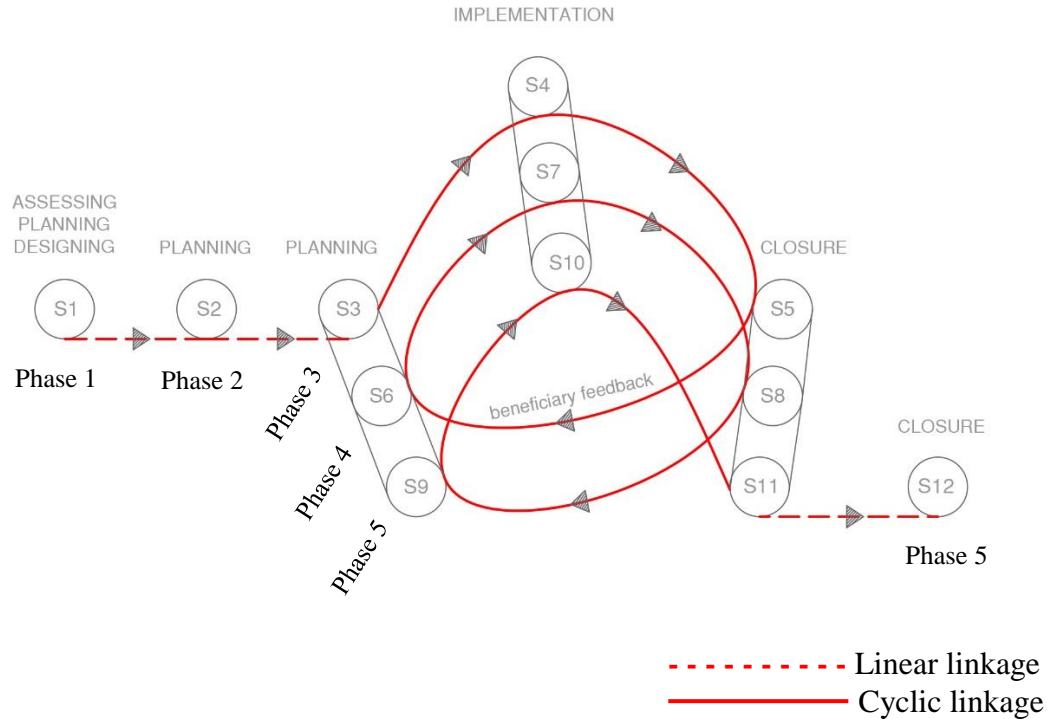
Figure 4-1: Linkages between stages of Case A

After assessing and designing buildings of the entire project during Stage 1, the project moved to Stage 2 in a linear sequential manner. Subsequently, after planning the entire project in a schematic manner during Stage 2, the project moved to Stage 3 as well in a linear sequential manner. Empirical findings further revealed that project moved to Stage 2, prior to successful completion of its Stage 1. This interesting finding get further explained in section 4.2.1.1 below. After completing Stage 2, the project moved to Stage 3, again in a linear sequential manner.

During Stages 3, 4, 5 planning, implementation and closure of Phase 2, MH were carried out and at the end of Stage 5, model houses were completed. Even though linkages between these stages were sequential, they were identified to be cyclic. During Stages 6, 7, 8 too a similar cyclic linkage related to Phase 3, HP-I was identified. At the end of Stage 8, Housing Phase-I got completed. Similar cyclic relationship was identified during Stages 9, 10, 11 as well and it was concentrated on Phase 4, HP-II only. At the end of Stage 11, Housing Phase-II got completed. Subsequently, it was identified from empirical findings that the linkages between Stages 3-11 were sequential, yet comprised of three repetitive cycles. Each cycle corresponded to a particular phase of the project only and they were incremental and produced a portion of the PDR project that people could occupy. However, Case A waited till the end of

the entire project to handover completed houses to beneficiaries, due to challenges they had in selecting beneficiaries and it is further explained in section 4.2.3 under 'Identifying Beneficiaries'.

Thereafter, the project moved from Stage 11 to 12 in a linear sequential manner. At the end of Stage 12, the entire PDR housing project was closed and came to an end.

However, providing communal buildings and infrastructure continued even after beneficiaries got occupied in their houses. Therefore, planning, implementation and closure related to communal buildings and infrastructure continued to progress.

4.2.1.2 Case B

Case B initially planned to have 4 phases as follows: Start, Donor-1 Core Housing, Donor-2 Core Housing and End. However during execution of project, it was realized that transitional shelters of beneficiaries were built on the same plot where the permanent houses were planned to build and the transitional houses were located in the middle of the plot interrupting the setting out and construction of permanent houses. Eventually it was decided to execute core housing in two folds. Construction of a room and a toilet was planned to execute at first, which was called the Stage-i House. Thereafter beneficiaries were required to occupy in the Stage-i House and demolish the transitional shelter. Then, the Stage-ii House was planned to execute on the cleared plot. Thereby, the Core House was divided into two folds as Stage-i House and Stage-ii House.

Subsequently, Case B comprised of 6 distinct phases. They are: Start (S), Donor 1-Stage i Housing (D1-Si), Donor 1-Stage ii Housing (D1-Sii), Donor 2-Stage i Housing (D2-Si), Donor 2-Stage ii (D2-Sii) Housing and finally, the End (E). Refer table 4-2. During Phase 1, the project got started soon after the strike of disaster and then moved to Phase 2 which concentrated on stage i of donor 1 funded houses. Thereafter the project moved to Phase 3 where the primary focus was to complete the houses funded by donor 1. Having completed PDR houses funded by donor 1, project moved to Phase 4, which concentrated on stage i of donor 2 funded houses. Thereafter the project moved to Phase 5 where the primary focus was to complete houses funded by donor 2. Finally it reached Phase 6 which was the end of the entire PDR project.

Table 4-2: Stages of PLC of Case B

Project Phases	Project Stage	Corresponding PLC Stage
Phase 1 - Start (S)	Stage 1	Assessing, Designing
	Stage 2	Planning
Phase 2 - Donor 1-Stage i Housing (D1-Si)	Stage 3	Planning
	Stage 4	Implementation
	Stage 5	Closure
Phase 3 - Donor 1-Stage ii Housing (D1-Sii)	Stage 6	Planning
	Stage 7	Implementation
	Stage 8	Closure
Phase 4 - Donor 2-Stage i Housing (D2-Si)	Stage 9	Planning
	Stage 10	Implementation
	Stage 11	Closure
Phase 5 - Donor 2-Stage ii Housing (D2-Sii)	Stage 12	Planning
	Stage 13	Implementation
	Stage 14	Closure
Phase 6 - End (E)	Stage 15	Closure

Empirical findings further revealed that 15 stages can be identified within the six phased project studied. Theme identification of Case B (illustrated in figure 4-5) revealed that during Stages 1 and 2, the project was focusing on the assessing and designing of the entire project. However, during Stages 3, 4, 5, the project was respectively focusing on planning, implementation and closure of Phase 2, D1-Si only. Thereafter, during Stages 6, 7, 8 also the project was focusing on planning, implementation and closure of Phase 3, D1-Sii only. Subsequently, during Stages 9, 10, 11 the project was focusing on planning, implementation and closure of Phase 4, D2-Si and during Stages 12, 13, 14 project was focusing on planning, implementation and closure of Phase 5, D2-Sii only. However, finally during stage 15, the project concentrated on closure of the entire project.

Throughout Case B, the project moved from one stage to the other sequentially. However, it was identified that some linkages between stages were linear, while others were cyclic in case B as well. Refer figure 4-2.

After assessing and designing buildings of the entire project during Stage 1, the project moved to Stage 2 in a linear sequential manner. Subsequently, after planning the entire project in a schematic manner during Stage 2, the project moved to Stage 3 as well in a linear sequential manner. Empirical findings further revealed that similar to case A,

Case B also moved to Stage 2, prior to successful completion of its Stage 1. This finding get further explained in section 4.2.1.2 below. After completing Stage 2, the project moved to Stage 3, again in a linear sequential manner.
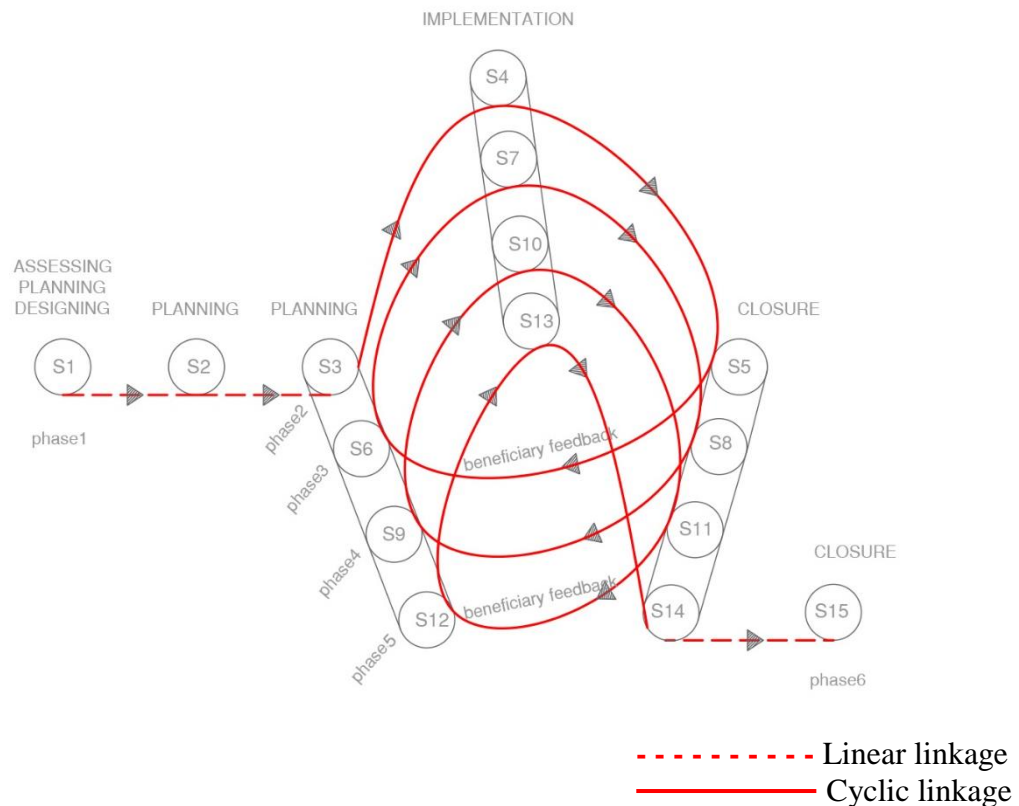
Figure 4-2: Linkages between stages of Case B

After assessing and designing buildings of the entire project during Stage 1, the project moved to Stage 2 in a linear sequential manner. Subsequently, after planning the entire project in a schematic manner during Stage 2, the project moved to Stage 3 as well in a linear sequential manner. Empirical findings further revealed that similar to case A, Case B also moved to Stage 2, prior to successful completion of its Stage 1. This finding get further explained in section 4.2.1.2 below. After completing Stage 2, the project moved to Stage 3, again in a linear sequential manner.

During Stages 3, 4, 5 planning, implementation and closure of Phase 2, D1-Si were carried out and at the end of Stage 5, Stage i houses funded by donor 1 were completed. Even though linkages between these stages were sequential, they were identified to be cyclic. During Stages 6, 7, 8 too a similar cyclic linkage related to Phase 3, D1-Sii was identified. At the end of Stage 8, PDR houses funded by donor 2 got completed. Similar cyclic relationship was identified during Stages 9, 10, 11 and stages 12, 13, 14 as well.

They were concentrated on Phase 4, D2-Si houses and Phase 5, D2-Sii houses respectively. At the end of Stage 14, PDR houses funded by donor 2 got completed. Subsequently, it was identified from empirical findings that the linkages between Stages 3-14 were sequential, yet comprised of four repetitive cycles. Each cycle corresponded to a particular phase of the project only and they were incremental and produced a portion of a house that people could occupy. Therefore, Case B did not wait till the end of the entire project to provide a completed house for beneficiaries, instead they provided a portion of the permeant house at the end of Phases 2, 3, 4 and 5. Therefore beneficiaries gained an assurance that they are going to get a good quality permanent house at the end of the project. In addition, beneficiaries having lived in the same premises, gave their feedback on the portion of the house they started to live in. Even though it was not planned to obtain a beneficiary feedback on the portion of the house they were living in, offices involved in the project considered the feedback and incorporated improved measures for subsequent stages of houses.

After completion of houses, the project moved from Stage 14 to 15 in a linear sequential manner. At the end of Stage 15, the entire PDR housing project was closed and came to an end.

Similar to Case A, Case B too proceeded with providing communal buildings and infrastructure even after beneficiaries got occupied in houses. Therefore, planning, implementation and closure related to communal buildings and infrastructure continued to repeat. In addition, Case B provided provision for beneficiaries to extend their houses in the future. Even though built extensions to houses were not revealed at the time of carrying out the field survey, having kept provision for extensions by initial design of the project itself, further repetitions of planning, implementation and closure related to house extensions could be anticipated in the future.

4.2.1.3 Cross Case Analysis

Empirical findings disclosed that both cases A and B phased-out the PDR project. Accordingly Case A had 5 distinct phases and Case B had 6 distinct phases. Refer table 4-3.

Table 4-3: Cross case analysis of stages of Case A and B

	Case A			Case B		
No of phases	5			6		
Phases	Phase 1 - Start, Phase 2- Model houses, Phase 3- Housing Phase 1, Phase 4- Housing Phase 2, [middle] Phase 5- End			Phase 1 - Start Phase 2 - D1-Si Housing, Phase 3 - D1-Sii Housing, Phase 4 - D2-Si Housing, Phase 5- D2-S ii Housing, [middle] Phase 6 - End		
No of stages	12			15		
Stages	**Phase 1**	Stage 1	Assessing, Designing	**Phase 1**	Stage 1	Assessing, Designing
		Stage 2	Planning		Stage 2	Planning
	Phase 2	Stage 3	Planning	**Phase 2**	Stage 3	Planning
		Stage 4	Implementation		Stage 4	Implementation
		Stage 5	Closure		Stage 5	Closure
	Phase 3	Stage 6	Planning	**Phase 3**	Stage 6	Planning
		Stage 7	Implementation		Stage 7	Implementation
		Stage 8	Closure		Stage 8	Closure
	Phase 4	Stage 9	Planning	**Phase 4**	Stage 9	Planning
		Stage 10	Implementation		Stage 10	Implementation
		Stage 11	Closure		Stage 11	Closure
	Phase 5	Stage 12	Closure	**Phase 5**	Stage 12	Planning
					Stage 13	Implementation
					Stage 14	Closure
				Phase 6	Stage 15	Closure
Stage linkages	1-3 Linear 3-11 Cyclic, repetitive and Incremental 11-12 Linear			1-3 Linear 3-13 Cyclic, repetitive and Incremental 14-15 Linear		

Case A and B had 12 and 15 stages respectively within PDR projects. Stages 1 and 2 of both cases were related to assessment, designing and planning of the entire project respectively. Stages 3-11 of Case A and Stages 3-14 of Case B were related to planning, implementation and closure of each phase of the project. Last stage of both cases studied were related to closure of the entire project.

Empirical findings revealed that both Cases A and B, moved from one stage to the other sequentially. However, linkages between stages of both PDR projects studied were linear, cyclic and repetitive. Refer figure 4-3.
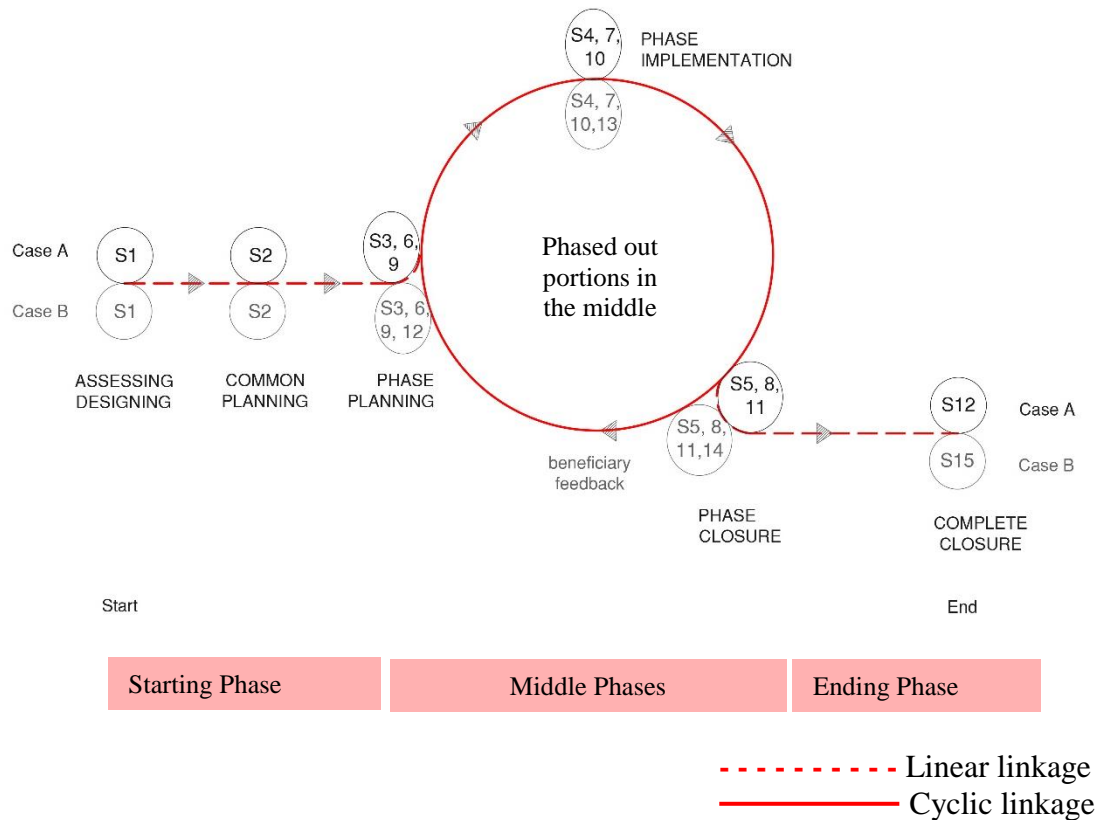
Figure 4-3: Linkages between stages of Cases A and B

It was identified that both Cases A and B had, both linear and cyclic relationships between stages of PDR projects. Linkages between stages 1-2-3 were linear and non-repetitive in both cases. Linkages between stages 3-4-5 of both cases were cyclic and they got repeated in an incremental manner. Number of repetitions had had a clear correspondence to number of phases the project contained in the middle of the project. The linkage between last two stages of both cases were again linear and non-repetitive. Therefore both cases started and ended with linear non-repetitive manner and all linkages between stages in the middle of the project were iterative and incremental.

4.2.2 Managerial Process (MPs) of PDR Projects

Many Managerial Processes got carried out during each stage identified in cases studied. They are explained below in sections 4.2.2.1-3.

4.2.2.1 Case A

Cognitive mapping carried out for theme identification of Case A revealed, thirty six managerial process that were carried out during 12 stages of the project. Refer figure 4-4.
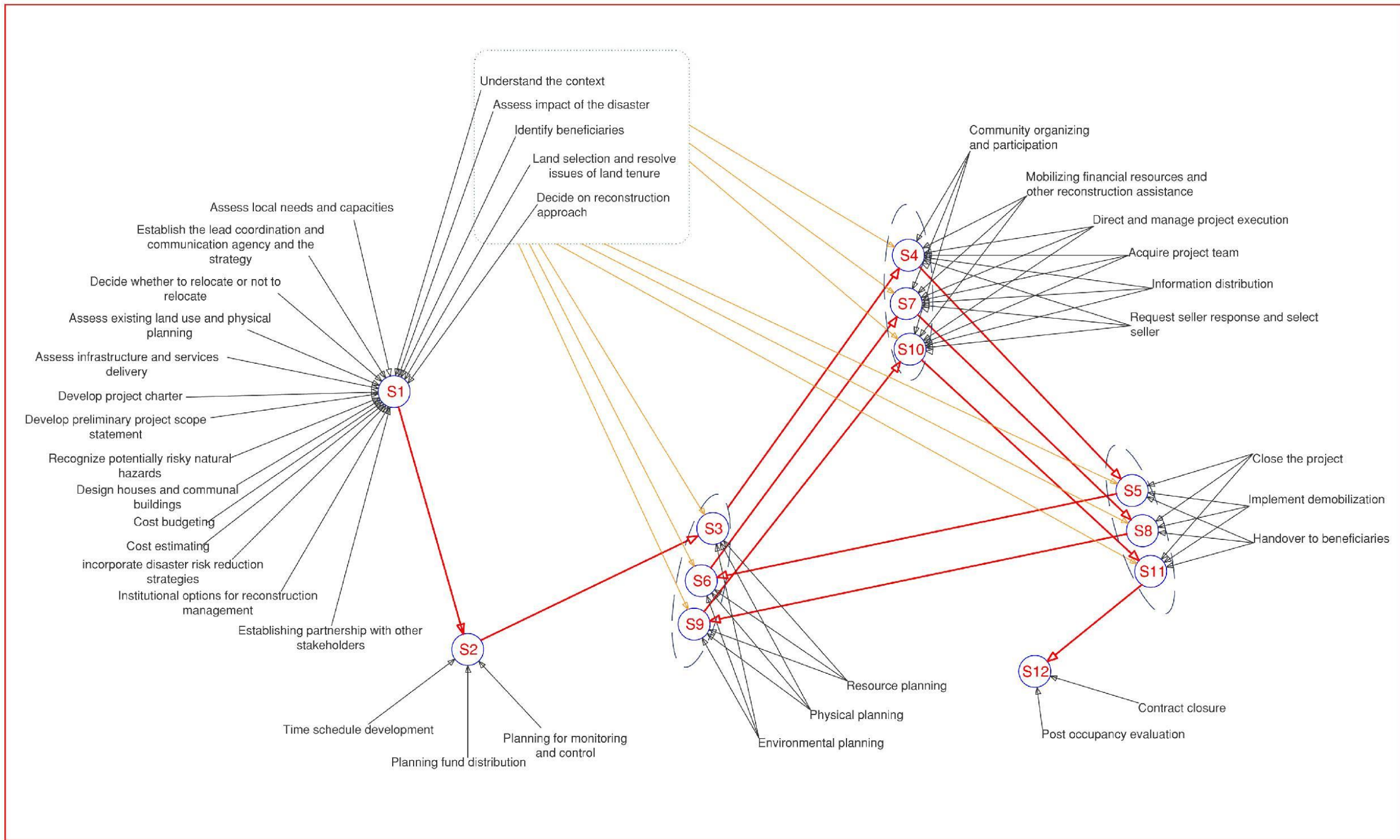
Figure 4-4: Cognitive map illustrating distribution of managerial process during PLC stages of Case A.

It was identified that theme 1 was related to assessing and designing and theme 2 and 3 were related to planning. Theme 4 was related to implementation, while theme 5 was and 6 were related to closure.

Empirical findings revealed that during Stage 1 of Case A, total of nineteen MPs started to carry out and they were related to assessing and designing of the whole project. Five MPs out of those continued to carry out throughout the project, and significantly reoccurred during Stages 3-11. Those five MPs were related to assessing and they provided most updated assessment information to Stages 3 to 11. During Stage 2 of Case A, three MPs were identified and they were related to planning of the entire project.

The common set of MPs identified during Stages 3, 6 and 9, were related to planning of MH, HP-I and HP-II. Similarly, the common set of MPs identified during Stages 4, 7 and 10 were related to implementation of MH, HP-I and HP-II. Further, another common set of MPs that were identified during Stages 5, 8 and 11 were related to closure of MH, HP-I and HP-II.

During Stage 12 of Case A, two MPs were identified and they were related to closure of the entire project.

Therefore a total of 36 MPs of Case A were identified through coding carried out on the software NVivo. They were as follows:

Stage 1

- Understand the context
- Assess impact of the disaster
- Identify beneficiaries
- Land selection and resolve issues of land tenure
- Decide on Reconstruction Approach
- Establish the lead coordination and communication agency and the
- Decide whether to Relocate or Not to Relocate
- Establish partnerships with other stakeholders
- Develop Project Charter
- Develop Preliminary Project Scope Statement
- Design of houses and communal buildings
- Incorporate disaster risk reduction strategies
- Recognize potentially risky natural hazards
- Cost Budgeting
- Cost Estimating
- Assess Infrastructure and services delivery
- Assess existing Land use and Physical planning
- Institutional options for reconstruction management
- Assess local needs and capacities

Stage 2

- Time Schedule Development (milestone based)
- Planning Fund distribution
- Planning for monitoring and control

Stages 3, 6, 9

- Resource Planning
- Physical planning
- Environmental planning
- Understand the context
- Assess impact of the disaster
- Identify beneficiaries
- Land selection and resolve issues of land tenure
- Decide on Reconstruction Approach

Stage 4, 7, 10

- Community Organizing and Participation
- Mobilizing financial resources and other reconstruction assistance.
- Direct and Manage Project Execution
- Acquire Project Team
- Information Distribution
- Request Sellers Response and select seller
- Understand the context
- Assess impact of the disaster
- Identify beneficiaries
- Land selection and resolve issues of land tenure
- Decide on Reconstruction Approach

Stage 5, 8, 11

- Close the project
- Implement demobilization
- Handing over to beneficiaries
- Understand the context
- Assess impact of the disaster
- Identify beneficiaries
- Land selection and resolve issues of land tenure
- Decide on Reconstruction Approach

Stages 12

- Contract closure
- Post occupancy evaluation

4.2.2.2 Case B

Cognitive mapping carried out for theme identification of Case B revealed, forty three managerial process that were carried out during 15 stages of the project. It was further revealed that those forty three MPs were also belonging to 6 main themes. Refer figure 4-5. Theme 1 was related to assessing and designing and theme 2 and 3 were related to planning. Theme 4 was related to implementation, while theme 5 and 6 were related to closure.

71
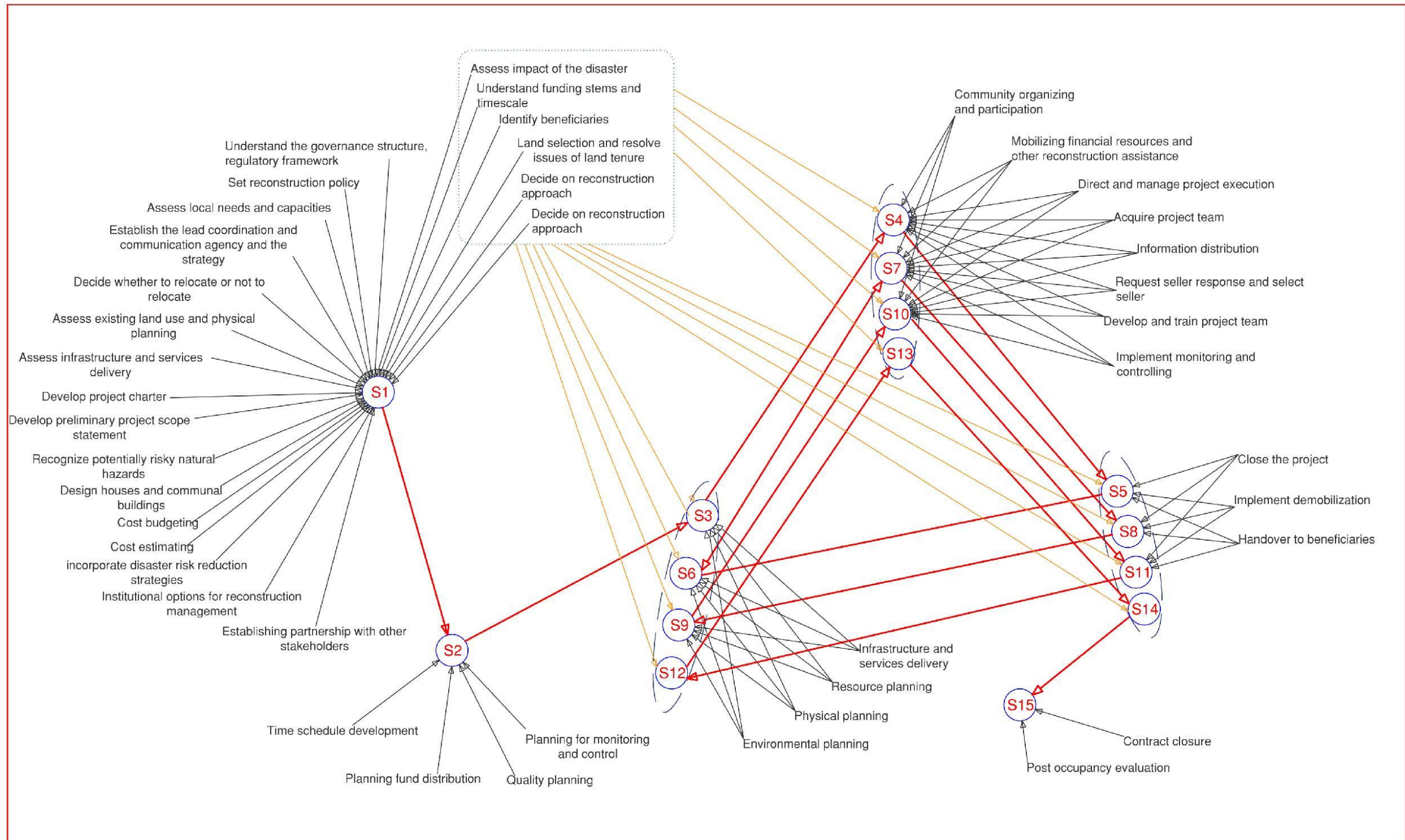
Figure 4-5: Cognitive map illustrating distribution of managerial process during PLC stages of Case B

Empirical findings revealed that during Stage 1 of Case B, total of twenty two MPs were started to carry out and they were related to assessing and designing of the whole project. Six out of those MPs continued to carry out throughout the project, and significantly reoccurred during Stages 3-14. Those six MPs were related to assessing and they provided most updated assessment results to Stages 3-14. During Stage 2 of Case B, four MPs were identified and they were related to planning of the entire project.

The common set of MPs identified during Stages 3, 6, 9 and 12, were related to planning of D1-Si, D1-Sii, D2-Si and D2-Sii houses. Similarly, the common set of MPs identified during Stages 4, 7, 10 and 13 were related to implementation of D1-Si, D1-Sii, D2-Si and D2-Sii houses. Further, the other common set of MPs identified during Stages 5, 8, 11 and 14 were related to closure of D1-Si, D1-Sii, D2-Si and D2-Sii houses.

During Stage 15 of Case B, two MPs were identified and they were related to closure of the entire project.

Therefore a total of 43 MPs of Case B were identified by coding carried out on software NVivo. They were as follows:

Stage 1

- Understand the local governance structures, regulatory framework
- Set reconstruction policy
- Establish the lead coordination and communication agency and the
- Establish partnerships with other stakeholders
- Develop Project Charter
- Develop Preliminary Project Scope Statement
- Decide whether to Relocate or Not to Relocate
- Design of houses and communal buildings
- Incorporate disaster risk reduction strategies
- Recognize potentially risky natural hazards
- Cost Budgeting
- Cost Estimating
- Assess Infrastructure and services delivery
- Assess existing Land use and Physical planning
- Institutional options for reconstruction management
- Assess local needs and capacities
- Assess impact of the disaster
- Understand funding steams and timescales
- Identify beneficiaries
- Establish quality of reconstruction
- Land selection and resolve issues of land tenure
- Decide on Reconstruction Approach

Stage 2

- Time Schedule Development (milestone based)
- Planning Fund distribution
- Quality planning
- Planning for monitoring and control

Stages 4, 7, 10, 13

- Community Organizing and Participation
- Mobilizing financial resources and other reconstruction assistance.
- Direct and Manage Project Execution
- Acquire Project Team
- Develop and Train Project Team
- Information Distribution
- Request Sellers Response and select seller
- Implement monitoring and controlling
- Assess impact of the disaster
- Understand funding steams and timescales
- Identify beneficiaries
- Establish quality of reconstruction
- Land selection and resolve issues of land tenure
- Decide on Reconstruction Approach

Stages 5, 8, 11, 14

- Close the project
- Implement demobilization
- Handing over to beneficiaries
- Assess impact of the disaster
- Understand funding steams and timescales
- Identify beneficiaries
- Establish quality of reconstruction
- Land selection and resolve issues of land tenure
- Decide on Reconstruction Approach

Stages 3, 6, 9, 12

⊞ ◯ Resource Planning
⊞ ◯ Physical planning
⊞ ◯ Environmental planning
⊞ ◯ Infrastructure and services delivery
⊞ ◯ Assess impact of the disaster
⊞ ◯ Understand funding steams and timescales
⊞ ◯ Identify beneficiaries
⊞ ◯ Establish quality of reconstruction
⊞ ◯ Land selection and resolve issues of land tenure
⊞ ◯ Decide on Reconstruction Approach

Stage 15

⊞ ◯ Contract closure
⊞ ◯ Post occupancy evaluation

4.2.2.3 Cross Case Analysis

It was identified that both Cases A and B carried out total of forty four MPs to manage PDR projects. Accordingly Case A had carried out thirty six MPs and Case B carried out forty three MPs. Distribution of MPs amongst stages of projects identified were tabulated in table 4-4.

Table 4-4: Distribution of managerial processes of cases

Case A			Case B		
Stages of the project		**No of MPs**	**Stages of the project**		**No of MPs**
Stage 1	Assessing, Designing	19	Stage 1	Assessing, Designing	22
Stage 2	Planning	3	Stage 2	Planning	4
Stage 3, 6, 9	Planning	3+(5)	Stage 3, 6, 9, 12	Planning	4+(6)
Stage 4, 7, 10	Implementation	6+(5)	Stage 4, 7, 10, 13	Implementation	8+(6)
Stage 5, 8, 11	Closure	3+(5)	Stage 5, 8, 11, 14	Closure	3+(6)
Stage 12	Closure	2	Stage 15	Closure	2
Total No of Managerial Processes (MPs)		**36**	**Total No of Managerial Processes (MPs)**		**43**

The comprehensive list of MPs identified for each stage of both Cases A and B are in table 4-5. Five managerial process of Case A and six managerial process of Case B, started at stage 1, continued throughout the project provided most updated information about assessment to all the middle phases of projects that followed. Those MPs are presented in Italics with an * mark in table 4-5.

Table 4-5: Managerial processes by project Life Cycle Stages of Cases

Stage	Project Management Processes	Case A	Case B
Stage 1 – Assessing and Designing	1. *Understand the context*	✓	X
	2. *Assess impact of the disaster*	✓	✓
	3. Understand the governance structures, regulatory framework	X	✓
	4. Set reconstruction policy	X	✓
	5. Assess local needs and capacities	✓	✓
	6. Establish the lead coordination and communication agency and the strategy	✓	✓
	7. *Understand funding steams and timescales*	X	✓
	8. Decide whether to Relocate or Not to Relocate	✓	✓
	9. *Identify beneficiaries*	✓	✓
	10. Assess existing Land use and Physical plan	✓	✓
	11. Assess Infrastructure and services delivery	✓	✓
	12. *Land selection and resolve issues of land tenure*	✓	✓
	13. Establish partnership with other stakeholders	✓	✓
	14. Develop Project Charter	✓	✓
	15. Develop Preliminary Project Scope Statement	✓	✓
	16. Recognize potentially risky natural hazards	✓	✓
	17. Incorporate disaster risk reduction (DRR) strategies	✓	✓
	18. *Establish quality of reconstruction*	X	✓
	19. Design houses and communal buildings	✓	✓
	20. Cost Budget	✓	✓
	21. Cost Estimate	✓	✓
	22. *Decide on reconstruction approach*	✓	✓
	23. Institutional options for reconstruction management	✓	✓
Stage 2 – Common Planning	24. Develop time schedule	✓	✓
	25. Plan fund distribution	✓	✓
	26. Quality plan	X	✓
	27. Plan for monitoring and control	✓	✓
Stage 3 – Phase Planning	28. Resource Planning	✓	✓
	29. Physical planning	✓	✓
	30. Environmental planning	✓	✓
	31. Infrastructure and services delivery	X	✓
Stage 4 – Phase Implementation	32. Community Organizing and Participation	✓	✓
	33. Mobilize financial resources and other reconstruction assistance	✓	✓
	34. Direct and Manage Project Execution	✓	✓
	35. Acquire Project Team	✓	✓
	36. Develop and Train Project Team	X	✓
	37. Information Distribution	✓	✓
	38. Requesting Sellers Response and selecting seller	✓	✓
	39. Implement monitoring and controlling	X	✓
Stage 5 – Phase Closure	40. Close the project	✓	✓
	41. Implement demobilization	✓	✓
	42. Hand over to beneficiaries	✓	✓
Stage 6- Complete Closure	43. Contract closure	✓	✓
	44. Post occupancy evaluation	✓	✓

MPs identified by empirical findings are explained in detail along with KCs of each process in section 4.2.3 below.

4.2.3 Key Considerations (KCs) of Managerial Processes of PDR Projects

Even though empirical findings revealed that forty four MPs were carried out during each stage of cases studied, in-depth investigations carried out revealed that most MPs carried out were poorly responsive to their respective key considerations. A sample of coding used to identify the KC of each managerial process, obtained from NVivo is shown in figure 4-6.

Figure 4-6: Sample of coding used to identify key considerations of each managerial process

Total of 108 number of Key Considerations were unveiled by coding carried out for Cases A and B to and their relevance to each aforementioned managerial process are summarized in table 4-6. MPs that were started during Stage 1 and continued throughout the entire project, as explained in section 4.2.2 are presented in Italics with an * mark.
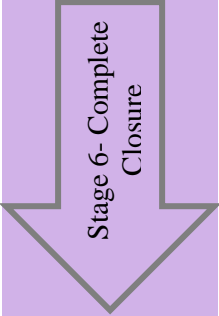
Table 4-6: Managerial processes and Key Considerations identified from the filed

		Managerial Processes (MPs)	Key Considerations (KCs)	Case	
				A	B
		1. *Understand the context	Understand the psychological conditions of victim	✓	X
	Stage 1- Assessing and Designing	2. *Assess impact of the disaster	Define guidelines for assessment	X	✓
			Assess housing conditions	✓	✓
			Identify Victims	✓	✓
			Assess the state of infrastructure systems	✓	X
		3. Understand the governance structures, regulatory framework	Understand the responsible group for disaster reconstruction, regulatory framework, standards, etc.	X	✓

4.	Set reconstruction policy	Establish basic parameters of the reconstruction policy	X	✓
5.	Assess local needs and capacities	Assess locally available human resources	✓	✓
6.	Establish the lead coordination and communication agency and the strategy	decide on the lead agency to develop communications strategy	✓	X
		Plan for the project communications strategy	X	✓
		Develop stakeholder communication plans	X	✓
		Establish effective stakeholders communication channels	X	✓
7.	*Understand funding steams and timescales*	*Search for donors*	X	✓
		Understand the timescale it can be spent.	X	✓
		Understand other donor requirements	X	✓
8.	Decide whether to relocate or not to relocate	Initiate an analysis of disaster risk management	X	✓
		Identify whether relocation is needed to mitigate the risk	✓	✓
		Define the policy framework for relocation	✓	✓
		Quantify the population subject to relocation	X	✓
		obtain community opinion on relocations	X	✓
9.	*Identify beneficiaries*	*Determine eligibility criteria*	✓	✓
		Identify eligible beneficiaries	✓	✓
		Obtain community consent for list of beneficiaries	X	✓
		Obtain approval from the government for list of beneficiaries.	✓	X
10.	Assess existing land use and physical planning	Study land use plan	X	✓
		Assess available land	✓	✓
11.	Assess infrastructure and services delivery	Assess the state of infrastructure systems	✓	✓
		Assess capability to restore/provide infrastructure services	✓	✓
12.	*Land selection and resolve issues of land tenure*	*Follow an adequate site selection procedure*	✓	✓
		Plan to restore livelihoods and social conditions.	✓	X
		Incorporate beneficiaries to identify relocation sites	✓	✓
		Identify relocation sites	✓	✓
		Access land ownerships	✓	✓
13.	Establishing partnerships with other stakeholders	Request support from other partners	X	✓
		Make partnerships with government, other agencies or local organizations.	✓	✓
14.	Develop project charter	Define Project authority (sponsor, project manager)	✓	✓
		Define Resources and budget	X	✓
15.	Develop preliminary project scope statement	Identify preliminary project scope (objectives, boundaries,	✓	✓

		deliverables, constraints, milestones)		
	16. Recognize potentially risky natural hazards	understand what natural hazards are likely to occur and their potential impact	✓	✓
	17. Incorporate disaster risk reduction strategies	Adhere to international standards and best practice guidelines	✓	✓
	18. *Establish quality of reconstruction	*Provide new/improved building codes and construction guidelines*	X	✓
	19. Design houses and communal buildings	Select the HDCTs to be used in reconstruction	X	✓
		Ensure that they are fully integrated into the reconstruction policy	X	✓
		Design houses	✓	✓
		Allow for design flexibility to suit the community	X	✓
		Community participation to select the best fit type design	X	✓
		Obtain authority consent for houses	✓	✓
		Design fit for purpose schools, health centers etc.	✓	X
	20. Cost budgeting	Assign cost per house	✓	✓
		Obtain authority consent for the budget	✓	✓
	21. Cost estimating	Identify cost for labour,	X	✓
		Identify cost for material,	✓	✓
	22. *Decide on reconstruction approach	*Decide on level/method of assistance to provide*	X	✓
		Decide and agree on benchmarks for all reconstruction approaches	X	✓
		Decide which reconstruction approach/s (method of implementation) is/are most suitable	✓	✓
	23. Institutional options for reconstruction management	Design the outline of the institutional mechanism	✓	✓
		Equipped with a structure, a mandate, a policy, and a plan	X	✓
Stage 2 - Common Planning	24. Time schedule development (milestone based)	Establish project time frame	✓	✓
	25. Planning fund distribution	Decide on a system for delivering funds	X	✓
		designate the agency to manage and monitor reconstruction financing	✓	✓
	26. Quality planning	Provide quality management plan	X	✓
		Provision of special training workshops for supervisory (including beneficiary) and management personnel on project inspection, supervision and enforcement	X	✓
		Plan to quality test materials	X	✓
	27. Planning for monitoring and control	Include a dedicated management agency	✓	✓
		Decide on area authority	✓	✓

Stage	Task	Activity		
Stage 3 - Phase Planning	28. Resource planning	Identify HR/construction team	✓	✓
		Staffing management plan	✗	✓
	29. Physical planning	Plan land allocation	✓	✓
		Plan road layout	✓	✓
		Plan plot layout	✓	✓
		Plan for infrastructure and services	✓	✗
		Plan for public buildings and social infrastructure	✓	✗
	30. Environmental planning	Evaluate the ecological footprint of a relocation site	✓	✓
		Develop mitigation measures for the project and construction	✗	✓
	31. Infrastructure and services delivery	Decide how to ensure interim and permanent infrastructure to reconstruction sites	✗	✓
Stage 4- Phase Implementation	32. Community organizing and participation	Analyze the community's capacity and preferences for participation	✓	✗
		Agree with the community on the activities and outcomes they deliver	✗	✓
	33. Mobilizing financial resources and other reconstruction assistance.	Activate delivery system for cash that is accessible for recipients/suppliers	✗	✓
		Distribute funds for assigned agency	✓	✓
	34. Direct and manage project execution	Setout buildings and execute construction	✓	✓
		Phase out and plan the execution	✗	✓
		Constructing model houses	✓	✗
	35. Acquire project team	Mobilize and/or recruit local artisans, construction workers, volunteers and beneficiaries	✓	✓
	36. Develop and train project team for reconstruction	Train on General management skills, Technical skills and Ground rules	✗	✓
		Provide technical guidance to community participants	✗	✓
	37. Information distribution	Distribute drawings, schedules, specifications, etc. on time	✓	✓
	38. Request sellers response and select seller	Obtain quotes and detains from sellers	✓	?
		Implement the select seller process	✓	✓
	39. Implement monitoring and controlling	Establish monitoring and control and evaluation systems	✗	✓
		Establish project communication mechanism during construction	✗	✓
Stage 5- Phase Closure	40. Close the project	Implement exit strategy	✓	✓
		Handover assets, activities, functions etc. to correct agency	✓	✓
		Close internal activities that the implementing agency has established	✗	✓
		Close internal activities that the implementing agency has established with other parties	✓	✓
	41. Implement demobilization	Ensure safety and demobilize human resources	✓	✓

			Ensure safety and demobilize equipment, non-consumable goods	✓	✓
		42. Handover to beneficiaries	handover of the houses to their future owners and end-users	✓	✓
Stage 6- Complete Closure		43. Closeout reports with lessons learned	Collect knowledge acquired during the project.	X	X
			Prepare close-out report with lessons learned	X	X
			Provide feedback report to donors	X	✓
		44. Contract closure	Close contracts that are applicable to internal support	✓	✓
			Close contracts that were established with outside parties	✓	✓
		45. Post occupancy evaluation	Conduct post occupancy survey	✓	✓
			Evaluate whether reconstruction acted as a catalyst for recovery	X	X

Key Considerations of each managerial Process identified for both Cases A and B and summarized in above table 4-6 are discussed below:

1. Understand the context

Findings of the empirical study revealed that, in order to understand the context, Case A did not consider carrying out a systematic procedure. However, beneficiaries of Case A revealed that officers involved with the project were not keen in obtaining community assistance for construction due to psychological trauma they went through. Therefore it can be suggested that even though, a systematic procedure was not carried out to understand the context, Case A had an understanding on psychological conditions of the victims.

Findings disclosed that Case B did not make an attempt to understand the context.

Accordingly, it was revealed that by having an understanding of the psychological conditions of victims, Case A obtained a moderate understanding about the context. Case B did not take measures to understand the context.

2. Assess impact of the disaster

It was found that Case A practiced assessing the impact of disaster as a key consideration. During that process it had considered assessing housing conditions, identifying victims and assessing the state of infrastructure system. Accordingly, Case A had assessed 57 completely destroyed houses. However, there was no agreed guideline to assess. Further, Grama Niladaris (GN) of affected areas identified victims

of the disaster and found that statistics available with GNs to identify victims were fragmental. ADS stated *"all what Grama Niladhari knew was there were about 100 families living there. Actually the GN who was there at the time of landslide was a new GN. That person couldn't identify people one by one. Then the old GN also joined to identify victims but it was very difficult to find straight statistics."* In addition, Case A, considered assessing the status of infrastructure system such as the road network, water supply, electricity, etc.

Case B defined and prepared a guideline to assess the impact of the disaster soon after its occurrence (Refer appendix-C) and used the defined guidelines for assessing housing conditions and accordingly identified houses belonging to two categories: completely destroyed houses and partially damaged houses. BQS stated *"I assessed the damage of partially damaged houses. If their roof is damaged we quantify the damage and decide the cost of it. If walls are cracked, we check how much we can pay for it. We got details of houses of that were fully destroyed".* GN of Case B too identified victims of the disaster and found that statistics available with GNs to identify victims were fragmental and insufficient.

Empirical findings revealed that both Case A and B considered assessing the impact of disaster. In order to do that Case A assessed housing conditions, identified victims and assessed the state of infrastructure system. However Case A did not defined guidelines for assessments. Unlike Case A, Case B had a defined guideline for assessment and assessed housing conditions and identified victims. However Case B did not assessed the state of infrastructure system. Both Cases A and B identified that information available with GNs for assessment were fragmental and insufficient.

3. Understand the local governance structures and regulatory framework

It was revealed that Case A did not take measures to understand the existing local governance structures and regulatory framework.

However, Architect of Case B, BA stated *"Everyone had an understanding on regulatory framework".*

Therefore, findings suggesting that unlike Case A, Case B considered understanding the governance structure existed and understood the unavailability of a regulatory frameworks for PDR.

4. <u>Set reconstruction policy</u>

Case A did not considered setting a reconstruction policy for PDR project.

Case B drafted a policy as a result of professionals being involved from NBRO were keen on implementing the project in a systematic manner. Planner of Case B, BP expressed, *"NBRO is the one who made the framework and prepared a policy and influenced others. This policy was something I drafted on 1st January while at home. I have a friend who is an engineer, I write it, take a picture of it and send it to my engineer friend. That's how we did it. This is the draft policy I did (interviewee shows a photograph of it). We sent it to the parliament and they were ok with it. That's how this policy came into place".* The draft policy included basic parameters of the reconstruction policy. Even though the draft policy did not succeeded in becoming the approved reconstruction policy, Ministry of Disaster Management, published it as the guide to the resettlement project.

Therefore it was disclosed that unlike Case A, Case B considered establishing basic parameters of the reconstruction policy.

5. <u>Assess local needs and capacities</u>

Empirical data disclosed, Case A did not systematically assessed the capacity and availability of local construction professionals, labour and support services in order to plan resources.

However, Case B realized the shortage of construction professionals at the outset. The architect, BA stated *"I was the only architect for the entire project. It was difficult for me to go to all land plots to select the best suitable house type for it. We didn't have enough staff to do that"*. Accordingly, more technical staff were appointed to assist the work of the architect. However, BPC attached to ministry of disaster management stated that *"When the project is going on also we identified that we need more resources"*.

Both Cases A and B did not assessed local needs and capacities. However, unlike Case A, Case B had an insight of the capacity and availability of local construction professionals. However, Case A did not assessed, nor had an insight of the available labour and other support staff.

6. <u>Establish the lead coordination, communication agency and the strategy</u>

Empirical findings disclosed contradictory information about the lead coordination, communication agency and the strategy of Case A. Interviewees of Case A, APM who represented UDA stated *"UDA was asked by the government to coordinate and handle this project"*. In contrary, APC mentioned *"District Secretary made all coordination"*. Therefore it suggests that even though Case A decided on the lead agency to develop a lead coordination and communication strategy, the key stakeholders of the project were unaware of an accepted communication mechanism. Findings further revealed that Case A did not consider: establishing an initial communication mechanism, planning for the project communication strategy, developing a stakeholder communication plan, establishing effective stakeholder communication channels.

Similar situation was reveled for coordination and communication of Case B also. Interviewees of Case B, BPC representing Ministry of Disaster Management stated *"We coordinated the whole project"* and BDS representing Divisional Secretariat stated *"Coordination happened through the ministry"*. In contrary BP representing NBRO mentioned *"All technical coordination happened via me and project coordination happened via the District Secretariat."* It was not revealed whether Case B considered deciding on a lead agency to develop communications strategy or establishing an initial communication mechanism. But it was disclosed that Case B had meetings every fortnight or once a month depending on the necessity. BPC stated that they had *"Progress meetings once a week. Meetings with ministers once a month. There is a District Disaster Management Committee which had all Divisional Secretaries, Tri Forces, NBRO and all other institutes. Coordination among all stakeholders happened via District Disaster Management Committee, which is a permanent committee that get activated at a disaster"*. Therefore it was expressed that Case B considered: planning for a basic project communication strategy, developing a stakeholder communication plan and establishing stakeholder communication channels. Further BPC mentioned

"All stakeholders were coordinated via District Disaster Management Unit. I was the coordinator", which suggests that District Disaster Management Unit worked as the stakeholder communication channel of Case B.

It was revealed that both Case A and B did not established an effective lead coordination, communication agency or a strategy. Lack of common understanding on a lead coordination and communication agency was disclosed from both cases. Unlike Case A, Case B planned for project communication via periodical meetings and developed a stakeholder communication plan where District Disaster Management Unit worked as the stakeholder communication channel.

7. Understand funding steams and timescales

Case A been funded by the government, revealed it did not consider: searching for donors, determining the total amount of money available, and understanding the timescale it could be spent or understood other donor requirements.

In Case B, District Secretariat and GoSL searched for funding agencies. BPC explained, *"We had many funding stems during recovery. Some were local some were foreign. But only local organizations and individuals funded resettlement of direct victims. Other funds were from GoSL. Some of these funds came at the initial assessment stage itself"*. It was identified that Case B was in search for funds even during the construction was going on. Case B had an understanding on requirements of donors and the time scale funds can be spent. Private donors, who funded PDR component of Case B also had their own time scale to spend funds and they adhered to relevant time scales appropriately. It was evident that both cases, disregarded the cost of social infrastructure during fund allocation, and eventually spent GoSL funds haphazardly to provide such.

It was disclosed that Case A did not had the necessity to understand the funding stems and timescales as it was funded by GoSL where there was no specific timescale to spend funds or any other specific requirement communicated. On the other hand Case B had sufficient donors for immediate recovery, yet had to search for donors for reconstruction after disaster. They also understood the time scale funds can be spent and other donor requirements.

8. Decide whether to relocate or not to relocate

Empirical findings disclosed that Case A identified that relocation is needed to mitigate the risk and had a policy framework for relocation. It was identified that Case A considered deciding to relocate all victims whose houses got destroyed from the disaster. Initial decision was to provide a house to victims who were not previously obtained a loan facility from the GoSL for relocation. However, later it was decided to adopt providing a 'house to house' for all houses that got destroyed from the disaster.

Case B made considered initiating an analysis of disaster risk management. BA of Case B stated, *"NBRO got involved with assessing the disaster. We did a risk map"*. Planner, BP explained, *"After a big landslide of this nature happened, in addition to the main incident, many other small incidents happened, associated with that. Soil in the surrounding area also got unstable and they got cracked. So NBRO had a task to go to all these places and to access the risk of those other incidents too. And did a landslide risk assessment"*. Case B identified whether relocation is needed to mitigate the risk and considered having a policy framework for relocation. Case B being a large project, analyzed to identify whether relocation is needed more systematically. Case B also adopted providing a 'house to house' policy. In addition, Case B considered relocating families living in 'high-risked' lands and reconstruction approach for latter was owner driven and excludes from the core study area of this research. In addition Case B obtained the opinion of selected beneficiaries for their willingness to relocate. Planner of the Case B mentioned *"some people said they have alternative land and they would like to build on their land, some preferred to buy houses and some preferred to go for government given land"*.

Both cases A and B identified whether relocation is needed to mitigate the risk as they both had adopted 'house to house' policy framework for relocation. However, unlike Case A, Case B considered initiating an analysis on disaster risk management, quantifying the exact population subjected to relocate and obtaining community opinion for relocation.

9. Identify beneficiaries

It was revealed that Case A was not in keen to finalize identifying the beneficiaries during assessing stage. Thus they continued to identify beneficiaries and finalized it only during phase closure of phase housing stage II. GoSL decided to provide 75 houses

for the victims of Case A. Rationale behind finalizing the number of houses was not clear, yet political influence was apparent. Even though finalizing beneficiaries of Case A happened only after completing construction it determined an eligibility criteria, obtained community consent for list of beneficiaries and obtained approval from the government for list of beneficiaries prior handing over houses to beneficiaries. Main eligibility criteria of Case A was a 'house to house' policy, where a new house was provided to every house that was completely destroyed by the disaster. However, due to disparity of available statistics such as number of houses in the affected area and no. of families lived, on rent, vacated; influence of media, social groups and activists, determining no. of beneficiaries was a tough task.

On the other hand, Case B identified beneficiaries during the stage of assessing damage and considered defining the reconstruction policy. Case B determined an eligibility criteria to select beneficiaries. Refer appendix D. Having considered providing a new house to every victimized family with totally destroyed house due to the landslide, a total of 54 beneficiaries were identified. BBii stated *"After disaster, we were in the camp. They identified families whose houses got destroyed completely. Then we were put in a different camp. Then said they give houses for all of us in another location. We all got houses"*. Divisional Secretariat considered obtaining community consent for list of beneficiaries and approval from government for list of beneficiaries was not obtained. However, an exemption to this was identified, where a family who were not direct victims of the landslide, lived in a 'high-risked' land, was also provided a house in the relocated settlement, along with direct victims.

Therefore it was disclosed that both Case A and B determined eligibility criteria to identify beneficiaries and accordingly identified beneficiaries. However Case A was not in keen to finalize identifying the beneficiaries during assessing stage, thus finalized it only before handing over houses to beneficiaries. Unlike Case B, Case A obtained the approval from the GoSL for the final list of beneficiaries and Case B, unlike Case A obtained community consent for the final list of beneficiaries.

10. Assess existing Land use and Physical planning

The disaster related to Case A happened in a remote location which was not a declared area by Urban Development Authority (UDA). There were no land use or physical plan

available relevant to the location with UDA, Land Use Policy Development Authority or National Physical Planning Department. Therefore, Case A had no means to assess an existing Land use and Physical plan. However, Case A considered assessing available land for relocation.

Land use Policy development authority being a stakeholder of Case B, took measures to assess some aspects of land use and physical planning. BP stated *"we considered land use for land selection. Land use Policy Planning Department was involved with that. They are now preparing land use plans. Because of that they had some idea. When selecting land we looked at physical planning. We looked whether there are any UDA declared land in the area and whether they have a development plan. They were not UDA declared areas".* But they did not consider assessing it in detailed manner. Case B assessed available land also.

Therefore it was disclosed that both cases assessed the available land however only Case B considered studying the land use plan and Case A had no opportunity to study the land use plan.

11. Assess infrastructure and services delivery

Empirical findings disclosed that Case A assessed infrastructure and services delivery soon after the disaster as well as during land selection. Road Development Authority assessed the road network and other relevant organizations assessed water supply, electricity, etc. Case A considered assessing the capability to restore infrastructure as well. Accordingly organizations involved with Case A provided their options to restore them. APM stated *"CEB was to arrange transformers to provide electricity. Water Board said they can't provide water to this location. So, it was decided to provide drinking water from an available source in that area".* However, beneficiaries of Case A, ABi, ABii, ABiii complained even after many months after they started living in given houses, that they do not have drinking water available at the time the data collection was carrying out.

Similarly Case B also assessed the state of infrastructure systems and assessed the capability to restore services and infrastructure. Having selected a land that has no drinking water, District Secretariat agreed to provide drinking water to the location in

partnership with other organizations. However, it was revealed that some services were not provided as agreed.

Therefore both Cases A and B assessed the state of infrastructure systems and assess the capability to restore infrastructure services. However both Cases A and B was not able to provide all infrastructure and services as they agreed.

12. <u>Land selection and resolve issues of land tenure</u>

In order to select land and resolve issues of land tenure, Case A practiced following adequate site selection procedure and planned to restore livelihoods of people. However the selected relocation site was located 6km away, and beneficiaries believed it to be too far away from their livelihoods. Case A considered incorporating beneficiaries to identify relocation sites also and thereafter accessed land ownership and acquired them. AA stated *"The land we have selected belonged to a state bank. And land vesting happened."*

Figure 4-7: Selected land of Case A. Source: NBRO, 2017

Similarly Case B also followed adequate site selection procedure. Land selection criteria of Case B is shown in appendix E. Some of the site selection criteria considered were: availability of a bazar or a town within 2.5 km radius to relocation site, ability to provide water and electricity to relocation site, etc. Case B incorporated beneficiaries too to identify relocation sites. Beneficiary BBii mentioned *"We were told to come and have a look at the land. Those days this land had rubber trees. We told this land is good".* It also accessed land ownership and acquired them. BPC representing Ministry of Disaster Management mentioned *"Lands here belongs to estates. Acquiring a land is a long process. After we selected land, we gave the list of land to Presidential*

Secretariat. They called estate companies to a meeting. They were told these lands are needed and The President quickly ordered to release those lands." However, Case B did not consider making reasonable attempt to plan to restore livelihoods.

Both Cases A and B considered following adequate site selection procedure, incorporating beneficiaries to identify relocation sites, identifying relocation sites, assessing land ownerships to acquire land. Both cases also attempted to restore social conditions at the time of site selection. However, unlike Case A, Case B did not attempt to plan to restore livelihood.

13. Establishing partnerships with other stakeholders

Findings disclosed that in order to establish partnership with other stockholders Case A did not consider making a significant effort to request support from other partners. However in the post disaster context they were able to establish partnership with other stakeholders such as NBRO, UDA, Divisional Secretary, District Secretory, Water Supply and Drainage Board, Electricity Board, etc.

Case B requested support from other stakeholders to make partnership with them. However BP mentioned that *"We tried to create linkages with other related institutes like NHDA. I went to their district office and requested to take part. But they had no interest".* Nevertheless, Case B also considered establishing partnership with other stakeholders such as NBRO, UDA, Divisional Secretary, District Secretory, Water Supply and Drainage Board, Electricity Board, Land Use Policy Planning Department, Foreign Aid Organizations, etc.

Therefore it was revealed that irrespective of obtaining support from other partners both cases were able to make partnership with government, local organizations and other agencies. Unlike Case A, Case B requested support from other partners too.

14. Develop Project Charter

In an attempt to develop project charter it was identified that Case A considered making an attempt to define project authority. Accordingly Case A appointed a project manager and the sponsor for the PDR project. Even though the project manager was appointed

at the beginning of the project, it was revealed that they were not provided required power and authority to manage the project. Therefore, they functioned as a namesake project manager during the execution. However they identified that GoSL is going to fund the project, thus the sponsor of the project was defined.

In order to develop project charter Case B considered defining project authority, resources and budget. Case B identified the project manager of the PDR project and defined that private sponsors are going to fund the project. In addition they had an idea about the resources and the budget that is required for an individual house. However, they did not analyzed required resources and budget for the entire project including infrastructure.

Both Case A and B considered defining the project authority by defining the project manager and the sponsor of the project, though the defined project manager of Case A was not able to render their duties as expected. Unlike Case A, Case B defined resources and budget of the project to some extent.

15. Develop Preliminary Project Scope Statement

In order to capture the objectives of the project the empirical findings revealed that Case A did not consider defining project objectives. Case A identified a preliminary project scope based on data available at that time. However the scope changed over time. The project objective, providing permanent houses for victims, remained unchanged. Furthermore, Case A did not consider identifying boundaries, deliverables, constraints and milestones in a detailed manner.

Case B defined project objectives at the beginning of the project. Objectives of Case B extracted from 'Guide to resettle disaster victims' prepared for Case B by Ministry of Disaster Management is attached in appendix- F. Accordingly main objectives of the project were to provide a 'house to house' for every house completely destroyed by disaster and to fund and provide guidance to build the core house, incorporate build back better concept for houses, ensure that houses are disaster resilient. Similar to Case A, Case B also did not consider identifying boundaries, deliverables, constraints and milestones in a detailed manner.

Therefore it was evident that in order to develop preliminary project scope, both cases

A and B considered making an attempt to define project objectives. However, they did not identify boundaries, deliverables, constraints and milestones in a detailed manner.

16. Recognize potentially risky natural hazards

Case A understood what natural hazards are likely to occur and their potential impact. AP stated "*Natural hazards that could affect the selected land was identified and was assessed by NBRO*".

Similarly, Case B also considered understanding what natural hazards are likely to occur and their potential impact. BP stated that "*We evaluated the risk level of sites for future hazards*".

Therefore in order to recognize potentially risky natural hazards both cases understood what natural hazards are likely to occur and their potential impact.

17. Incorporate Disaster Risk Reduction (DRR) strategies

Case A adhered to disaster resilient features and incorporated DRR strategies. APM of Case A explained, "*NBRO guidelines helped to plan. Disaster risk reduction was considered during design and planning stage. Considered that these people should not face another disaster in the future*". Future APii of the same case mentioned *"we properly planned the settlement with resilient features, drainage and we considered the high wind and wildlife attacks also. So we have put up an electric fence"*.

Similarly Case B also considered adhering to international standards and best practice guidelines. BPC representing NBRO added *"we decided that new houses should not bring in new disasters".* Planner of the same case too confirmed "*houses were disaster resilient. NBRO was involved with design from the beginning. So we gave them guidance to incorporate resilient features*".

Therefore, in order to incorporate Disaster Risk Reduction (DRR) strategies both cases considered adhering to international standards and best practice guidelines.

18. Establish quality of reconstruction

It was revealed that Case A did not consider providing new and improved construction guidelines for the project to establish quality of reconstruction.

However, Case B considered providing new and improved construction guidelines for the project. Having realized that current local construction guidelines limit the floor area of a house in resettlement programmes to 550sqft., BA representing NBRO stated that they agreed to provide a house with an area of 650sqft as 550 sqft. floor area was insufficient. BP stated that that they obtained consent from GoSL to go ahead with the increased floor area. In addition, they considered preparing other necessary guidelines as well to establish quality of construction. Architect of Case B stated *"We followed NBRO guidelines for materials etc. We prepared guidelines to ensure quality of products they used".*

Unlike Case A, Case B considered providing new and improved construction guidelines for the project to establish quality of reconstruction. Accordingly Case B agreed that the floor area of a house in the resettlement project should be 650sqft.

19. Designing Houses and Communal Buildings

Selection of Housing Design and Construction Technology (HDCT) was not considered significantly in Case A, however they designed houses for relocation site and obtained authority consent. Case A did not consider allowing for design flexibility to suite community needs. It also designed fit for purpose communal buildings such as schools, health centers, etc. However findings revealed that communal buildings did not proceed beyond the design stage. Even at the time of carrying out data collection for the research (post occupation stage), it was not found that Case A was planning to implement communal buildings.

Case B considered selecting the HDCT to be used in construction and accordingly considered a 4 member family and did a core house design with a living, kitchen, two bedrooms and a toilet. It is elaborated on appendix G. It ensured that agreed HDCT was incorporated into reconstruction guidelines and designed houses for relocation sites and obtained authority consent. Case B considered allowing for design flexibility. Accordingly community was given three type design and in addition, minor alterations

to designs and materials also were accepted. The architect of Case B mentioned that *"We kept provision for them to extend houses. Some brought their house plans. We approved them. Some people brought in astrological input. We changed the design according to their requirements, within the budget. Some people brought tiles. Some people requested moldings for columns. Tri Forces did those as well."*

In addition, Case B had 3 house type designs to make them adoptive to any type of land they select. BP revealed that *"We had to design houses before land selection. So we had 3 type designs suitable for flat, medium, steep slopes."* Case B did not consider including schools and health centers in their designs as such facilities were in close proximity to the selected land. However, they designed a community center for studied relocation site which also serve as an evacuation centers for people in nearby villages, in case of any disaster they may face in the future. It was designed after completion of all houses only. Case B too considered getting community participation to select the best fit type design for them. BA mentioned, *"We showed them house drawings, plans, elevations and asked their preference. Some people had a problem with attached toilets. Some people didn't mind attached toilet as long as the door was from outside."*

Accordingly, both cases considered designing houses and communal buildings and obtained authority consent for them. However unlike Case A, Case B considered selecting the HDCT to be used in reconstruction, and ensured that they are fully integrated into the reconstruction policy. In addition Case B allowed for design flexibility to suite the community needs and topography and obtained community participation to select the best fit type design case by case.

20. Cost Estimating

Case A considered identifying costs for materials per individual house but did not take measures to identify cost of materials for infrastructure, etc.

Case B also identified costs for materials per individual house but did not take measures to identify cost of materials for infrastructure, etc. However, Case B considered obtaining reconstruction labour rates and identified cost of labour per an individual house.

Both cases considered identified costs for materials per individual house but did not take measures to identify cost of materials for infrastructure, etc. However, Case B identified cost of labour per an individual house.

21. Cost Budgeting

Case A estimated cost of a house of Case A was 1.2 million. Case A submitted the budget to the Ministry of Disaster Management and obtained the consent for the per house budget.

Having prepared a quick Bill of Material (BOM) for Case B, the estimated cost per house was established as 1.2 million. Due to tight time frame, had only 2 week to complete the BOM. Case B obtained authority consent for the per house budget from a meeting they had at Presidential Secretariat.

Both cases carried out cost budgeting and considered estimating the cost of one house only and obtained authority consent for per house budget.

22. Decide on Reconstruction Approach

Case A considered deciding on level of assistance to be given, however the level of assistance decided, changed at the end of the project. Initial decision was to assist direct victims by providing an unfurnished house only. However, in addition to the house Case A ultimately provided, furniture, kitchen equipment, satellite TV, etc. Case A did not consider deciding on benchmarks for reconstruction approach. Case A decided which method of implementation was most suitable for reconstruction. Accordingly it considered to follow donor driven reconstruction approach and GoSL was the principal donor.

Case B initially considered Donor driven approach for the entire project where GoSL become the donor. However due to issues they had, it was later decided to look for private donors. BP stated *"initially, the GoSL decision was to do all houses by government funds with the help of Tri Forces. HE, the President wanted to get Tri Forces involved. Then when we looked at logistics of Tri Forces etc., forces requested an addition of 0.4 million, in addition to allocated 1.2 million per house for their expenses. Since GoSL did not agree to that, that proposal was withdrawn. Then we*

decided to go for donor-driven approach funded by private organizations". Accordingly the implementation method of reconstruction was donor-driven. Level of assistance considered was limited to providing a 10 perch land with a completed core house unfurnished. Benchmarks for reconstruction approach also decided and agreed upon all stakeholders. Accordingly it was decided that the core house get implemented in two folds, stage-i contains a bedroom and a toilet and thereafter once the beneficiaries moved into the stage-i house Case B decided to demolish the transitional shelter beneficiaries were living in. Thereafter, the construction of the stage-ii house began.

Both cases A and B decided on the reconstruction approach by deciding on the donor driven implementation method, and decided on the level of assistance to be provided. However, Case A failed to be within the limit they decided at the beginning of the project. Unlike Case A, Case B considered on deciding and agreeing on benchmarks for the reconstruction approach.

23. Institutional options for reconstruction management

Case A considered designing an outline of an institutional mechanism. ADS disclosed that "*Funds for this was sent to District Secretariat. Construction was done by the Army. Monitoring was done by NBRO. I had to do undefined ('kaaryaniyamayak nomethi') coordination. They tell me when there is a shortage of materials. Purchasing was done by kachcheriya. Selection of beneficiaries has to be done by me. Water was given by someone else. Work was not assigned to one entity".* Therefore it was revealed that, even during a presence of an outline of an institution mechanism, Case A suffered from not having one entity to manage the whole project. Case A was not equipped with a structure, a mandate, a policy or a plan for reconstruction management.

Nevertheless Case B, as attached in appendix-G, planned a steering committee for the resettlement project which incorporated an institutional mechanism. Case B was equipped with a structure, a mandate, a guide and a plan.

Both cases designed an outline of an institutional mechanism. But both suffered from not having one entity to manage the whole project. Unlike Case A, Case B was equipped with a structure, a mandate, a guide and a plan.

24. Time Schedule Development (milestone based)

Case A considered developing a time scale to the whole project with a construction schedule but it was not a time schedule based on milestones.

Case B established a time target to finish construction, which was 6 months and it was successful in meeting the time target established.

Empirical data revealed that both Case A and B did not develop a time schedule based on milestones. Identifying milestones was not done as well. Accordingly did not consider determining milestone dates. They had an overall time frame to finish construction.

25. Planning Fund distribution

In order to plan funds distribution, Case A did not consider deciding on a system for delivering funds. During construction stage District Secretariat received funds and they made payments to suppliers without consultation of UDA who was the appointed Project Manager.

It was identified that Case B, considered deciding on a system for delivering funds which was also via the District Secretariat. Funds were released to purchase materials as shortage of material was informed by Constructors. However delay in releasing funds was noticed. It was decided to deliver funds through District Secretariat. BPC explained *"GoSL gave money to build houses. District Secretary brought in a new plan that we first build them a room and a toilet. After that they have to occupy in the new house and demolish the transitional house, and then only the remaining money was released".*

Unlike Case A, Case B decided on a system to deliver funds to purchase building materials. Both cases designated the District Secretariat as the agency to manage and monitor financing of reconstruction.

26. Quality planning

In order to ensure quality planning, empirical data disclosed that Case A did not consider having a systematic quality management plan. However, Case A conducted

training workshops for supervisory TOs on supervision of construction. No training was carried out for management personnel.

Case B had a quality management plan. Considered Carrying out training programs on supervision, inspection, etc. It also planned to quality control materials. BP representing NBRO stated *"in donor-driven projects, we arranged to test building material at our labs. After we approve material samples we send a portion of that to the Tri-forces. So at site they check whether all materials they get to the site are of same. In cases that it was not, they rejected the supply".*

Therefore it was revealed that unlike Case A, Case B had a quality management plan, accordingly planned to conduct training workshops and planned to quality test building materials.

27. Planning for monitoring and control

In order to plan monitoring and controlling of the project, UDA was the dedicated management agency for Case A. Their area of authority was also defined. However Project Manager represented UDA stated that they didn't have the required powers to manage the project during the execution of the project. Therefore it suggests that area of authority had changed during the execution of the project.

Case B planned for monitoring and control by introducing NBRO and District Secretariat as Management Agencies. However BP of NBRO stated *"Those days we monitored only the houses built on government given land. Later we had to monitor other houses also".* Therefore it suggests that area of authority Case B also changed during the execution of the project.

Therefore it was revealed that both cases considered on deciding on a dedicated management agency to monitor and control the project. However their area of authority changed thorough out.

28. Resource Planning

Having decided that construction of Case A was assigned to Sri Lanka Army, representative of Sri Lanka Army ACt revealed that they identified and planned their

construction team and had sufficient labour. However, a systematic staffing management plan was not revealed.

Construction of Case B was assigned to Tri forces and representative of Sri Lanka Army, ACt revealed that they identified and planned their construction team and had sufficient labour. Consultants of Case B, having realized they lack Technical Offices (TOs) made partnership with other government organizations in the area to share their technical staff for the project. BP representing NBRO stated *"Since four of us can't monitor each and every house we appointed TOs to monitor houses. We didn't have sufficient TOs either. Divisional Secretaries prepared a program to exchange TOs. Thereby they appointed TOs from other areas to areas where there were more work"*. Accordingly Case B considered having a staffing management plan too.

Therefore it was revealed, even though both cases identified the human resources needed, it was only that Case B considered a staffing management plan. Accordingly Case B shared technical staff available with them.

29. Physical planning

District Secretariat played a key role in land allocation of Case A and considered a Land Surveyor to allocate the selected land. Road and plot layout was planned and designed by the UDA incorporating steps to provide access to each individual house. *"We did the design of roads, side drains, main drains, etc.",* stated APM. UDA who was assigned as the Project Manager of Case A considered planning for physical and social infrastructure, services and public buildings. APM representing UDA stated *"Accessibility and infrastructure was planned first. A kovil was planned to a location that cannot be utilized for a house. Two shops were planned to have near the road with benches etc. near the bus halt".* Case A planned for public buildings such as kovil, daycare center, montessori, etc. and social infrastructure such as shop houses, bus halts, outdoor seating etc. However, this plan did not get executed. Adding to chaos, APii representing NBRO stated *"When we do layout planning we allocated adequate space for roads, adequate open spaces, space for playground, community hall, etc. For water management purpose we have designed drainages"*, suggesting they also did a separate physical plan for the Case A. Therefore it was identified that both UDA and NBRO

carried out physical planning to the selected land independently and District Secretariat executed road and plot lay outing with no consultation of other professionals.

Land allocation of Case B was done by Divisional Secretariat and incorporated a land surveyor to allocate the selected land. Divisional Secretariat of Case B also carried out the road and plot layout and empirical data did not reveal them on planning roads or plot layout or obtaining guidance of other professionals involved in the project. Road and plot layout of Case B was planned by planners involved from NBRO. BA representing NBRO stated "*We actually didn't do physical planning at the beginning. AGA office has done something and later on only we started to do that*". Empirical data did not relevel evidence of District or Divisional Secretariat planning for infrastructure and services or public buildings and social infrastructure for the housing program.

Both cases followed activities related to land use and physical planning of the selected land. Accordingly both cases considered and carried out planning and allocation, plot layout, road layout land surveyors were involved in the process and was managed and coordinated by District Secretariat and NBRO. Unlike Case B, Case A planned for infrastructure, services, public buildings and social infrastructure too.

30. Environmental Planning

According to findings, environmental planning was not adequately considered by Case A. However Case A developed mitigation measures for the project and construction, such as not uprooting trees to prevent soil erosion and creating buffer for natural water bodies, etc.

Case B considered providing environmental guidance to all institutions active in reconstruction: how to build on slopes, where to locate waste treatment pits etc. Further, it considered about the ecological footprint of relocation sites at the time of land selection. BP representing NBRO revealed *"One site was in a dense forest area. We studied, analyzed and gave a report and recommended it was not suitable for development (showed the report)"*. Case B also developed mitigation measures for the project and construction and considered to not uproot trees to prevent soil erosion, buffer for natural water bodies, etc.

Therefore it was revealed that, in order to ensure environmental planning, both cases evaluated the ecological footprint of the relocation site. Unlike Case A, Case B considered provideing environmental guidance to institutes involved and developed migratory measures for the project.

31. Infrastructure and services delivery

Findings did not reveal significant planning measures taken by Case A to plan infrastructure and services delivery to reconstruction site.

However Case B considered deciding on how to ensure interim and permanent infrastructure to reconstruction sites. BA representing NBRO disclosed *"The plan was to clear the site, we built a road to relocation site, first. Then built retaining walls... We had an idea about how to provide transportation for construction...".*

Therefore, findings suggests that unlike Case A, Case B had a plan to provide infrastructure to reconstruction site.

32. Community Organizing and Participation

It was revealed that Case A did not consider to obtain community participation for reconstruction intentionally. Therefore, they did not systematically analyze the community's capacity and preferences for participation. However ABii stated that officers involved with Case A were aware of the psychological status of victims and beneficiaries after the disaster and thus did not encourage to participate for construction work. Therefore, it suggested that the key stakeholders of the project were aware of capacity and preference of the community for participation of construction. Case A, having not obtained participation from the community, did not agree with the community on the activities and the outcome they would deliver.

Case B too did not systematically analyze the community's capacity and preferences for participation, as they had no intention to obtain community participation for reconstruction. However, community participation was obtained for one of the donor-driven house of Case B, which was given to a non-direct victim of the disaster. BBii stated *"we were told that we can do excavations for our own house if we like, and they are going to pay for it. So we did our own excavations. And they paid us for that".*

Accordingly empirical data disclosed that Case B agreed with the community on the activities and outcomes they deliver, at the special instance where they requested community participation for reconstruction.

It was revealed both Cases A and B was not intended to obtain community participation for reconstruction. Therefore they did not plan for community organization and participation. However, Case A understood the poor psychological condition, the beneficiaries of Case A was in, thus the inability to participate in construction. Case B agreed with the community and activities and outcome they would deliver, on the special encounter where they obtained community participation for reconstruction.

33. Mobilizing financial resources and other reconstruction assistance.

Case A mobilized their financial resources and other assistance to assigned agencies. Funds were provided by the Ministry to District Secretariat. Then the District Secretariat utilized it to purchase materials. Other assistance received such as furniture, appliances etc. were also distributed by the District Secretariat.

Case B also mobilized their financial resources and other assistance to assigned agencies. Private donors who funded Case B, purchased materials when the need aroused and handed them over to Tri forces who constructed houses.

Therefore both Cases A and B mobilized their financial resources and other reconstruction assistance systematically via the District Secretariat. They considered having an active delivery system for funds was in place.

34. Direct and manage project execution

Case A considered carrying out setting out prior to start of execution but didn't intend to phase out the execution except for construction of model houses which was planned to construct prior construction of other houses. However during setting out of buildings, it was realized that the originally acquired land was not enough to cater to the agreed number of houses. Therefore they had to acquire an adjacent piece of land, while construction of houses were going on in the originally acquired land. Therefore, building houses on the land later acquired got carried out as a separate phase of the project.

In order to direct and manage project execution Case B considered phasing out the project and planned the execution. BPC representing Ministry of Disaster Management stated *"It was done in phases. 20 houses were assisted by donor 1 and built by their Builders. They built fast. Another 30 houses were assisted by donor 2 and were constructed by Tri Forces. Rest of the houses were done by some other private companies".* Accordingly Case B planned and phased out the construction to two phases. In addition, as illustrated in figure 4-8, during setting out, Case B realized that transitional shelter of beneficiaries were built at the same plot that the permanent house was getting built and the transitional shelter was built in the middle of the plot, hindering the construction of the permanent house. Therefore it was decided to phase out the core house in to stage -i house and stage-ii house. Stage-i consisted of a bed room and a toilet and stage-ii consisted of another bedroom, living and the kitchen, which completed the core house. Therefore in addition to planned phasing out, Case B had to phase out the project due to site constraints experienced as well.
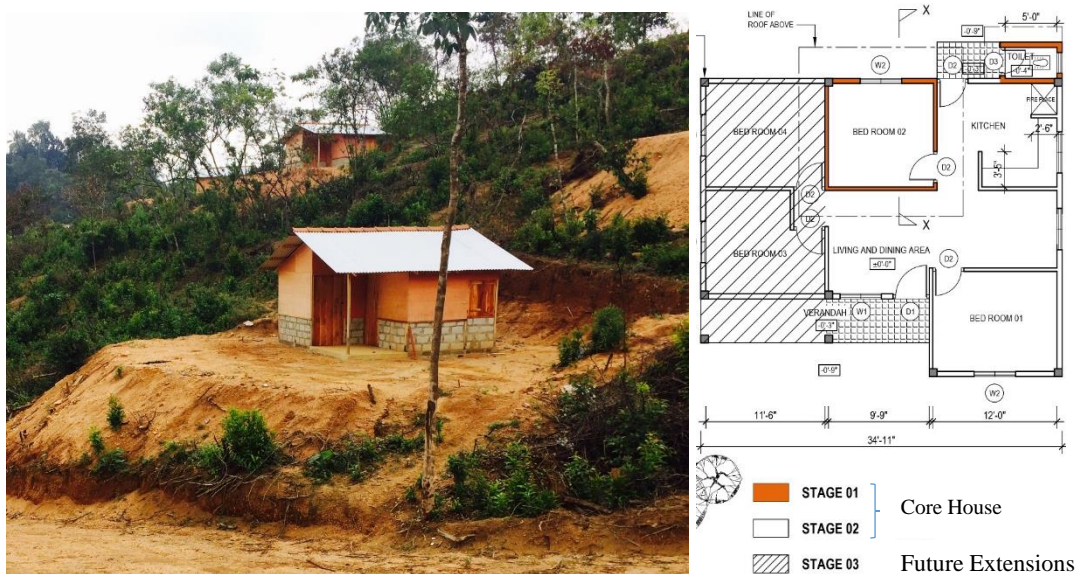
Figure 4-8: Transitional shelter being built in the middle of the plot (left), Core house being phased out as stage-i and stage-ii houses (right).
Source: NBRO

In order to direct and manage project execution, both cases A and B considered carrying out setting out of houses. Case A did not plan to phase out the construction. However, due to insufficient land acquisition, Case A eventually had to phase out during execution. On the other hand, Case B planned to construct in two phases in response to delays in finding donors. In addition, they had to phase out it further during execution, due to poor planning of setting out of transitional shelter.

35. Acquire project team

Case A, having assessed they had sufficient staff to construct buildings, did not consider acquiring additional staff. Similarly Case B also identified that they had sufficient staff to construct, thus did not make an attempt to acquire construction staff. They mobilized their available staff throughout the project.

Therefore both Case A and B did not consider acquiring additional staff for project team. However, available staff, which was identified as sufficient, was mobilized for reconstruction works.

36. Develop and train project team for reconstruction

Findings disclosed that Case A did not attempt to train the project team for construction.

Case B took a minimal effort to train TOs with technical skills and provided guidance for the community who participated for construction. Having obtained labour for construction from Tri Forces, Case B was certain that the staff had required skills to carry out the construction works. An outline of the training programmes to be carried out was incorporated in the reconstruction guidelines of Case B and attached on appendix – I. Nevertheless extensive training programmes as outlined in the guide was not carried out.

Empirical finding reveled that Case A did not attempt to train the project team for construction. On the other hand, training programmes to provide management, technical skills, etc. for target groups of staff were outlined in the reconstruction guidelines of Case B. Nevertheless they carried out programmes to provide technical skills for community only.

37. Information Distribution

In order to ensure the distribution of information, Case A distributed drawings, specifications schedules etc. They were prepared by UDA. However it was revealed that specifications provided for bricks were outdated thus, there were delays in correcting specifications.

Drawings, specifications schedules etc. of Case B were prepared by NBRO. BA representing NBRO stated *"Before start construction we took Tri Forces to the site, showed them each and every plot, gave them all drawings and gave an opportunity to ask any questions they have. So we cleared their matters in advance"*.

Therefore, it was revealed that both Cases A and B considered distributing relevant documents, schedules, specifications, etc. to relevant constructors and ensured smooth information distribution.

38. Request sellers' response and select seller.

Case A requested responses from sellers and obtained quotes and details from sellers. AA stated *"Materials were purchased according to government procedure by the Kachcheriya"*. It was revealed that Case A selected sellers who operates from far distance as well. ACt, the representative of the constructor of Case A elaborated that following the rigid government procurement system in Case A, resulted delays in completing works. Further, Case A followed standard tender procedure for additional ground clearance for the later acquired land.

Case B was funded by private donors and empirical findings disclosed that donors obtained quotes and details form sellers an implemented their own select seller process to request sellers' responses and select sellers.

Therefore it was revealed that Case A considered following standard government procedure for request sellers' response and select sellers and on the other hand Case B followed a customized procedure by donors.

39. Implement monitoring and controlling

Case A did not had a systematic monitoring and controlling measures implemented except for monitoring and controlling of construction work implemented by the Constructor himself. However, beneficiaries visited the construction site on their own interest to observe construction and requested for changes where necessary.

Case B established a monitoring, control and evaluation system and communication mechanism also was integrated in it. BP representing NBRO stated *"We had a database to manage the project. Site locations are mentioned there. It's an online data base*

linked to phone. We being in Colombo don't know what happen at site. So I made them a mobile app. They updated the app the moment they go to sites. Progress need to be entered to the app during every visit. It was done on my personal interest. Sooner someone updated the app, database get updated automatically and we also get a notification email. If they have no signal at site they can save it in phone and the updated information automatically get synced to database when they have reception". In addition to that TOs were provided with log books and log books were kept at each site. Instructions that needed to be given to constructors/ workers at site were mentioned on log books ensuring a good communication mechanism during construction.

It was identified that Case A did not implement a monitoring and controlling system, Unlike Case A, Case B established a monitoring and controlling system and a communication mechanism during the construction.
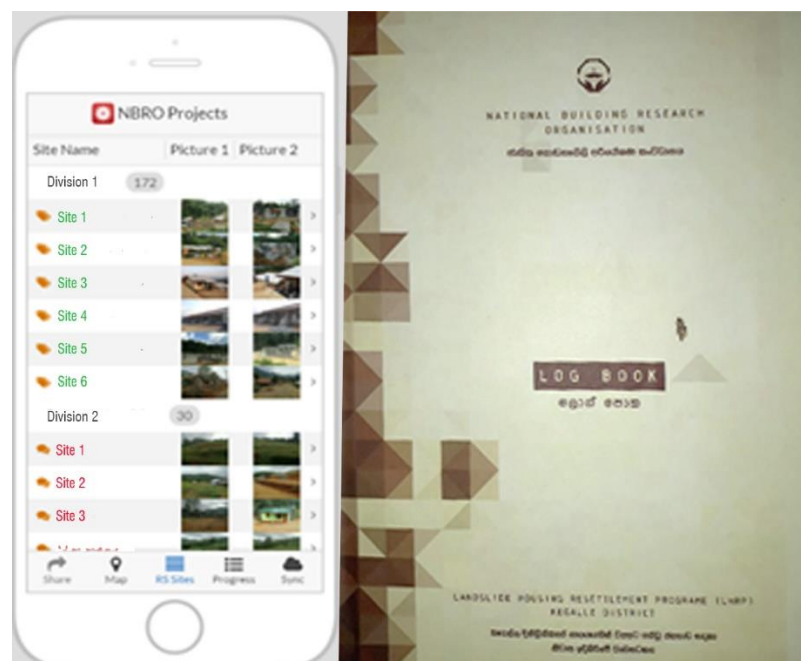
Figure 4-9: Interface of the App developed for monitoring the project (left), Cover of the Log Book (right

40. Close the project

Findings reveled that UDA, a key stakeholder of the project exited the project soon after the completion of construction without getting involved in formal procedure of closure. APM stated *"We didn't involve in handing over. After completion of building works, there was a gap of about 6 months for handing over. We didn't involve during*

that 6 moths gap. NBRO handled things during that time. We handed over checking defects to NBRO and Army". After completing construction of houses, Case A focused on completing infrastructure, etc. APi stated *"At the closure we made sure whatever we planned, with resilient features, drainages, etc. are in order. Actually, after completing all the infrastructure only we accepted it. We visited the site one week before the handover and we have informed that certain things were not done properly. We asked disaster management officer do it properly before hand it over".* Therefore Case A considered implementing the agreed exit strategy and took over completed houses. Thereafter closed both internal and external activities they had within the organizations. However, even after handing over of houses, Case A carried out providing infrastructure and services such as internal roads, retaining walls, drinking water etc. Therefore both internal and external activities related to them did not come to an end.

Case B also executed the agreed exit strategy. BA stated *"Once houses are done with construction our technical staff checked for defects. We didn't had defects liability period as such. After we established that the overall quality of the house is good we handed it over to the AGA".* In addition BP stated *"We didn't take inventories at the time of taking over. We gave a certificate to each house. Confirming that they include disaster resilient features".* Accordingly Case B also closed both internal and external activities they had within the organizations and carried out infrastructure and services such as providing internal roads, retaining walls, drinking water etc. even after handing over of houses, therefore both internal and external activities related to them did not come to an end.

Thus, it was revealed that both cases implemented exit strategy as agreed at the beginning of projects and handed over completed houses and closed all internal activities they had within the organization and both cases closed all external activities they had with other organizations. However even after handing over of houses, both cases carried out providing infrastructure and services therefore both internal and external activities related to them did not come to an end.

41. Implement demobilization

Even though Case A did not follow a significant procedure to implement demobilization, it considered demobilizing human resources and other equipment that

were used for the PDR project. APi stated *"our technical officers, engineers, town planner and the architect was part of the project team. Soon after the project we moved to other projects"*.

Similarly Case B also did not follow a significant procedure to implement demobilization, however it also demobilized human resources and other equipment that were used for the PDR project.

Therefore, it was revealed that both Cases A and B did not follow a systematic procedure to implement demobilization.

42. Handover to Beneficiaries

Case A handed over houses to beneficiaries who are going to be the end user. Their process of handing over was complicated as they finalized beneficiaries only at the time of handing over. They used lots to select the exact house plot for beneficiaries. ADS explained *"I did whole selection process in front of beneficiaries. They were the ones who prepared lots. It was very transparent. So no one can make any complaints against it"*. Similarly beneficiary of Case A, ABi also explained *"There was a function to handover buildings to us. We went to the AGA office and they gave us the number. Then only we got houses. We went to MP's house to get deeds. But it was just a letter only"*. Therefore it was revealed that Case A did not hand over deeds to end-users. However a letter stating ownership was provided.

Case B also handed over houses to end-users. Beneficiary of Case B, BBi explained *"They sent us a message that they are going to hand over houses and told us to do our customs. We looked at an auspicious time and brought in goods to the house. Other sirs came and opened on another day. They gave us the key only. No deeds, no letters nothing"*.

It was releveled that both cases handed over houses to the end-users, beneficiaries. It was also revealed, that beneficiaries expected legal ownership of houses via deeds though such was not provided at the time of carrying out the study.

43. Contract closure

Case A did not follow a significant procedure to close the contract. However it closed contracts that were applicable to internal support and closed contracts that were established with outside parties.

Similarly Case B also did not follow a significant procedure to close the contract, yet closed contracts that were applicable to internal support and closed contracts that were established with outside parties.

Both cases A and B studied closed contracts that are applicable to internal support and closed contracts that were established with outside parties.

44. Post occupancy evaluation

NBRO, Universities etc. carried out post occupancy survey related to Case A. APi representing NBRO explained "*People have accepted houses, now they have initiated their livelihood with the available space and have cultivated vegetables in the front garden of the house. They also have started their own livestock development. But some people are just not making an effort*".

Similarly BA of Case B, representing NBRO explained *"We went to check their occupancy. The last time I went, some families were not there. We saw some issues in retaining walls. Didn't see any issues with houses. We are now arranging to carry out a post occupancy survey"*.

Therefore Findings revealed that both cases A and B carried out post occupancy evaluations.

5 CHAPTER 5 - DISCUSSION AND DEVELOPMENT OF FRAMEWORK

5.1 Introduction

This chapter discusses research findings of this study. The purpose of this chapter is to interpret and describe findings of the research, in light of available literature. The discussions were mainly focused on PLC of PDR projects in Sri Lanka, MPs of PDR projects in Sri Lanka, KCs of managerial process of PDR projects in Sri Lanka, project management methodology for PDR projects in Sri Lanka and finally, the framework to successfully manage PDR projects in Sri Lanka is presented.

5.2 Project Life Cycle (PLC) of PDR Projects in Sri Lanka

PDR projects studied were complex. Empirical findings revealed that both cases studied phased out PDR projects. Phases identified were summarized in table 4-3. As illustrated in figure 5-1, both Cases A and B studied had distinctly identifiable Starting Phase, series of Middle Phases and an Ending Phase.
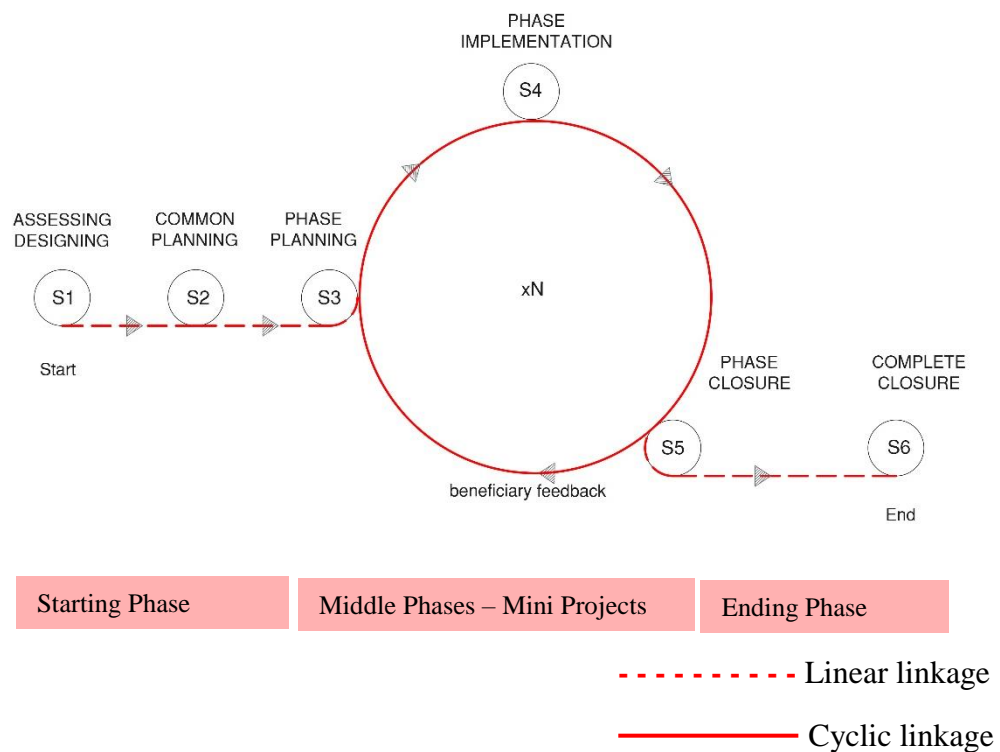
Figure 5-1: Project Life Cycle (PLC) of PDR projects in Sri Lanka

Starting Phase was focusing on the entire PDR project. Series of Middle Phases were focusing on planning, implementation and closure of the respective Middle Phase of the project only. Therefore, empirical findings revealed that phasing out in cases studied were different to phasing out commonly experienced during the construction period of construction projects. Series of sequential phases in the middle of the PDR projects studied were broadly in line with iterative and incremental PLC explained by PMI (2013). Accordingly, itereations had during the Middle Phases of PDR projects created a series of repeated cycles whilst increments successively add to the functionality of the final housing project by producing a portion of the PDR project at the end of each Middle Phase. Further, phasing out in Case A and B were in line with 'Mini Projects' Misra et al. (2012) suggested as well, where the whole project can be broken into series of small portions. The number of Middle Phases had was depending on the number of Mini Projects the project was broken into, due to the complexity of the PDR project. Ending Phase was focusing on the entire PDR project.

PLC of PDR projects identified by cases studied were unique in nature. Accordingly, it consisted of six refined identifiable stages. They were: 1) assessing and designing, 2) common planning, 3) phase planning, 4) phase implementation, 5) phase closure and finally, 6) complete closure. Refer table 5.1.

Table 5-1: PLC Stages of PDR Projects

Project Phases	Project Stage		Linkage between Stages
Starting Phase	Stage 1 (S1)	Assessing and Designing	S1-S2: Linear
	Stage 2 (S2)	Common Planning	S2-S3: Linear
Middle Phases - 'Mini Projects'	Stage 3 (S3)	Phase Planning	S3-S4-S5: Cyclic and Repetitive
	Stage 4 (S4)	Phase Implementation	
	Stage 5 (S5)	Phase Closure	
Ending Phase	Stage 6 (S6)	Complete Closure	S5-S6: Linear

During Stage 1- Assessing and Designing, initial assessment as well as designing of all buildings of the PDR project were carried out. Being in line with literature suggested by Baroudi and Rapp (2012), assessments carried out in this stage was indefinite. However, designing of buildings of the PDR projects also occurred during Stage 1 of PLC and it was in counter to generic PLC discussed in literature review and unique to

PDR projects studied. After completion of Designing and prior to completion of Assessing, PDR projects studied moved to Stage 2. Accordingly, some activities of Assessing was carried out through the entire PDR project and provided most updated results to proceeding Mini Projects of the PDR project (this is further discussed in section 5.3). This finding was also in contrary to literature suggested by Adams and Brandt (1988), Cleland and Ireland (2002), Kerzner (2009) and PMI (2013). However, PDR projects moved from Stage 1 to 2 in a linear sequential manner, which was broadly in line with litrature review.

Stage 2–Common Planning, was consisted of an outline planning related to the entire PDR project. A skeleton of planning works that is required for the overall project was carryout in this stage and detailed planning related to Mini Projects were not carried out. Therefore, findings suggested that planning of PDR projects was broken in two folds, and during Stage 2 of PLC of PDR projects, Common Planning related to the overall project was carried out. This finding was also unique and was in counter to PLC discussed in literature review. At the end of Stage 2, cases studied moved to Stage 2 of PLC in a linear sequential manner, which was broadly in line with litrature review.

Empirical findings revealed Stages 3, 4 and 5 of PLC of PDR projects were iterative. Thereby, one iteration focused on one Mini Project only. Even though this finding was not in line with PLC of generic projects discussed in literature review, it was in consistent with iterative incremental life cycle suggested by PMI (2013). Furthure, it was closely related to iterative incremental model suggested by (Charvat, 2003) which conatins phased delivery as well. During Stage 3 – Phase Planning, detailed planning works related to a Mini Project were carried out. During Stage 4 – Phase Implementation, the Mini Project was implemented. Thereafter during, Stage 5 – Phase Closure, the Mini Project was closed. After the closure of one Mini Project, the next Mini Project was planned. Thereby, Stages 3, 4, 5 got reiterated. Each Mini Project provided a valuable portion of the final product and each repetition was incremental. Thus the final project scope was dramatically built. Further, in Case B, beneficiaries occupied the portion of the house they completed at the end of every Mini Project and provided Feedback. Given feedback was considered to improve the proceeding Mini Project.

At the end of all Mini Projects, PLC of cases studied moved in to the Stage 6 in a linear sequential manner, which was broadly in line with litrature review.

Finally, Stage 6–Complete Closure was identified to have occurred in PLC of PDR projects studied. The entire PDR project was Closed at this stage and the PLC came to an end.

5.3   Managerial Processes (MPs) of PDR Projects in Sri Lanka

Managerial Processes that were carried out during each PLC stage of PDR projects were of great variety and wide spread. The study suggested fifty two MPs that should be carried out to successfully manage PDR projects in Sri Lanka. Their distribution amongst PLC stages of PDR project are tabulated in table 5-2.

Table 5-2: Distribution of Managerial Process amongst PLC stages of PDR projects in Sri Lanka

Stage	No. of Managerial Process
Stage 1 – Assessing and Designing	25
Stage 2 – Common Planning	5
Stage 3 – Phase Planning	7+(7)
Stage 4 – Phase Implementation	9+(7)
Stage 5 – Phase Closure	3+(7)
Stage 6- Complete Closure	3
Total No. of managerial processes	**52**

Empirical findings of Cases A and B disclosed forty four MPs of PDR projects that were broadly in line with literature review. In addition, the study suggested eight more MPs that appear to be essential to manage PDR projects successfully. Accordingly, the study identified 52 MPs that is necessary to manage PDR projects in Sri Lanka and they are summarized in table 5-3. As discussed in section 5.2, some activities of Assessing continued thought out the entire PDR project and there were seven MPs related to them. They provided most updated assessing information to Mini Projects that followed. Those seven MPs are presented in Italics with an * mark in table 5-3.

Table 5-3 : Managerial Processes (MPs) of PDR projects in Sri Lanka

Stage	Project Management Processes
Stage 1 – Assessing and Designing	1. *Understand the context*
	2. *Assess impact of the disaster*
	3. Understand the governance structures, regulatory framework
	4. Set reconstruction policy
	5. Assess local needs and capacities
	6. Establish the lead coordination and communication agency and the strategy
	7. *Understand funding steams and timescales*
	8. Decide whether to relocate or not to relocate
	9. *Identify beneficiaries*
	10. Assess existing land use and physical planning
	11. Assess Infrastructure and services delivery
	12. Asses cultural heritage
	13. *Land selection and resolve issues of land tenure*
	14. Establish partnership with other stakeholders
	15. Develop project charter
	16. Develop preliminary project scope statement
	17. Recognize potentially risky natural hazards
	18. Incorporate Disaster Risk Reduction (DRR) strategies
	19. *Establish quality of reconstruction*
	20. Designing houses and communal buildings
	21. Time schedule development (milestone based)
	22. Cost budget
	23. Cost estimate
	24. *Decide on reconstruction approach*
	25. Institutional options for reconstruction management
Stage 2 – Common Planning	26. Scope plan
	27. Plan fund distribution
	28. Quality plan
	29. Stakeholder management planning
	30. Plan for monitoring and control
Stage 3 – Phase Planning	31. Resource planning
	32. Physical planning
	33. Environmental planning
	34. Cultural heritage conservation planning
	35. Plan Purchases and Acquisitions
	36. Infrastructure and services delivery
	37. Risk management planning
Stage 4 – Phase Implementation	38. Community organizing and participation
	39. International, national and local partnership in reconstruction
	40. Mobilize financial resources and other reconstruction assistance
	41. Direct and manage project execution
	42. Acquire project team
	43. Develop and train project team
	44. Information distribution
	45. Request sellers response and selecting seller
	46. Implement monitoring and controlling
Stage 5 – Phase Closure	47. Closing the project
	48. Implement demobilization
	49. Hand over to beneficiaries
Stage 6- Complete Closure	50. Closeout reports with lessons learned
	51. Contract closure
	52. Post occupancy evaluation

Key:

	New MPs and KCs found from the field
	MPs and KCs suggested by literature
	MPs and KCs found from both field and literature

5.3.1 Stage 1- Assessing and Designing

During Stage 1 of the PLC of PDR projects twenty five MPs related to Assessing and Designing were carried out. They were broadly in line with MPs suggested by literature review. In addition, MPs suggested by literature review for planning such as recognizing potentially risky natural hazards, cost estimating, cost budgeting, etc. which were related to designing of buildings also occurred during Stage 1- Assessing and Designing. Two new processes were identified from the field. They were: assessing existing land use and physical planning; and assessing infrastructure and services delivery. Interestingly, KCs of them were closely related to land use and physical planning; and infrastructure and services delivery, suggested for Planning Stage of PLC by literature review. Therefore the study suggests that assessment related to land use and physical planning, and infrastructure and services delivery happened earlier in the PLC of PDR projects studied. Further as Jha et al. (2010) suggested assessing cultural heritage was also an important MP due to its ability to preserve practices, history, identity, etc. thus, study suggests it for the stage assessment. In addition, the importance of milestone based time schedule development was highlighted by PMI (2005). Its outcome is directly related to cost budgeting. Therefore, even though it was identified during planning stage of cases studied, the study suggests that the time schedule development also should happen during Stage 1 prior to execution of cost budgeting.

Interestingly, seven MPs presented in Italics with an * mark in table 5-3, that started during Stage 1 continued throughout projects studied. Those MPs were related to Mini Projects that followed and provided most updated outcome of the assessment to each Mini Project.

5.3.2 Stage 2 - Common Planning (CP)

During Stage 2, five MPs related to planning of the entire project were identified and they were in line with literature. They were not related to detail planning of Mini Projects. Plan fund distribution, Quality plan, Plan for monitoring and control were

MPs identified from cases studied. In addition, Scope planning is important as it provide the foundation for the execution of the project (PMI, 2005), stakeholder management planning is also an important management process (Jha et al., 2010) which suggests to carry out during 'Common Planning' stage as it has an ability to satisfy stakeholders by resolving their issues.

5.3.3 Stage 3 - Phase Planning (PP)

During Stage 3 of PLC seven MPs related to planning of Mini Projects were performed and they were not related to the planning of the entire project. Accordingly Resource Planning, Physical planning, Environmental planning, Infrastructure and services delivery were carried out. In addition literature suggests that Cultural heritage planning is also important due to its ability to provide identity to a community (Jha et al., 2010), Plan purchases and acquisitions (Barakat, 2003; Silva, 2010) is also important as it can provide and overall value to the entire programme, and Risk management planning is also vital due to its ability to minimize threats to the project and take advantages of opportunities (PMI, 2005)

5.3.4 Stage 4 - Phase Implementation (PI)

During Stage 4 of PLC, nine MPs related to implementation of Mini Project were performed and they were not related to the implementation of the entire project. Community Organizing and Participation, Mobilizing financial resources and other reconstruction assistance, Direct and Manage Project Execution, Acquire Project Team, Develop and Train Project Team, Information Distribution, Request Sellers Response and select seller, Implement monitoring and controlling were identified from cases studied. In addition Jha et al. (2010) and Silva (2010) emphasized international, national and local partnership in reconstruction was important during implementation as no single organization is capable of providing all resources that are required for PDR projects.

5.3.5 Stage 5 - Phase Closure (PC)

During Stage 5 of PLC, three MPs related to closure of Mini Projects were performed and they were not related to the planning of the entire project. Processes executed were

closing the project, implementing demobilization and handing over to beneficiaries. All processes identified during this stage were in line with findings of literature.
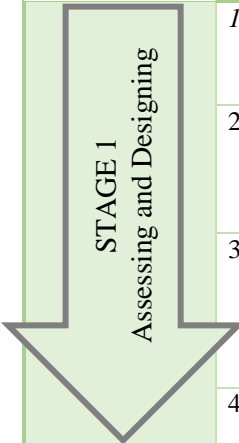
5.3.6   Stage 6 - Complete Closure (CC)

During Stage 6 of PLC three MPs related to the closure of the entire project were identified. Accordingly, contract closure and post occupancy evaluation were carried out during this stage and in addition, the importance of carrying out closeout reports and lessons learned was also emphasized by PMI (2005) as it collect knowledge aquired during the project.
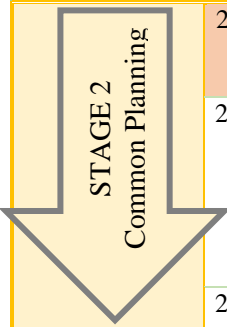
5.4   Key Considerations (KCs) of Managerial Processes of PDR Project in Sri Lanka
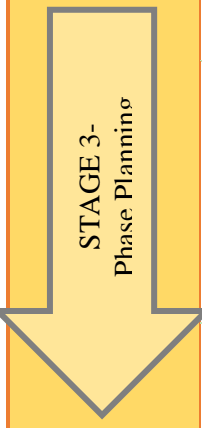
Though MPs disclosed from cases studied were broadly in line with literature, in-depth findings unveiled, that only four MPs carried out during PLC of PDR projects studied were in line with all relevant Key Considerations suggested by literature review. They were: assess infrastructure and services delivery, recognize potentially risky natural hazards, incorporate DRR strategy and cost budgeting. Thus, the study suggests that, KCs of MPs were poorly addressed in cases studied. Total of 183 KCs that should be addressed when carrying out MPs of PDR projects in Sri Lanka are summarized in table 5-4 below. MPs that were started during Stage 1 and continued throughout the entire project are presented in Italics with an * mark.

Table 5-4: Key Considerations of Managerial Processes of PDR projects in Sri Lanka

		Managerial Processes	Key Considerations
STAGE 1 Assessing and Designing		1. *Understand the context	Understand the psychological conditions of victim
			Understand the geography, society, economics, politics, climate and hazards
		2. *Assess impact of the disaster	Define guidelines for assessment
			Assess housing conditions
			Identify Victims
			Assess the state of infrastructure systems
		3. Understand the governance structures, regulatory framework	Understand the responsible group for disaster reconstruction, regulatory framework, standards, etc.
		4. Set reconstruction policy	Designate the agency responsible for reconstruction policy
			Consult stakeholders
			Establish basic parameters of the reconstruction policy

5.	Assess local needs and capacities	Understand particular needs of groups and individuals (men, women, elderly, children)
		Assess locally available human resources
		Assess locally available materials
6.	Establish the lead coordination and communication agency and the strategy	Decide on the lead agency to develop communications strategy
		Plan for the project communications strategy
		Develop stakeholder communication plans
		Establish effective stakeholders communication channels
		Agree on feedback mechanism
7.	*Understand funding steams and timescales*	*Search for donors*
		Determine the total amount of money available
		Understand the timescale it can be spent.
		Understand other donor requirements
8.	Decide whether to relocate or not to relocate	Initiate an analysis of disaster risk management
		Identify whether relocation is needed to mitigate the risk
		Define the policy framework for relocation
		Quantify the population subject to relocation
		Obtain community opinion on relocations
9.	*Identify beneficiaries*	*Determine eligibility criteria*
		Identify eligible beneficiaries
		Obtain community consent for list of beneficiaries
		Obtain approval from the government for list of beneficiaries.
10.	Assess existing Land use and Physical planning	Study land use plan
		Assess available land
		Decide whether revisions to existing land use plan, regulations needed
		Decide whether existing land use plan contributed to the disaster
		Determine how land use should be revised to mitigate future disaster risk
11.	Assess Infrastructure and services delivery	Assess the state of infrastructure systems
		Assess capability to restore/provide infrastructure services
12.	Asses cultural heritage	Appoint an agency to address damage to resources of national significance
		Ensure cultural resources are considered in post-disaster damage and loss assessments
13.	*Land selection and resolve issues of land tenure*	*Follow an adequate site selection procedure*
		Plan to restore livelihoods and social conditions.
		Incorporate beneficiaries to identify relocation sites
		Identify relocation sites
		Access land ownerships
14.	Establishing partnerships with other stakeholders	Request support from other partners
		Make partnerships with government, other agencies or local organizations.
15.	Develop Project Charter	Define Project authority (sponsor, project manager)
		Define Purpose.
		Define Key assumptions, constraints & risks.
		Define Stakeholders.
		Define Resources and budget
		Define Milestones.
		Define Prediction of benefit.
16.	Develop Preliminary	Identify preliminary project scope (objectives, boundaries, deliverables, constraints, milestones)

		Project Scope Statement	
	17.	Recognize potentially risky natural hazards	Understand what natural hazards are likely to occur and their potential impact
	18.	Incorporate disaster risk reduction strategies	Adhere to international standards and best practice guidelines
			Influence local building practices and planning processes so that they support safer construction in the long term.
	19.	*Establish quality of reconstruction	*Understand the quality from the occupant's perspective.*
			Provide new/improved building codes and construction guidelines
	20.	Design houses and communal buildings	Analyze the disaster impact on common housing designs and construction technologies (HDCT)
			Select the HDCTs to be used in reconstruction
			Ensure that they are fully integrated into the reconstruction policy
			Design houses
			Allow for design flexibility to suit the community
			Community participation to select the best fit type design
			Obtain authority consent for houses
			Design fit for purpose schools, health centers etc.
	21.	Time Schedule Development (milestone based)	Determine milestone dates
			Establish project time frame
	22.	Cost Budgeting	Assign cost per house
			Assign cost to each milestone.
			Obtain authority consent for the budget
	23.	Cost Estimating	Identify cost for labour,
			Identify cost for material
			Identify cost for travel
	24.	*Decide on Reconstruction Approach	*Decide on level/method of assistance to provide*
			Decide and agree on benchmarks for all reconstruction approaches
			Decide which reconstruction approach/s (method of implementation) is/are most suitable
	25.	Institutional options for reconstruction management	Design the outline of the institutional mechanism
			Equipped with a structure, a mandate, a policy, and a plan
			Set up reliable monitoring and evaluation procedures to guarantee accountability and transparency
STAGE 2 Common Planning	26.	Scope planning	Set up Change management plan, reporting process, communication plan, logistic plan, and a demobilization plan
	27.	Planning Fund distribution	Decide on a system for delivering funds
			designate the agency to manage and monitor reconstruction financing
			Develop a viable reconstruction finance strategy
			Establish an expenditure tracking system at the national level, integrated with tracking at the project level
	28.	Quality planning	Provide quality management plan

		Provision of special training workshops for supervisory (including beneficiary) and management personnel on project inspection, supervision and enforcement
		Provision of capacity development workshops for management personnel
		Plan to quality test materials
	29. Stakeholder management planning	Decide on a plan to manage stakeholders
	30. Planning for monitoring and control	Establish multi-tiered institutional arrangements
		Include a dedicated management agency
		Decide on area authority
		Local monitoring and control units at all organizational and geographical levels
STAGE 3- Phase Planning	31. Resource Planning	**Identify HR/construction team**
		Staffing management plan
	32. Physical planning	Plan land allocation
		Plan road layout
		Plan plot layout
		Plan for infrastructure and services
		Plan for public buildings and social infrastructure
		Evaluate the ecological footprint of a relocation site
		Develop mitigation measures for the project and construction
	33. Environmental planning	Decide on the legal framework for environmental management
		Plan and coordinate the debris management
		Provide environmental guidance to all institutions active in reconstruction
		Evaluate the ecological footprint of a relocation site
		Develop mitigation measures for the project and construction
	34. Cultural heritage conservation planning	Identify cultural resources that require conservation during recovery and reconstruction
	35. Plan Purchases/procurement and Acquisitions	Engage qualified and dedicated procurement experts to manage resource procurement
		Assess resource requirements based on sufficient quality, availability, supply point and time of resource need
		Map resource markets and make provision for price variations due to seasonal variations and changing market conditions
		Identify sellers,
		Identify distribution channels,
		Identify a methods to expedite the approval process.
	36. Infrastructure and services delivery	Publicize the infrastructure standards
		Decide how to ensure interim and permanent infrastructure to reconstruction sites
		Include Build back better and conform to standards
		Estimate the cost of infrastructure and services delivery
		Identify the treats to the project

STAGE 4 - Phase Implementation	37. Risk Management Planning	Build a contingency plan
	38. Community Organizing and Participation	Analyze the community's capacity and preferences for participation
		Define the role of communities in planning and managing reconstruction
		Agree with the community on the activities and outcomes they deliver
		Decide how to support and empower communities to contribute for reconstruction
		Decide how to monitor and evaluate the involvement
	39. International, National and local partnership in reconstruction	request support from the UN or other partners
		identify the roles best suited to the UN, other humanitarian agencies, NGOs, and civil society organizations (CSO)s,
		Establish a monitoring and evaluation system for all NGO and CSO activity and mechanisms
	40. Mobilizing financial resources and other reconstruction assistance.	Design the assistance delivery system
		Activate delivery system for cash that is accessible for recipients/suppliers
		Distribute funds for assigned agency
	41. Direct and Manage Project Execution	Setout buildings and execute construction
		Phase out and plan the execution
	42. Acquire Project Team	Mobilize and/or recruit local artisans, construction workers, volunteers and beneficiaries
		Import workers
		Engage construction industry actors
	43. Develop and Train Project Team for reconstruction	Decide how reconstruction training will be managed
		Ensure that adequate staff and resources are available for the lead training agency
		Design the training program
		Recruit the core team, the trainers, and the field teams
		Set standards and procedures for monitoring and evaluation of training activities
		Obtain expertise support from Civil society organizations, building trades and academic institutions
		Train on General management skills, Technical skills and Ground rules
		Educate and develop skills and capacity of recruited workers
		Develop and utilize multi-skilled workers
		Activity reporting (performance assessment)
		Provide technical guidance to community participants
	44. Information Distribution	Distribute drawings, schedules, specifications, etc. on time
	45. Request Sellers Response and select seller	Obtain quotes and detains from sellers
		Implement the select seller process
	46. Implement monitoring and controlling	Daily/weekly/monthly activities including changes
		Recruit and deploy experienced management personnel or experts with requisite technical managerial skills to adequately monitor and apply control measures in reconstruction
		Deploy professionals and trained personnel and local representatives to monitoring units

		Set-up monitoring committees/work groups at local community level
		Ensure beneficiary participation in monitoring process to ensure that housing aligns with community needs and expected standards
		Establish monitoring and control and evaluation systems
		Establish project communication mechanism during construction
		Monitor and control the project team
		Manage stakeholders
		Risk monitor and control
STAGE 5 Phase Closure	47. Close the project	Implement exit strategy
		Handover assets, activities, functions etc. to correct agency
		Close internal activities that the implementing agency has established
		Close internal activities that the implementing agency has established with other parties
	48. Implement demobilization	Ensure safety and demobilize human resources
		Ensure safety and demobilize equipment, non-consumable goods
	49. Handover to Beneficiaries	Handover of the houses to their future owners and end-users
		Agree on a finite period during which the agency is responsible for defects
STAGE 6 Complete Closure	50. Closeout reports with lessons learned	Collect knowledge acquired during the project.
		Prepare close-out report with lessons learned
		Provide feedback report to donors
	51. Contract closure	Close contracts that are applicable to internal support
		Close contracts that were established with outside parties
	52. Post occupancy evaluation	Conduct post occupancy survey
		Evaluate whether reconstruction acted as a catalyst for recovery

Key:

	New KCs and MPs found from the field
	KCs and MPs suggested by literature
	KCs and MPs found from both field and literature

Key Considerations of each Managerial Process are explained in detail below:

1. <u>Understand the context</u>

Due to uniqueness of complexity, impact, cultural context, etc. of each post disaster situation, it is important to understand the context as emphasized by literature. Though not found from case studies, local context should be understood in terms of geography, society, economics, politics, etc. (Barakat, 2003; Jha et al., 2010; Silva, 2010). In addition, findings suggests that understanding the psychological conditions of victims is also important as beneficiaries are grieving in the context of PDR.

2. Assess impact of the disaster

According to Jha et al. (2010) defining and establishing guidelines to assess impact of disaster is important. Assessing housing conditions in detail, social conditions, infrastructure conditions and loss of lives are vital (Jha et al., 2010; Silva, 2010; Vahanvati & Mulligan, 2017), ideally as an iterative process (Silva, 2010). Housing conditions were assessed and completely destroyed houses were identified. Impact on infrastructure system was assessed to understand how to reach the affected area. Identifying victims was a challenge due to unavailability of accurate demographic data, thus study suggests it is important to maintain updated demographic data of disaster prone areas.

3. Understand the Governance structures, regulatory framework

Although a Governance structure was existed, the absence of a regulatory frameworks for PDR, inconsistencies of available general housing policy were understood by cases studied. Therefore, understanding specific responsible group in governance structure for PDR and the regulatory framework, gaps in national standards, inconsistencies with international law, locally and internationally accepted principles and standards (Barakat, 2003; Silva, 2010) are vital.

4. Set reconstruction policy

Setting reconstruction policy and communicating it effectively is essential as it establishes the expectations of the affected community and provides the framework for intervention by local and international actors (Jha et al., 2010). Due to interest of an individual involved, an attempt to establish basic parameters of a reconstruction policy was evident from findings, and was concluded as a guide to reconstruction. Stakeholder consultation is important for a successful reconstruction policy and Barakat (2003) suggests that government should retain overall responsibility of setting up the reconstruction policy and should designate an agency to set up a reconstruction policy.

5. Assess local needs and capacities

Though not revealed from findings, as suggested by Jha et al. (2010) and Barakat (2003) assessing particular needs of marginalized, vulnerable groups of people and individuals (men, women, elderly, children) in both qualitative and qualitative manner is important to establish an acceptable post disaster housing reconstruction programme. Similarly, an assessment of the locally available human and material resources, construction

capacity is of paramount (Barakat, 2003; Silva, 2010) as more resources are available locally, the fewer has to be imported which eventually reduces costs, contributes to the local economy and result in a reconstruction programme that is culturally and environmentally sensitive, sustainable and acceptable to the local community (Barakat, 2003). Both cases had an insight of the capacity and availability of local construction professionals. But had no understanding on building materials and other support staff needed.

6. <u>Establish the lead coordination, communication agency and the strategy</u>

Effective communication and coordination in post disaster situation is the foundation for acceptance, sustainability, and mutual understanding and strategic communication that builds trust and active participation (Jha et al., 2010). Empirical findings disclosed district secretariat working as lead agencies to develop communication strategy and then conducting fortnightly meetings with all stakeholders, suggest a basic project communication strategy and a stakeholder communication plan. However, it was revealed stakeholders were unclear about the lead coordination, communication agency and the strategy. Government should decide on the lead agency to develop and coordinate the post-disaster communication strategy and assign staff to carry it out. The lead communication agency should plan the communication strategy which include stakeholder communication plan and establish stakeholder communication channels as "silence" promotes rumors that can be exploited. Agreeing and implementing on a feedback mechanism is also important (Jha et al., 2010).

7. <u>Understand funding steams and timescales</u>

Findings being in line with literature revealed that funds were available soon after disaster and potential donors were identified. Satisfying requirements of all parties on how funds are to be spent is a key challenge (Barakat, 2003; Silva, 2010). Findings revealed that the time scale funds can be spent and other requirements of donors such as specific aspect of the program to be funded etc. were understood. Projects were phased out according to availability of funds and agencies continued to look for donors throughout. Due to availability of funds, scopes which were originally excluded such as providing kitchen equipment etc. were also provided later. However, cost of social infrastructure, etc. being not budgeted accurately, GoSL had to spend funds on them in an unplanned manner. Therefore the study suggests that, in order to receive sufficient funds for the entire 'project', it is important to budget the cost of the entire project

inclusive of houses as well as infrastructure and communal buildings; and estimating mere cost of a house is insufficient. Further findings revealed that agencies were unaware of total funds available. As per Silva (2010) it is vital to understand total amount of funds available.

8. <u>Decide whether to relocate or not to relocate</u>

Relocation lead to lost livelihoods, lost sense of community and social capital, cultural alienation, poverty, and people abandon the new sites and return to the location of their original community. Thus, relocation is often not the right solution (Jha et al., 2010). Findings revealed an initiation of a disaster risk management and deciding that relocation is needed as the land victims were living was no longer available after the disaster. As Jha et al. (2010) suggested, community opinion on relocation was obtained and literature further suggests that involving community in decision making processes related to relocation is beneficial. Findings further disclosed a relocation framework of 'house to house policy', to quantify the population subjected to relocation. However, finalizing the population subject to relocation was a challenge due to unavailability of accurate demographic data. Jha et al. (2010) emphasize that relocation is not merely rehousing people, but also about reviving livelihoods and rebuilding the community, the environment and social capital.

9. <u>Identify Beneficiaries</u>

As suggested critical by Barakat (2003), intractable beneficiary identification process was carried out by determining eligibility criteria and identifying beneficiaries in a transparent manner with involvement of the community. 'House to house' policy was in place to select beneficiaries. Government approval was obtained for the final list of beneficiaries and in addition to findings of literature it was identified that Community consent was also obtained for the list of beneficiaries. 'Hidden homeless' which was explained by Barakat, (2003), where people who made their own emergency arrangements and not register with an agency for assistance were not revealed from cases studied. However false claims, where several members of the same family applying for multiple houses were disclosed. Findings revealed that this process was a tough task due to unavailability of accurate demographic data, political, media influence etc. Therefore the study suggest the importance of maintaining accurate data and effective stakeholder management as important.

10. Assess existing Land use and Physical planning

Cases studied being located in non-urban contexts the findings revealed the absence of land use and physical plans thus opportunities to asses them were minimal. Nevertheless, it was releveled that land use planning was assessed wherever it was available yet, evidence of studying them in detail was not found. Barakat (2003) suggests reconstruction after disaster as an opportunity to review land use plan which Jha et al. (2010) further reconfirms and emphasize that it's important to access and decide whether existing land use plan contributed to the disaster and determine how land use should be revised to mitigate future disaster risks.

11. Assess Infrastructure and services delivery

According to Jha et al. (2010) ensuring availability of plans to reconstruct infrastructure and services is vital to plan housing reconstruction. As suggested by literature cases studied assessed the state of infrastructure systems and its capability to restore. Findings revealed it is important to agree on a viable mechanism to provide services, if they are not in a state to restore.

12. Assess cultural heritage

According to Jha et al. (2010) secondary effects from a disaster put cultural property at risk more than the disaster itself and cultural heritage conservation helps a community not only protect economically valuable physical assets, but also preserve its practices, history, and environment, and a sense of continuity and identity. Accordingly, an agency to assess damage to resources of national significant should be appointed and ensure that they are considered in post disaster damage assessment.

13. Land selection and resolve issues of land tenure

Findings revealed that Land selection and resolving issues related to land tenure was broadly consistent with literature. Adequate site selection procedures were followed, however determining the potential to provide sustainable living and livelihood conditions to the relocated population (Jha et al., 2010) was less evident. Beneficiaries were also involved with selecting relocation sites along with other officials and having identified the relocation site, ownership was assessed and acquired. Literature suggested political influence in PDR make project more challenging. However, in

contrary, findings revealed that political influence during land acquisition help the process of land acquisition.

14. Establishing partnerships with other stakeholders

Due to complexity of PDR projects, Silva (2010) believes that a single entity delivering all aspects was improbable. Findings revealed that agencies involved requested financial support as well as human resources from other partners made partnership with stakeholders in government and private organizations. These partnerships helped expedite decision making in land use planning, services delivery etc.

15. Develop Project Charter

Project charter is the keystone of the project (PMI, 2005) and literature findings disclosed that it contained project authority, purpose, key assumptions, constraints, risks, stakeholders, resources and budget, milestones and prediction of benefits. It was identified that cases studied made an attempt to define project authority even though failed to maintain it throughout the project. Therefore it was important to implement a viable mechanism to implement the project authority. Further, cases studied defined the budget of building materials and was successful in maintaining it, however defining the budget of the whole project was important. Literature suggests that in a post disaster context, project charter should consider needs of servicing organizations, community, government and other concerned agencies as well.

16. Develop Preliminary Project Scope Statement

Findings revealed that cases studied were with a basic project scope and evidence of it being detailed enough was not apparent. As a result project boundaries, deliverables etc. changed throughout the project and disclosed no milestones were defined. However primary objective of providing resilient, permanent houses which follow BBB concept for victims, remained unchanged. According to literature, preliminary project scope statement define the characteristics and boundaries of the project and it includes, project objectives, service requirement and characteristics, project boundaries, deliverables, constraints, assumptions, initial project organization, risks, milestones (PMI, 2005).

17. Recognize potentially risky natural hazards

Findings related to recognizing potentially risky natural hazards were in consistent with literature. Post-disaster reconstruction provides an opportunity to reduce vulnerability to future events by improved land-use planning, design practices, building methods and

building regulations (Silva, 2010). Both cases understood what natural hazards are likely to occur and their potential impact on housing.

18. Incorporate Disaster Risk Reduction (DRR) strategies

Considering Disaster Risk Reduction strategies as an integral part of PDR process significantly mitigate the vulnerability to hazards, with no significant cost implications (Silva, 2010). Going in line with literature, findings revealed that housing design and construction adhered to best practice guidelines and international standards related to DRR. Further, Silva (2010) stated that this is an opportunity to influence local building practices and planning processes so that they support safer construction in the long term.

19. Establish quality of reconstruction

Though not revealed from findings Silva (2010) emphasized that it is important to understand 'quality' from the occupant's perspective which could primarily be protection from weather, internal comfort, safety and security, sufficient space, etc. in post disaster context, and in longer term there may be additional considerations such as durability and adaptability. Empirical findings revealed that new and improved guidelines provided by NBRO, helped provide habitable houses with DRR principles. Literature suggests it is important to provide improved building codes as well.

20. Designing of Houses Schools and Communal Buildings

Empirical findings revealed that cases studied decided on a Housing Design and Construction Technology (HDCT) to be used in reconstruction, which contained standards and guidelines for safety, environmental impact and construction technology and ensured that they are fully integrated into the reconstruction policy which was broadly in line with literature. Jha et al. (2010) emphasized, though was not revealed from findings, that it is important to analyze the disaster impact on common HDCTs. Barakat (2003) Discussed that PDR programmes often introduce a prototype model, which is based on the assumption of occupancy by a nuclear family, however in many rural communities, residence in extended families are still the norm and a way forward would be to provide a 'Core house' and leave provision for occupant to modify the house later. In contrary some young married couples would make this an opportunity to break away. Findings of the research was vastly consistent with Barakat (2003)

where core house was designed allowing for design flexibility. In addition to findings of literature, cases studies revealed that community was given the choice of selecting one preferred house design out of 3 core house designs prepared professionally and obtained consent from relevant authorities.

The issue of sanitation and the location of the lavatory are particularly sensitive. Attempts to modernize the way communities live by locating the lavatory inside the house must be resisted, particularly in areas where there is no running water, or where the local culture dictates that toilets are placed far from people's homes (Barakat, 2003). Accordingly design flexibility allowed provision to provide the access to toilets and kitchens form inside or outside according to the preference of occupants. Nevertheless undisclosed from findings Barakat (2003) further emphasized that the house has an important economic function, or a key role in livelihoods. In rural areas, it require accommodation for livestock and storage space for food and equipment. In urban areas, space may be needed for a small workshop or for storing goods to be sold in markets. Another dimension that needs to be considered is the size of the plot, and whether recipients of the new housing will be able to extend and adapt it. Finding revealed, that not adhering to such, affected the livelihood of occupants.

Accommodating economic, social and religious needs are important for social wellbeing of occupants (Barakat, 2003) therefore it is essential to have fit for purpose designed and constructed schools, health centers, religious buildings, etc. (Silva, 2010). Findings revealed that a community building was designed and constructed, and the absence of a religious building was highlighted.

21. Cost Estimating

Findings revealed that cost of materials and labour were identified for an individual house. Cost of infrastructure and the entire project, Cost of travel was not identified. Cost Estimating should consider the duration of each scheduled activity, resources necessary and high-level estimate at project chartered and achieve the balance between the charter and schedule. Cost estimate get refined throughout the project as the situation changes (PMI, 2005).

22. Cost Budgeting

Using the cost estimate and assigning costs for each milestone of the project is cost budgeting and it provides the resultant budget. It provides the ability to monitor the cost

against each milestone (PMI, 2005). Empirical findings revealed that cases studied did not perform a cost budgeting and they executed a cost estimate for an individual house only, thus budget of the whole project was not identified.

23. <u>Decide on Reconstruction Approach</u>

Cash approach, owner driven, community driven, agency driven – in situ, agency driven – relocation are five distinct reconstruction approaches (Jha et al., 2010). Findings reveled determination of the reconstruction approach for each cases studied and hence the aim of the study was to explore a project management framework for donor driven PDR projects. Findings were focused on agency driven –relocation approach. However combinations of approaches were also identified from the field. The most appropriate method of implementation is dependent on the skills and capacity of the affected population, local material availability, the complexity of the housing design and type of construction, the timescale for reconstruction and the availability of funding (Silva, 2010) and adopting a combinations of approaches, to a single programme yield a wider range of benefits, recognizes diversity among the potential recipients of aid, helps to maintain community diversity, and distributes investment to reduce future vulnerabilities (Barakat, 2003; Jha et al., 2010; Silva, 2010). Empirical findings disclosed deciding on level of assistance was limited to construction of the core house, and agreed on benchmarks for all approaches. Nevertheless, decisions made on level of assistance changed throughout the project due to availability of donors and the interest officials had to build back better. Household items were also provided despite the unavailability of drinking water.

24. <u>Institutional options for reconstruction management</u>

Existence of an appropriate organizational structure to manage reconstruction, prior disaster strike, is the path for smooth early recovery. If such plan is not in place government should advice to design a structure to establish an effective system of coordination among governmental and nongovernmental entities (Jha et al., 2010). Findings revealed the absence of institutional options for reconstruction management thus an unavailability of a single entity to manage the project. However it was found that an outline of the institutional mechanism was designed soon after the disaster, which was equipped with a structure, mandate, a policy and a plan. Further, Jha et al. (2010) suggests that agencies involved in reconstruction can strengthen the central and

local government who were weakened by disaster strike, to adequately manage reconstruction and setting up a reliable monitoring and evaluation procedures can guarantee accountability and transparency, which were not found from the cases studied.

25. Scope Planning

It was identified that both cases did not planned the scope of the project thus had no scope management plan. According to PMI (2005) the scope management plan provides the foundation for execution of the project. It contain change management plan, reporting processes, communication plan, logistics plan, demobilization plan and other plans required by implementing agency, thus should be prepared referring the preliminary project scope statement. Though findings revealed an existence of a reporting process during the construction, a detailed scope management plan was not available.

26. Time Schedule Development

Empirical findings revealed cases studied had an overall time frame to finish construction, which was not based on milestones. PMI (2005) emphasized that a milestone based schedule is important for PDR due to unique aspects of such projects and it should be closely linked and aligned with cost estimating. It is essential to identify all milestones and associated tasks, assign a date to each task and a subsequent completion date for each milestone and arrive at a time schedule for the overall project. Milestone dates should not be changed except as outlined in change management plan.

27. Planning Fund distribution

A good reconstruction financing effort is one that is efficient, transparent, and firmly directed toward realizing the physical results envisioned in the reconstruction policy (Jha et al., 2010). Studied donor driven projects did not require funds for construction labour and for other consultants as they were government servants assigned by the government and were on their standard monthly wages. Funds required were provided by government and other donors. District Secretariat was the designated agency to manage and monitor reconstruction financing and they distributed funds on government funded projects and donor's themselves provided funds on installments for houses funded by private donors. A reconstruction finance strategy was available for civil work of houses thus such was not found for services, infrastructure and social community buildings of the resettlement. Developing a viable reconstruction finance strategy and

presenting it to donors, a system for tracking reconstruction finance at the national and project levels, and work with agencies involved in reconstruction is important (Jha et al., 2010).

28. Resource Planning

Findings revealed identification of human resource need and an availability of a basic staffing management plan where technical staff that was in short was decided to share. According to PMI (2005) staffing management plan specifies the project roles, responsibilities, reporting relationship and how the project will be staffed.

29. Risk Management Planning

Empirical findings did not disclose a risk management plan executed by cases studied. PMI (2005) emphasize that the Risk management plan minimize threats to the project, take advantage of opportunities and keep the project team safe. Identifying risks to the project and developing a contingency plan to mitigate the risk to the project cost and schedule is vital.

30. Plan Procurement and Acquisitions

It was revealed that both cases studied did not planned procurement and acquisition. Jha et al. (2010) stated developing a procurement strategy that provides overall value during the entire life is a key consideration. Barakat (2003) emphasized, engaging qualified and dedicated procurement experts to manage resource procurement and assess resource requirements based on sufficient quality, availability, supply point and time of resource need are important. Further Jha et al., (2010) and Silva (2010) mentioned that mapping resource markets and making provision for price variations due to seasonal variations and changing market conditions are facts to consider in planning procurement and acquisition. PMI (2005) Highlighted that it's important to identify sellers, identify distribution channels and alternative routes and establishing a methods to expedite communication and approval process are important in planning procurement and acquisition.

31. Stakeholder Management Planning

Empirical data revealed that both Case A and B did not decided on a plan to manage stakeholders despite efforts made during assessing stage to make partnerships with stakeholders. Therefore they had no stakeholder management plan. Planning to manage communication to satisfy and resolve stakeholders and their issues with open and

honest communication makes PDR projects successful (PMI, 2005). Jha et al. (2010) elaborated that post disaster context comprised many stakeholders primarily victims, agencies involved in reconstruction, government and nongovernment agencies, community, businesses, line departments not directly involved in reconstruction, and those who can contribute to reconstruction who unlikely would be homogeneous. It's important to carry out a stakeholder mapping and negotiate the interests among stakeholders as a key function of planning.

32. <u>Physical planning</u>

Planning land allocations, road layout, plot layout, panning for physical infrastructure and services, and planning for public infrastructure and social infrastructure were disclosed from findings. After a disaster, the planning should focus primarily on land for housing and infrastructure reconstruction and Jha et al. (2010) suggests that mixed use planning, where allowing residents to carry out commercial activities from the same housing plot affects the quality of life as home-based businesses are the life blood of low-income communities, nonetheless findings did not revealed such planning. Further Jha et al. (2010) highlighted the importance of planning for emergency access including escape and evacuation routes, which was not apparent from findings. However a community center which serves as an evacuation center was planned and constructed.

33. <u>Environmental Planning</u>

Findings revealed evaluation of ecological footprint, providing environmental guidance to institutions active in reconstruction to develop mitigation measures to prevent soil erosion, etc. were essential. However, Findings did not revealed a legal framework for environmental plan and debris management plan. Jha et al. (2010) suggests that a legal framework ensures the successful implementation of environmental planning and disaster debris is a valuable resource that should be reused during reconstruction whenever possible.

34. <u>Cultural heritage conservation planning</u>

An attempt to plan cultural heritage conservation was not found from cases studied. According to Jha et al. (2010) secondary effects from a disaster put cultural property in a greater risk more than the disaster itself. Therefore, it is important to identify cultural resources that require conservation during recovery and reconstruction.

35. Infrastructure and services delivery

Findings reveled that cases studied decided how to ensure interim and permanent infrastructure to reconstruction sites however a detailed planning was not done. Jha et al. (2010) suggests the necessity of publicizing the infrastructure standards which includes the concept of Build Back Better, and estimating the cost of it as important.

36. Quality planning

Findings revealed planning for training workshops for supervisory and management personal on quality management, providing adequate quality management plan and planning to test materials quality by testing samples were established to quality plan. Bilau et al. (2017) suggests that providing provision of capacity development workshops for management personnel also helps quality controlling and emphasized planning for such in advance is important.

37. Planning for monitoring and control

Dedicated management agency and their area of authority was attempted to identify in cases studied, however it was found that area of authority changed during the execution of the project. Mannakkara (2014) suggested that having a multi-tiered institutional arrangement is beneficial to monitor and control PDR projects and Oxfam (2008) highlighted the importance of having local monitoring and controlling units at all organizational and geographical levels.

38. Community Organizing and Participation

Findings revealed that cases did not systematically analyze the community's capacity and preferences for participation yet key stake holders of the project were aware of capacity and preference of the community for participation of construction and agreed with the community on the activities and outcomes they deliver. The research being focused on donor driven PDR projects, it was identified community organization and participation was minimal yet, noteworthy. Though no room for community participation was provided by the reconstruction strategy adopted, findings revealed that the community was interested in providing their feedback during the construction process. According to Jha et al. (2010) community participation is an integral part of a good reconstruction strategy it helps people to rebuild their houses, lives and livelihoods. It further emphasized the important of defining the role of communities in

planning and managing reconstruction, deciding with communities on how to monitor and evaluate the involvement of the community in reconstruction and importance of supporting and empowering communities to play the roles they have agreed to take on.

39. International, National and Local partnership in reconstruction

Even though findings revealed international, national and local partnership at the assessing stage, such partnership was not established for reconstruction. No single organization or category of organization can provide the institutional, human, technical, and financial resources needed to carry out a successful post-disaster reconstruction program thus partnerships between government and international, national, and local organizations are essential for successful reconstruction (Jha et al., 2010; Silva, 2010). It is vital to decide on the lead agency or individual to work with Non-Governmental Organizations (NGOs) to agree on the involvement of the UN in the disaster response, agree with partners on the parameters for NGOs and Civil Society Organizations involvement in response and reconstruction, decide on the system and the benchmarks to be used for monitoring the participation of partners in reconstruction, at the national and community levels.

40. Mobilizing financial resources and other reconstruction assistance.

Studied cases being donor driven, there was no necessity to design and activate a delivery system of cash for beneficiaries, empirical findings revealed that funds were distributed to assigned agencies and suppliers to purchase materials. Jha et al. (2010) highlights the importance of providing cash for production chains and material market and the distribution of construction materials based on a careful analysis of bottlenecks in materials markets.

41. Direct and manage project execution

As suggested by literature, Phasing out and planning the execution, setting out buildings on allocated plots, and constructing model houses were disclosed from findings. Model houses help families make their choices (Jha et al., 2010) on what house best suite their needs.

42. Acquire project team

Empirical findings reveled adequately mobilized construction workers. Jha et al. (2010) emphasized importance of recruiting and mobilizing local artisans, construction workers volunteers and beneficiaries and believes that when local artisans understand a construction problem they can often formulate an appropriate solutions. While

importing skilled workers is beneficial it is vital to engage construction industry actors such as local small scale builders, who could be trained and provide long term livelihood opportunities.

43. <u>Develop and train project team for reconstruction</u>

Developing and training a project team is necessary to develop skills, competencies and capabilities of the team and enhance project performance (PMI, 2005) and ensure quality and disaster resilience of PDR projects (Jha et al., 2010). Findings disclosed planning to carryout training programs for surveyors, relief officers, machine operators, technical officer, labourers and beneficiaries. However cases studied managed to carry out training programs for technical officers and beneficiaries only. Jha et al. (2010) emphasize it is important to decide how reconstruction training will be managed within the context of the housing and community reconstruction strategy and ensure that adequate staff and resources are available for the lead training agency. Further designing the training programme based on housing damage assessment in the disaster and recruited the core team, the trainers, and the field teams based on the requirement whilst obtaining expertise support from civil society organizations, building trades and academic institutions is also important. While Jha et al. (2010) highlights the importance of agreeing on standards and procedures for monitoring and evaluation of training activities PMI (2005) believes that major output of the team development is the staff performance assessment which measure the effectiveness of the team. PMI (2005) further highlights the importance of developing skills on general management, technical skills and ground rules which establish clear expectations of acceptable behavior in PDR context.

44. <u>Information Distribution</u>

Findings reveled effective distribution of information required for constriction by means of drawings, schedules, specifications, onsite meetings etc. reliable, accurate and timely information at all levels (Jha et al., 2010) is vital to keep the project informed on tasks to be accomplished (PMI, 2005).

45. <u>Request Sellers Response and select seller.</u>

As suggested by PMI (2005) findings disclosed cases studied requesting to respond for materials etc. and a consistent process that all prospective sellers could follow as in place when responding to request of proposals and a consistent process to select sellers and letters of agreements were established. However it was revealed that the distance

to the base location of seller was not considered hence faced delays during project execution. PMI (2005) highlights prioritizing the needs of the projects is of paramount importance, when setting seller selection evaluation criteria.

46. <u>Implement monitoring and controlling</u>

IT based monitoring and controlling system and a communication mechanism was evident from findings. Good monitoring and evaluation improve project outcomes and contribute to international understanding of what "works" in reconstruction (Jha et al., 2010). PMI (2005) suggests that it's important to monitor and control daily, weekly and monthly activities as well as changes that occur during the project. In order to implement successful implementation of monitoring and controlling it is vital to deploy trained, experienced and professional staff (Jha et al., 2010; Oxfam, 2008), monitor and control the project team (PMI, 2005) involve beneficiaries and the community for the process and set up local monitoring groups at community level (Jha et al., 2010; Silva, 2010). Further it is also important to manage stakeholders and monitor and control risks including corruption and risk associated with shortage of resources (Jha et al., 2010; PMI, 2005).

47. <u>Close the project</u>

Shared understanding is important between the agency and community as to the point the handover will occur (PMI, 2013; Silva, 2010). Accordingly, cases studied implemented the exit strategy and hand over houses. In addition to houses it is important to hand over communal buildings, other activities and functions also to correct agencies (PMI, 2005). Both internal and external activities that implementing agency had within the organization and with outside parties such as NBRO, etc. were closed.

48. <u>Implement demobilization</u>

As suggested by literature, both human resources, equipment, non-consumable goods, etc. were demobilized. PMI (2005) suggests that it's important to ensure safety at the demobilization process.

49. <u>Handing over to beneficiaries</u>

At the end of PDR cases studied handed over houses to their future owners and end-users. Thereafter ownership and responsibility for the building get transferred to beneficiaries and study suggests that beneficiaries expected the legal ownership by a

deed. Thus it is important to provide a legal deed to certify the ownership of the house. In addition Silva (2010) suggested it is important to facilitate the transition by agreeing a finite period during which the agency remain responsible for addressing defects.

50. Closeout reports with lessons learned

Even though empirical findings disclosed that cases studied did not acted on closeout reports and lessons learned, PMI (2005) and Silva (2010) elaborates that its vital to collect knowledge acquired during the project, prepare close-out report with lessons learned and provide feedback report to donors.

51. Contract closure

Broadly being in line with literature, cases studied closed contracts that are applicable to internal support and closed contracts that were established with outside parties. According to PMI (2005), this process verifies that all the work and deliverables are acceptable.

52. Post occupancy evaluation

Post occupancy evaluation is best carried out some months after handover in order to give adequate time for families to settle in and establish themselves (Silva, 2010). Even though implementing agency did not cay out post occupancy evaluations, other organizations involved with cases carried out post occupancy evaluations. Further, Silva (2010) elaborates on carrying out an evaluation few years or decades after occupation, to identify whether the reconstruction was succeeded in acting as a catalyst for recovery.

5.5 Project Management Methodology for PDR projects in Sri Lanka

Nature of the PLC is the underlying structural rationale for project management (Adams & Brandt, 1988; Cleland & Ireland , 2002; Kerzner, 2017; PMI, 2013). Six staged PLC identified for PDR projects in Sri Lanka, explained in section 5.2 was unique and stages of it moved from one to the other sequentially in both linear manner and cyclic repetitive manner. At the beginning of the PLC, PDR project moved from Stage 1-2 and Stage 2-3 in a linear sequential manner. Similarly, at the end of the PLC of PDR project, it moved from Stage 5-6 as well in a linear sequential manner. It was broadly

in line with heavy-weighted traditional project management approach explained in section 2.5.2.1.

Middle of the PDR project studied moved from Stages 3-4-5 in a cyclic repetitive manner thus, each cycle was iterative and incremental. At the end of each cycle one Mini Project within the PDR project got completed and that Mini Project was handed over to beneficiaries. This finding was broadly in line with delivering a valuable piece of the final product to the end user, early in the development of lifecycle than handing in a finished product towards the end of the contract. It was in consistent with one of the core values of light-weighted agile project management approach, 'working products' (Highsmith, 2004; Highsmith & Cockburn, 2001; Kerzner, 2017; Misra et al., 2012). Thereby, beneficiaries as well as other stakeholders involved such as politicians, mass media etc. received a feeling of satisfaction early in the development lifecycle of PDR project.

Beneficiaries occupied in the Mini Project provided their feedback about the portion of the house they were living in. It was in consistent with the core value 'customer collaboration' of light-weighted agile project management approach (Castillo, 2016; Highsmith, 2004; Highsmith & Cockburn, 2001; Misra et al., 2012; Pries & Quigley, 2011).

Thereafter, feedbacks received from beneficiaries were considered to improve proceeding phases of the project. It was broadly in line with the core value 'responding to change' of light-weighted agile project management approach (Highsmith, 2004; Highsmith & Cockburn, 2001). After completion of one Mini Project, project moved to the next Mini Project and the same cyclic relationship got repeated in an incremental manner. This was in line with literature findings, where final project scope of PDR was dynamically built as suggested by Highsmith (2004) and Špundak (2014). Therefore, the study suggests that the middle of PDR projects studied were broadly in line with light-weighted agile project management approach discussed in section 2.5.2.2.

Accordingly, it can be mentioned that linear sequential beginning and end of the PDR projects can be better managed with a heavy-weighted traditional project management approach and the cyclic repetitive incremental middle of the PDR project can be better managed with a light-weighted agile management approach. **Thus, the study suggests the project management approach for PDR projects in Sri Lanka is a mixed**

project management approach which is a combination of heavy-weighted traditional approach and light-weighted agile approach. This can be called a mixed Tradi-Agile project management approach.

5.6   Proposed Framework to Manage PDR Projects

PDR project management was often a failure in the past (Hidayat & Egbu, 2010; Karunasena & Rameezdeen, 2010; Kennedy et al., 2008; Koria, 2009). Therefore, identify a framework to better manage PDR projects is beneficial to professionals in construction industry. This framework to successfully manage PDR projects in Sri Lanka was developed based on the findings of this study.

The aim of the study was to explore a specific process to successfully manage PDR projects in Sri Lanka by identifying Project Life Cycle of PDR projects and its stages, exploring Managerial Processes of PDR projects and their relationship to stages of PLC of PDR, Key Considerations of each MP and finally, to arrive at a suitable project management framework to manage PDR projects in Sri Lanka. Findings of literature revealed that PDR projects were different to generic construction projects due to the chaotic context they operate (Amaratunga & Haigh, 2011; Bilau et al, 2018; Kulatunga, 2011; Olshansky et al., 2012), high level of stress generated by political influence, mass media, etc. (Norling, 2013; Olshansky et al., 2012), post disaster rumors generated by local community organizations (Olshansky et al., 2012), asymmetry of supply and demand of resources (Olshansky et al., 2012) and the resultant increased demand and shortage of resources (Amaratunga & Haigh, 2011; Le Masurier et al., 2006; Olshansky et al., 2012).

During the comprehensive literature study that was carried out, key project management methodologies, PLC and stages of it, 49 number of MPs and 210 number of KCs were identified. Empirical findings of the two cases screened and identified were analyzed via content analysis, theme identification, cognitive mapping and cross case analysis.

For successful project completion it is vital to identify stages of PLC due to the distinctive nature of PDR projects (Adams & Brandt, 1988; Baroudi & Rapp, 2012; Cleland & Ireland, 2002; Vahanvati & Mulligan, 2017). According to Cleland and Ireland (2002), constantly changing picture of the PLC is the underlying structural

rationale for project management thus, understanding the PLC is the key to better manage projects (Adams & Brandt, 1988; Cleland & Ireland, 2002; Kerzner, 2017; PMI, 2013). Six staged PLC was discussed in Section 5.2, which was a unique PLC for PDR projects in Sri Lanka.

Stages of PLC is the key work elements around which the project is managed and involves different management considerations (Adams & Brandt, 1988). Therefore it is important to identify MPs involved in each stage of PLC (Cleland & Ireland, 2002). Accordingly, 52 number of MPs that were common and unique to PDR projects were identified and discussed in section 5.3. Thereafter, 183 number of KCs were identified and KCs of each managerial process were discussed in section 5.4. It was further discussed that the six staged PLC of PDR projects in Sri Lanka was unique and can be better managed with a mixed project management approach which can be called a mixed Tradi-Agile project management approach. Refer section 5.5.

Finally, a project management framework was achieved to manage PDR projects in Sri Lanka by identifying PLC of PDR projects and MPs of PDR projects involved in each stage of the PLC. The arrived project management framework contain two levels. Refer figure 5-2 for Level – 1 of the framework and refer figure 5-3 for Level – 2 of the framework.
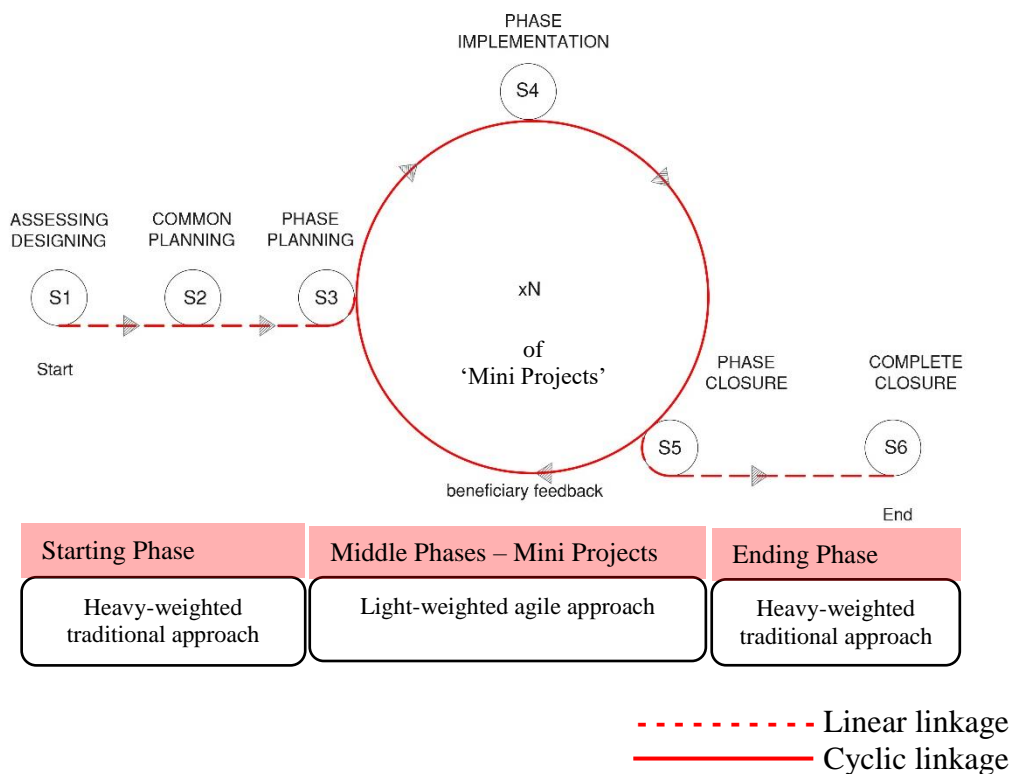
Figure 5-2: Framework to successfully manage PDR projects in Sri Lanka – Level 1

Framework to manage PDR projects in Sri Lanka- Level 1 as illustrated in figure 5-2 portrays that the PDR projects in Sri Lanka contains six distinct stages and they are 1) assessing and designing, 2) common planning, 3) phase planning, 4) phase implementation, 5) phase closure and 6) complete closure. Stages 1 and 2 of PLC of PDR projects are related to the entire PDR project and Stages 3, 4 and 5 are relate to a particular phase of the project only. These particular phases function as 'Mini Projects' within the project. By the end of Stage 5 one Mini Project get completed. These Stages 3, 4 and 5 get repeated till all Mini Projects within the projects are completed. Finally, Stage 6 of PLC is again related to the entire project and the PDR project get concluded.

Each Mini Project within the PDR project produce a portion of the house that people could occupy and proceeding Mini Projects that are incremental get culminated with the completed house. After end of every Mini Project the beneficiaries start to live in the portion of the house that get completed by the Mini Project and they give their feedback on the portion of the house that they occupy. Given feedback get considered to improve proceeding Mini Projects.

Furthermore, PDR projects move from Stage 1 to 2 and 2 to 3 in a linear sequential manner. However, they move from Stages 3 to 4 to 5 in a cyclic manner and those cycles get repeated till the end of all Mini Projects. It must be noted that each repetitive cycle is incremental. Finally, project moves from Stage 5 to 6 too in a linear sequential manner. Therefore, at the beginning and end of the project, stages of PLC move from one stage to the other in a linear sequential manner; and stages of PLC in the middle of the project move from one stage to the other in a cyclic, repetitive and incremental manner.

Linear sequential relationship between PLC stages of PDR projects at the beginning and end of the project suggests a heavy-weighted traditional project management approach and the cyclic, repetitive, incremental relationship between PLC stages of PDR projects in the middle of the project suggests a light-weighted agile project management approach. Therefore in order to manage PDR projects successfully in Sri Lanka a mixed project management approach that can be called the mixed Tradi-Agile Project Management approach is appropriate.

Framework to successfully manage of PDR project in Sri Lanka-Level 2 as illustrated in figure 5-3 portrays fifty two Managerial Processes.
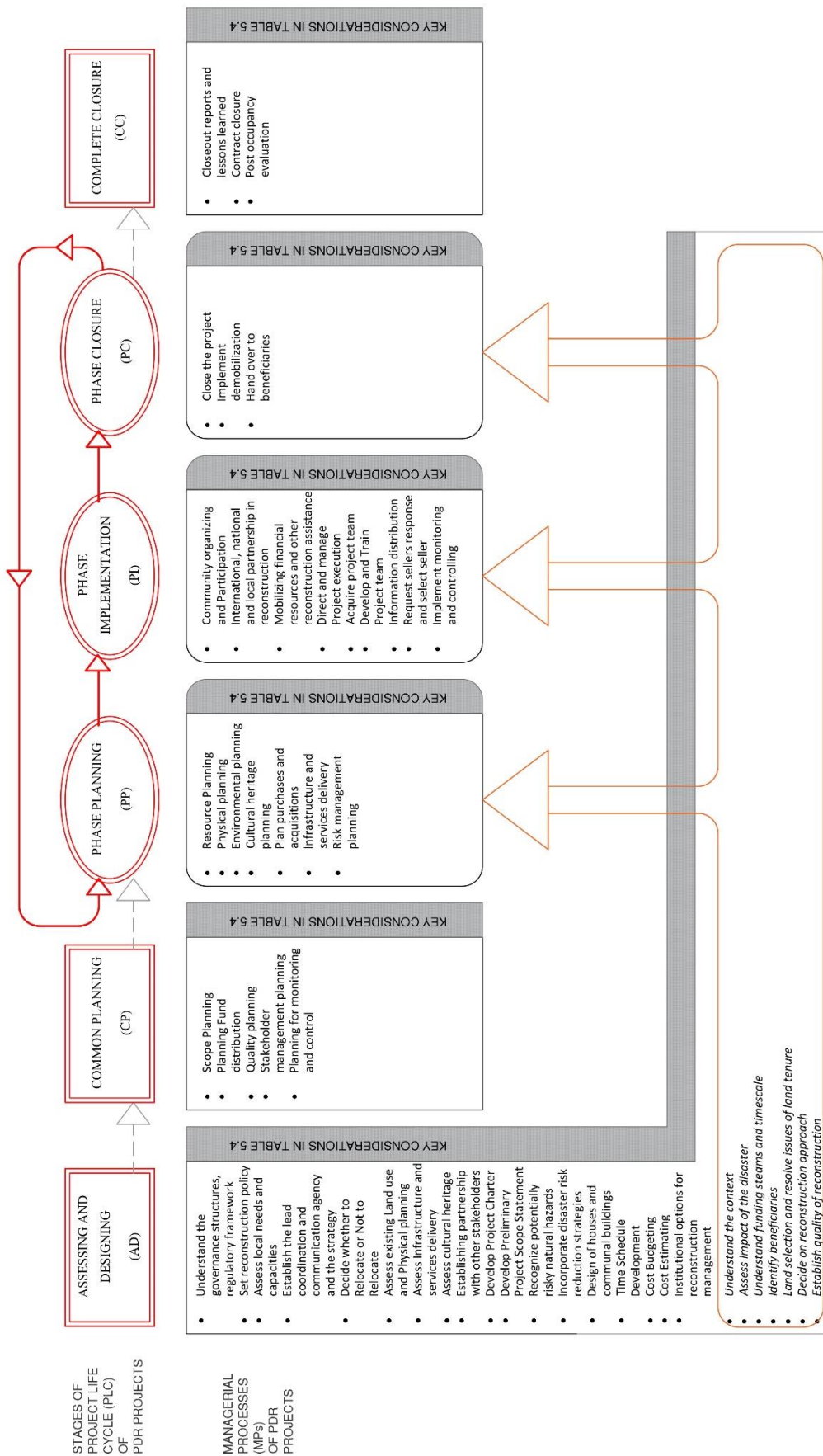
Figure 5-3: Framework to successfully manage PDR projects in Sri Lanka – Level 2

142

Identified Managerial Processes should be carried out during the six staged PLC of PDR projects. They were discussed in detail in section 5.3. During Stage 1 there are twenty five number of managerial process related to Assessing and Designing that should get carried out. Seven MPs out of them continue throughout the entire PDR project to provide most updated information to each Mini Project within the PDR project. Therefore, PDR projects move from Stage 1 to 2, prior to the completion of Stage 1. Thereafter, During Stage 2, five MPs related to Common Planning get carried out. In addition, during Stages 3, 4 and 5 also seven, nine and three MPs get carried out and they are respectively related to stages Phase Planning, Phase Implementation and Phase Closure. Finally, during Stage 6, another three MPs get carried which are related to Complete Closure of the entire PDR project. In addition, to successfully manage PDR projects in Sri Lanka it is important to take into account all Key Considerations explained in section 5.4 and summarized in table 5-3.

Therefore, the framework to manage PDR projects successfully in Sri Lanka is comprised of a unique six staged PLC where a comprehensive set of Managerial Processes had to be carried out during each stage of PLC, while addressing Key considerations of each Managerial Process.

6 CHAPTER 6 – CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

Key findings of this study are summarized under this chapter in order to establish conclusions and recommendations. The conclusion describes how each research objectives were accomplished and findings that were made. The recommendations proposes necessary managerial practices to be followed in order to manage PDR projects successfully in Sri Lanka. Finally, new research directions emerging from this study were identified and described.

6.2 Overview of the Research

Rising number of natural disasters are experienced wide across the world over the years (UNDRR, 2015) and Sri Lanka experienced deadly natural disasters in the past (DMC, 2017). PDR projects carried out so far in Sri Lanka were poorly responsive due to poor management (Koria, 2009). Therefore this research aim was to explore a specific process to successfully manage PDR projects in Sri Lanka. To achieve the aforementioned aim a literature review was carried out to review the need of PDR implementation methods and associated challenges. Further the literature review was extended to review the concept of project management, project management methodologies and their applicability to PDR context. Thereafter an extensive literature review was carried out to identify Projects Life Cycle of PDR projects, Managerial Processes of PDR projects and Key Considerations of each Managerial Process. Then the applicability of these to Sri Lankan PDR context was investigated through case studies. Two cases of PDR projects in Sri Lankan context were selected and collected data via semi-structured interviews and document review. Thereafter collected data was analyzed with use of content analysis, cognitive mapping and cross case analysis.

6.3 Conclusion

The conclusions reached under each of the objectives mentioned in section 1.3 are explained below.

Objective 1(a) - To review the need for PDR implementation methods and associated challenges.

Literature review identified, that there are multiple implementation methods of PDR projects as summarized in table 2-1,. They are: cash approach, owner driven approach (self-build), community driven approach (community-build), agency driven approach in-Situ, agency-driven reconstruction in relocated site (contractor – build). Sri Lanka is following two different implementation methods and they are: owner–driven approach and donor-driven approach. Donor-driven approach is widely used. Further, challenges of PDR projects are vast and they are summarized in table 2-2. Poor coordination, lack of community participation, lack of resources and poor management of resources, poor capacity to coordinate among institutes were some key challenges identified.

Objective 1(b) - To review the concept of project management, project management methodologies and their applicability to PDR context.

It was identified that managing PDR projects in post disaster context require high level of management capacity and generic one size fit approach is not capable of managing PDR projects and explained in section 2.5.1. Literature review further identified that there are many types of project management methodologies and can be broadly classified as heavy-weighted traditional methodologies, light-weighted agile project management methodologies and mixed project management methodology. They are explained under sections 2.5.2.1 and 2.5.2.2 and compared on table 2-4. Need of a context specific and an agile project management approach to manage PDR project emerged from literature review and discussed under 2.5.3 and summarized in table 2-5.

Objective 2- To identify Project Life Cycle of PDR projects in Sri Lanka

Project Life Cycle is important to understand project management and generic PLC contains commonly identifiable stages. PLCs identified by literature and their stages are summarized in table 2.3. Findings revealed that PDR projects in Sri Lanka were carried out in phases and these phases can be identified as Mini Projects within the entire PDR project. During the start of the project it focused on assessing and designing buildings of the entire project followed by schematic planning of the entire project. Thereafter PDR projects move into mini projects and focus on planning, implementation and closure of Mini Projects only. At the end it closes the entire project.

145

Accordingly, the study disclosed six identifiable stages of PDR projects and they are illustrated in figure 5-1. Accordingly six stages of PLC of PDR in Sri Lanka were identified as: 1) assessing and designing, 2) common planning, 3) phase planning, 4) phase implementation, 5) phase closure) and 6) complete closure. Stages 1 and 6 of PLC of PDR projects were related to the entire PDR project and Stages 3, 4, 5 were related exclusively for the mini-project in implication only. Thereby, stages 3, 4 and 5 get repeated till the end of all Mini Projects.

Stages of PLC moved from one stage to the other both linear sequential and cyclic repetitive manner. The linkage between Stages 1-2 and 2-3 were linear and sequential, while the linkage between Stages 3-4-5 were cyclic and repetitive. Each cycle concluded a Mini Project and each repetition was incremental.

Objective 3- To investigate Managerial Processes and their relationship to stages of Project Life Cycle of PDR projects in Sri Lanka.

Literature review disclosed 49 Managerial Processes which were related to four distinctive PLC stages of PDR projects and were summarized in table 2-4. However according to findings of the research it can be concluded that there were 52 managerial processes that contributed to the six staged PLC of PDR projects in Sri Lanka and they were summarized in table 5-3. During Stage 1 comprehensive collection of MPs got carried out and they were related to assessing and designing of the entire PDR project. Some of the MPs that got started during this stage continued to proceed throughout the project and they provided most updated assessment information to all mini-projects within the project.

Objective 4- To investigate Key Considerations of Managerial Processes of PDR projects in Sri Lanka

In order to manage PDR projects successfully it is important to ensure that Key Considerations of each Managerial Process were addressed. Literature review carried out revealed 210 number of KCs and they were summarized in table 2-4. Findings of the study revealed that many KCs were not given the due recognition during the execution of PDR projects in Sri Lanka and summery of that can be found in table 4-4. Finally, the study derived a comprehensive array of KCs which is necessary to be carried out to manage PDR projects successfully and their relationship to each Managerial Process and stages of PLC are summarized in table 5-4.

146

Objective 5- To synthesis a framework to successfully manage PDR projects in Sri Lanka.

PDR projects in Sri Lanka reflect both traditional heavy-weighted project management approach and agile light-weighted project management approach. Therefore, it can be concluded that mix Tradi-Agile project management is the most appropriate approach to manage PDR projects in Sri Lanka. The study got concluded with the synthesis of a two level framework to manage PDR projects in Sri Lanka and it was illustrated in figure 5-2 and 5-3.

6.4   Recommendations

Having identified the distinct nature of the PDR context, a unique PLC and specific Managerial Processes for PDR projects and their Key Considerations, there are many recommendations that the study suggests. They can be specifically identified for Policy Makers, Project managers and other Professional Consultants involved.

Recommendations for Policy Makers

In order to successfully manage PDR projects it is important to have a reconstruction Policy. Therefore, policy makers should appoint an agency responsible to set the reconstruction policy.

It is important to make community members an integral part of reconstruction policy making as well as making a part of the entire PDR project.

Note, that it is impossible for one organization to provide all needs of PDR projects, thus institutional options strategic communication and coordination among them is important.

The PDR context is with added challenges such as pressure generated by political, media influence and post disaster rumors. Therefore it is important to make effective stakeholder management an important part of reconstruction policy.

Recommendations for Project Managers

It should be understood that PDR projects are complex and often do not get initiated with clearly defined goals. Therefore the ability to accept agility and embracing a mixed project management approach is beneficial.

Accordingly, in order to manage PDR projects successfully, project managers should deviate from rigid sequential way of management and move towards a combination of traditional and agile project management where voice of beneficiaries were welcomed

PDR projects could be Phased Out where necessary to ensure that beneficiaries receive a usable potion of the house early in the development without waiting till the completion of the entire project. It can be used to address the additional pressure that politicians, mass media, etc. generate demanding permanent houses as early as possible.

Ensure to make measures to obtain feedback from beneficiaries after they occupy in the completed mini project and consider the obtained feedback to improve proceeding mini project. Thereby, beneficiaries build a trustworthiness with consultants and managers.

Managerial Process of PDR should be executed at the right stage of Project Life Cycle of PDR projects and experts involved in PDR should make careful attention to address all Key Considerations of managerial process to successfully manage PDR projects in Sri Lanka.

It should be understood that assessing the impact of the disaster is a continuing task that happen throughout the project. Therefore, the project should move to proceeding stages without waiting till the completion of assessing.

Recommendations for other Professionals and Consultants.

Understanding the context during the assessing of impact of the disaster is important.

Designing of buildings could be done at the beginning of the project keeping provisions for customizations and expansions.

Consultant involved should ensure that reconstruction incorporates Disaster Risk Reduction strategies and further, influence the legislatives to incorporate them in to common Housing Design and Construction Technology as well.

It should be given importance that community involvement for land selection, designing and construction provide them a sense of belongingness to the new house they are going to get moved into after a devastating disaster.

6.5   Future Research Directions

This research focused on donor driven PDR projects only and further research can extend into PDR projects that implement other implementation methods such as owner driven, etc.

The project management framework presented in this study is not validated by the construction industry thus this opens up an avenue to carry out further research to validate the framework presented by this.

Having found unique project lifecycle for PDR projects by this research, it opens up a new research avenue to explore PLC and management approach suitable for disaster resilient housing construction projects that is getting carried out extensively worldwide.

The emerged mixed project management approach for management of PDR projects was researched less related to PDR and therefore, further research can be carried out to explore and strengthen its applicability.

REFERENCES

Adams, J. R., & Brandt, S. E. (1988). Behavioral Implications of the Project Life Cycle. In D. I. Cleland, & W. R. King (Eds.), *Project Management Handbook (2nd ed.)* (pp. 206-230). New York: John Wiley & Sons, Inc.

Ahmed, I. (2011). An overview of post-disaster permanent housing reconstruction in developing countries. *International Journal of Disaster Resilience in the Built Environment, 2(2)*, 148 - 164.

Alexander, D. (2002). *Principles of Emergency Planning and Management.* Edinburgh, UK: Terra Publishing, Dunedin Academic Press Ltd.

Alsaadi, O., & Acar, E. (2016). Using Construction Project Management Know how for Disaster Recovery Projects - A Synthesis of Literature. *Architecture in Emergency - Rethinking the Refugee Crisis.* Istanbul: Istanbul Kültür University and Bergen School of Architecture.

Alsaadi, O., & Acar, E. (2018). Challenges of post-disaster reconstruction projects: An empirical investigation according to project management knowledge areas. *Risk and Resilience in Practice: Vulnerabilities, Displaced People, Local Communities.* Lisbon: 8th International Conference on Building Resilience.

Amaratunga, D., & Haigh, R. (2011). *Post-disaster reconstruction of the built environment: rebuilding for resilience.* West Sussex, UK: Wiley-Blackwell: JohnWiley & Sons Ltd.

Amaratunga, D., Haigh, R., Kermainiyage, K., & Malalgoda, C. (2017, May 15). *Mainstreaming disaster resilience in the construction process:Professional education for a resilient built environment. A report of the CADRE project: Collaborative Action towards Disaster Resilience Education.* Retrieved from www.hud.ac.uk: www.disaster-resilience.net/cadre

Andrew, S. A., Arlikatti, S., Long, L. C., & Kendra, J. M. (2013). The effect of housing assistance arrangements on household recovery: an empirical test of donor-assisted and owner-driven approaches. *Journal of Housing and the Built Environment, 28(1)*, 17–34.

Atkinson, R. (1999). Project Management: Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management, 17(6)*, 337-342.

Attalla, M., Hegazy, T., & Elbeltagi, E. (2004). In-House Delivery of Multiple-Small Reconstruction Projects. *Journal of Management in Engineering - ASCE* , 25-31.

Attalla, M., Hegazy, T., & Penny, S. (2000). Challenges of managing multiple small reconstruction projects. *AACE International Transactions; Morgantown*, 16.1-7.

Barakat, S. (2003). Housing reconstruction after conflict and disaster. *Humanitarian Practice Network Paper, Overseas Development Institute*, 1-40.

Barenstein, J. E., & Leemann, E. (2013). *Post-Disaster Reconstruction and Change: Communities' Perspectives.* Florida: Taylor & Francis Group, LLC.

Baroudi, B., & Rapp, R. (2012). Disaster restoration projects: A conceptual project management perspective. *Australasian Journal of Construction Economics and Building Conference Series*, 72-79.

Benator, B., & Thumann, A. (2003). *Project management and leadership skills for engineering and construction projects.* Georgia: The Fairmont Press, Inc.

Bevere, L., Sharan, R., Barrett, S., & Honegger , C. (2017). *Natural catastrophes and man-made disasters in 2016: a year of widespread damages.* Zurich, Switzerland: Swiss Re Institute.

Bilau, A. A., Witt, E., & Lill, I. (2015). A framework for managing post-disaster housing reconstruction. *Procedia Economics and Finance 21* (pp. 313 – 320). Tampere, Finland: Nordic Conference on Construction Economics and Organization.

Bilau, A. A., Witt, E., & Lill, I. (2017). Analysis of Measures for Managing Issues in Post-Disaster Housing Reconstruction. *Buildings, 7(29)*, 1-26.

Bilau, A. A., Witt, E., & Lill, I. (2018). Practice Framework for the Management of Post-Disaster Housing Reconstruction Programmes. *Sustainability 10, 3929*, 2-26.

151

Boehm, B. W. (1988). A Spiral Model of Software Development and Enhancement. *IEEE Computer, 5*, 61-72.

Bouraoui, D., & Lizarralde, G. (2013). Centralized decision making, users' participation and satisfaction in post-disaster reconstruction. *International Journal of Disaster Resilience in the Built Environment, 4(2)*, 1759-5908.

Boyd, I., & Hofknecht, G. (2012). *How-to Guide: Managing Post-Disaster (Re)-Construction Projects.* Maryland: Catholic Relief Services.

Carter, W. (2008). *Disaster management: a disaster manager's handbook.* Manila: Asian Development Bank.

Castillo, F. (2016). *Managing Information Technology (1st ed.).* Cham, Switzerland: Springer International Publishing AG.

Chang, Y., Wilkinson, S., Potangaroa, R., & Seville, E. (2010). Resourcing challenges for post-disaster housing reconstruction: a comparative analysis. *Building Research & Information, 38(3)*, 247– 264.

Chang, Y., Wilkinson, S., Potangaroa, R., & Seville, E. (2011). Donor-driven resource procurement for post-disaster reconstruction: Constraints and Actions. *Habitat International, 35*, 199-205.

Chang-Richards, Y., Rapp, R., Wilkinson, S., Meding, J. v., & Haigh, R. (2017). Disaster recovery project management: A critical service. *International Journal of Project Management, 35(5)*, 717-924.

Charvat, J. (2003). *Project Management Methodologies Selecting, Implementing, and Supporting Methodologies and Processes for Projects.* New Jersey: John Wiley & Sons, Inc.

Chin, C. M., & Spowage, A. C. (2012). Project Management Methodologies: A Comparative Analysis. *Journal for the Advancement of Performance Information and Value, 4(1)*, 106-118.

Cleland, D. I., & Ireland, L. R. (2002). *Project Management: Strategic Design and Implementation (4th ed.).* New York: The McGraw-Hill Companies, Inc.

Crawford, L., Langston, C., & Bajracharya, B. (2013). Participatory project management for improved disaster resilience. *International Journal of Disaster Resilience in the Built Environment, 4(3)*, 317-333.

Creswel, J. W. (2014). *Research design : qualitative, quantitative, and mixed methods approaches (4th ed.).* California: SAGE Publications, Inc.

Creswell, J. W. (2012). *Educational research: planning, conducting, and evaluating quantitative and qualitative research (4th ed.).* Boston: Pearson Education, Inc.

Davidson, C. H., Johnson, C., Lizarralde, G., Dikmen, N., & Sliwinski, A. (2007). Truths and myths about community participation in post-disaster housing projects. *Habitat International, 31*, 100–115.

Demir, S. T., & Theis, P. (2016). AgileDesign Management – The application of Scrum in the design phase of construction projects, sect.4. *Procedia* (pp. 13–22). Boston: 24th Annual Conference of the International Group for Lean Construction.

DMC, D. C. (2017, Septemebr 09). *http://www.desinventar.lk*. Retrieved from http://www.dmc.gov.lk/index_english.htm: http://www.desinventar.lk:8081/DesInventar/graphics.jsp

Eckstein, D., Hutfils, M.-L., & Winges, M. (2019). *Global Climate Risk Index 2019.* Berlin, Germany: Germanwatch e.V.

Eden, C. (1992). On the nature of cognitive maps. *Journal of management studies, 29(3)*, 261-265.

Fayazi, M., Arefian, F. F., Gharaati, M., Johnson, C., Lizarralde, G., & Davidson, C. (2017). Managing Institutional Fragmentation and Time Compression in Post-Disaster Reconstruction – the Case of Bam. *International Journal of Disaster Risk Reduction, 21*, 340-349.

Fayazi, M., Kikano, F., & Lizarralde, G. (2015). The Impact of Post-Disaster Reconstruction Policies on Different Categories of Households in Bam, Iran. *7th i-Rec Conference 2015: Reconstruction and Recovery in Urban Contexts* (pp. 1-9). Geneva, Switzerland: International Federation of Red Cross and Red Crescent Societies .

Fernando, R. S., & Kumari, M. (2019). Recovery After Disasters—Problems and Prospects: The Case of Koslanda-Meeriyabedda Landslide in Sri Lanka. *Disaster Risk Reduction*, 335-356.

Flick, U. (2009). *An Introduction to Qualitative Research (4th ed.).* London, UK: SAGE Publications Ltd.

Haigh, R., & Amaratunga, D. (2011). *Post-disaster reconstruction of the built environment: rebuilding for resilience.* West Sussex, UK: Blackwell Publishing Ltd.

Hidayat, B., & Egbu, C. (2010). A literature review of the role of project management in post-disaster reconstruction. *26th Annual ARCOM Conference* (pp. 1269-1278). Leeds, UK: Association of Researchers in Construction Management.

Highsmith, J. (2004). *Agile Project Management: Creating Innovative Products (1st ed.).* Boston: Addison-Wesley.

Highsmith, J., & Cockburn, A. (2001). Agile software development: the business of innovation. *Computer, 34(9)*, 120-127.

Horney, J., Simon, M. C., Ricchetti-Masterson, K., & Berke, P. (2016). Resident perception of disaster recovery planning priorities. *International Journal of Disaster Resilience in the Built Environment, 7(4)*, 330 - 343.

IFRC, I. a. (2012). *Post-disaster settlement planning guidelines.* Geneva, Switzerland: International Federation of Red Cross and Red Crescent Societies.

Ingirige, B., Haigh, R., Malalgoda, C., & Palliyaguru, R. (2008). Exploring Good Practice Knowledge Transfer Related to Post-Tsunami Housing (Re-)Construction in Sri Lanka. *Journal of Construction in Developing Countries, 13(2)*, 21-42.

Ismail, D., Majidb, T. A., Rooslic, R., & Samahd, N. A. (2014). Project Management Success for Post-Disaster Reconstruction Projects: International NGOs Perspectives. *Procedia Economics and Finance, 18*, (pp. 120-127).

Jha, A. K., Barenstein, J. D., Phelps, P. M., Pittet , D., & Sena, S. (2010). *Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural*

Disasters. Washington DC: The International Bank for Reconstruction and Development / The World Bank.

Johnson, C., Lizarralde, G., & Davidson, C. H. (2006). A systems view of temporary housing projects in post-disaster reconstruction. *Construction Management and Economics, 24*, 367–378.

Jordan, E., & Javernick-Will, A. (2014). Successes and Failures of the Post-Tsunami Housing Reconstruction Program in Tamil Nadu, India . *Construction Research Congress* (pp. 1199 - 1208). Atlanta, Georgia: American Society of Civil Engineers.

Kalkman, J. P., & de Waard, E. (2017). Inter-organizational disaster management projects: Finding the middle way between trust and control. *International Journal of Project Management, 35(5)*, 889-899.

Karunasena, G., & Rameezdeen, R. (2010). Post-disaster housing reconstruction: Comparative study of donor vs. owner-driven approaches. *International Journal of Disaster Resilience in the Built Environment, 1(1)*, 173-191.

Kates, R. W., & Pijawka, D. (1977). From Rubble to Monument: A pace of Reconstruction. In J. E. Hass, R. W. Kates, & M. J. Bowden, *Reconstruction Following Disaster* (pp. 1-20). Cambridge, UK: The Massachusetts Institute of Technology.

Keller, E. A., & DeVecchio, D. E. (2016). *Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes (4th ed.).* Oxfordshire, UK: Routledge:Taylor & Francis Group.

Kennedy, J., Ashmore, J., Babister, E., & Kelman, I. (2008). The Meaning of 'Build Back Better': Evidence From Post-Tsunami Aceh and Sri Lanka. *Journal of Contingencies and Crisis Management, 16(1)*, 24-36.

Kennedy, J., Ashmore, J., Babister, E., & Kelman, I. (2008). The Meaning of 'Build Back Better': Evidence From Post-Tsunami Aceh and Sri Lanka. *Journal of Contingencies and Crisis Management, 16(1)*, 24-36.

Kerzner, H. (2009). *Project management: a systems approach to planning, scheduling, and conrolling (10th ed.).* New Jersey: John Wiley & Sons, Inc.

Kerzner, H. (2017). *Project management : a systems approach to planning, scheduling, and controlling (12th ed.).* New Jersey: John Wiley & Sons, Inc.

Kerzner, H. (2017). *Project Management Case Studies (5th ed.).* New Jersey: John Wiley & Sons, Inc.

Kim, K. N., & Choi, J.-h. (2013). Breaking the vicious cycle offlood disasters: Goals of project management in post-disaster rebuild projects. *International Journal of Project Management, 31*, 147–160.

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

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

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques (2nd Rev. ed.).* New Delhi, India: New Age International (P) Ltd.

Kozák, J., & Cermák, V. (2010). *The illustrated history of natural disasters.* Dordrecht, Germany: Springer.

Krippendorff, K. (1989). Content Analysis. *International encyclopedia of communication, 1*, 403-407.

Krippendorff, K. (2012). *Content Analysis: An Introduction to Its Methodology (3rd ed.).* California : Sage Publications. Inc.

Kulatunga, U. (2011). Project Management of Disaster Reconstruction. In D. Amaratunga, & R. Haigh (Eds.), *Post-disaster reconstruction of the built environment: rebuilding for resilience* (pp. 133-150). West Sussex, UK: Wiley-Blackwell, JohnWiley & Sons, Ltd.

Le Masurier, J., Rotimi, J. O., & Wilkinson, S. (2006). A comparison between routine construction and post-disaster reconstruction with case studies from New Zealand. *Proceedings 22nd Annual ARCOM Conference, 1* (pp. 523-530). Birmingham, UK: Association of Researchers in Construction Management.

Lennard, J. (2015). *Global Estimates 2015: People displaced by disasters.* Geneva, Switzerland: Internal Displacement Monitoring Centre.

Lindell, M. K. (2013). Recovery and Reconstrution after Disaster. In P. T. Bobrowsky (Ed.), *Encyclopedia of Natural Hazards* (pp. 812-824). Dordrecht, Netherlands: Springer.

Lyons, M. (2009). Building Back Better: The Large-Scale Impact of Small-Scale Approaches to Reconstruction. *World Development, 37(2)*, 385-399.

Manatunge, J., & Abeysinghe, U. (2017). Factors affecting the satisfaction of post-disaster resettlers in the long term: A case study on the resettlement sites of tsunami-affected communities in Sri Lanka. *Journal of Asian Development, 3(1)*, 94-124.

Mannakkara, S. (2014). "Build Back Better" Principles for Reconstruction. *Encyclopedia of Earthquake Engineering*, 1-12.

Mannakkara, S., & Wilkinson, S. (2015). Supporting post-disaster social recovery to build back better. *International Journal of Disaster Resilience in the Built Environment, 6(2)*, 126-139.

Mason, J. (2002). *Qualitative Researching (2nd ed.).* London, UK: SAGE Publications Ltd.

Maxwell, J. A. (2013). *Qualitative Research Design: An Interactive Approach (3rd ed.).* London, UK: SAGE Publications, Inc.

Meredith, J. R., & Mantel, Jr., S. J. (2009). *Project Management: A Managerial Approach (6th ed.).* New Jersey: John Wiley & Sons, Inc.

Miles, M. B., & Huberman, A. (1994). *Qualitative Data Analysis: An Expanded Sourcebook (2nd ed.).* London, UK: SAGE Publications, Inc.

Misra, S., Vinod , K., Kumar, U., Fantazy, K., & Akhter, M. (2012). Agile software development practices: evolution, principles, and criticisms. *International Journal of Quality & Reliability Management, 29(9)*, 972-980.

Mochizuki, J., & Chang, S. E. (2017). Disasters as Opportunity for Change: Tsunami Recovery and Energy Transition in Japan. *International Journal of Disaster Risk Reduction, 21*, 331-339.

Moe, T. L., & Pathranarakul, P. (2006). An integrated approach to natural disaster management:Public project management and its critical success factors. *Disaster Prevention and Management, 15(3)*, 396-413.

Mucke, P. (2016). *World Risk Report 2016.* Berlin, Germany: Bündnis Entwicklung Hilft (Alliance Development Works), and United Nations University – Institute for Environment and Human Security (UNU-EHS).

Nazara, S., & Resosudarmo, B. P. (2007). *Aceh-Nias Reconstruction and Rehabilitation: Progress and Challenges at the End of 2006* . Tokyo, Japan: Asian Development Bank Institute .

Norling, B. (2013, May 30). *Effective Time Management in Post-Disaster Reconstruction* . Retrieved from http://theyellowcompany.com.au: http://theyellowcompany.com.au/wp-content/uploads/2013/10/Effective-Time-Management-in-Post-Disaster-Reconstruction1.pdf

O'Brien , G., O'Keefe, P., Rose, J., & Wisner, B. (2006). Climate change and disaster management. *Disasters, 30(1)*, 64-80.

Ohlson, S., & Melich, R. (2014). Designing and Developing Sustainable Housing for Refugee and Disaster Communities. *Global Humanitarian Technology Conference.* California: IEEE .

O'Keefe, P., Westgate, K., & Wisner, B. (1976). Taking the naturalness out of natural disasters. *Nature, 260(5552)*, 566-567.

Oliver-Smith, A. (1991). Successes and failures in post-disaster resettlement. *Resettlement. Disasters, 15(1)*, 12-23.

Oliver-Smith, A. (2004). Theorizing Vulnerability in a Globalized World: A Political Ecological Perspective. In G. Bankoff, G. Frerks, & D. Hilhorst (Eds.), *Mapping Vulnerability: Disasters, Development and People* (pp. 10-24). London, UK: Earthsacn.

Olsen, R. P. (1971). Can project management be defined? *Project management quarterly. 2(1)*, 12-14.

Olshansky, R. B. (2005). How do Communities Recover from Disaster? A Review of Current Knowledge and an Agenda for Future Research. *46th Annual Conference of the Association of Collegiate Schools of Planning.* Kansas City.

Olshansky, R. B., Hopkins, L. D., & Johnson, L. A. (2012). Disaster and Recovery: Processes Compressed in Time, 13(3). *Natural Hazards Review*, 173- 178.

Ophiyandri, T., Amaratunga, D., & Pathirage, C. (2013). Risk Assessment on Community-Based Post-Disaster Housing Reconstruction Project. *International PostGraduate Research Conference: IPGRC 2013.* Salford, UK: University of Huddersfield.

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.

Oxfam. (2008). *Sheltering people after disasters: Lessons from the tsunami.* Oxford, UK: Oxfam International.

Patel, S., & Hastak, M. (2013). A framework to construct post-disaster housing. *International Journal of Disaster Resilience in the Built Environment, 1(1)*, 103-122.

Pinto, J. K., & Prescott, J. E. (1988). Variations in Critical Success Factors Over the Stages in the Project Life Cycle. *Journal of Management, 14(1)*, 5-18.

Platt, S., & So, E. (2017). Speed or deliberation: a comparison of post-disaster recovery in Japan, Turkey, and Chile. *Disaster, 41(4)*, 696-727. Retrieved from http://onlinelibrary.wiley.com.

PMI, P. (2005). *Project Management Methodology for Post-Disaster Reconstruction (1st ed.).* Pennsylvania: Project Manangement Institute, Inc.

PMI, P. (2013). *A guide to the project management body of knowledge (PMBOK® guide) (5th ed.).* Pennsylvania: Project Management Institute, Inc.

Pries , K. H., & Quigley , J. M. (2011). *Scrum Project Management (1st ed.).* Florida: Taylor & Francis Group.

Quarantelli, E. L. (1995). Patterns of sheltering and housing in US disasters. *Disaster Prevention and Management, 4(3)*, 43–53.

Rahmayati, Y. (2016). Reframing "building back better" for post-disaster housing design: a community Perspective. *International Journal of Disaster Resilience in the Built Environment, 7(4)*, 344-360.

Ratnayake , R., & Rameezdeen, R. (2008). Post disaster Housing Reconstruction: Comparative Study of Donor Driven vs. Owner Driven Approach. *Post Disaster Recovery Challenges in Sri Lanka, The University of Salford, UK: CIB.*, 1067-1080.

Ribeiro, F. L., & Fernandes, M. T. (2010). Exploring agile methods in construction small and medium enterprises: a case study. *Journal of Enterprise Information Management, 23(2)*, 161-180.

Sadiqi , Z. "., Coffey, V., & Trigunarsyah, B. (2012). Rebuilding Housing after a Disaster: Factors for Failure . *Proceedings of 8th Annual International Conference of the International Institute for Infrastructure, Renewal and Reconstruction (IIIRR)* (pp. 292-300). Kumamoto, Japan: Queensland University of Technology .

Sadiqi, Z., Trigunarsyah, B., & Coffey, V. (2017). A framework for community participation in post-disaster housing reconstruction projects: A case of Afghanistan. *International Journal of Project Management, 35(5)*, 900-912.

Schwab, J. (2014). *Planning for Post-Disaster recovery : Next Generation.* Chicago: American Planning Association.

Schwab, J., Topping, K. C., Eadie, C. C., Deyle, R. E., & Smith, R. A. (1998). *Planning for Post-Disaster Recovery and Reconstruction.* Chicago: American Planning Association.

Shaluf, I. M. (2007). Disaster types. *Disaster Prevention and Management: An International Journal, 16(5)*, 704-717.

Shaw, R., Kobayashi, M., Kameda, H., Gupta, M., Sharma, A., Nakagawa, Y., & Banda, M. (2002). International cooperation in a post-disaster scenario: A case study from gujarat, India. *Journal of natural disaster science, 24(2)*, 73-82.

Siembieda, W., Johnson, L., & Franco, G. (June 2012). Rebuild Fast but Rebuild Better:Chile's Initial Recovery Following the 27 February 2010 Earthquake and Tsunami. *Earthquake Spectra, 28(1)*, S621–S641.

Silva, J. d. (2010). *Lessons from Aceh: Key Considerations in Post-Disaster Reconstruction.* Warwickshire, UK: Practical Action Publishing Ltd.

Silverman, D. (2011). *Interpreting Qualitative Data (4th ed.).* London, UK: SAGE Publications Ltd.

Siriwardena, N., & Haigh, R. (2011). Stakeholder Consultation in the Reconstruction Process. In D. Amaratunga, & R. Haigh, *Post-disaster reconstruction of the built environment: rebuilding for resilience* (pp. 117-130). West Sussex, UK: Blackwell Publishing Ltd.

Siriwardena, N., Haigh, R., & Ingirige, B. (2010). Managing Stakeholder Expectations of Post-Disaster Housing Reconstruction Projects in Sri Lanka. *18th CIB World Building Congress* (pp. 326-345). Rotterdam, Netherlands: CIB Publication.

Smith, G. B. (2015). Hurricane Katrina 10 years later: New Orleans still struggling to rebuild, but residents refuse to give in. *New York Daily News*.

Sohi, A. J., Hertogh, M., Bosch-Rekveldt, M., & Blom, R. (2016). Does lean & agile project management help coping with project complexity? *Procedia-Social and Behavioral Sciences, 226* (pp. 252–259). Westin Playa Bonita, Panama: 29th World Congress International Project Management Association (IPMA).

Špundak, M. (2014). Mixed agile/traditional project management methodology – reality or illusion? *Procedia-Social and Behavioral Sciences, 119*, 939 – 948.

Steinfort, P. (2017). Community and post-disaster Program Management Methodology. *International Journal of Project Management, 35(5)*, 788-801.

Straçusser, G. (2015). Agile project management concepts applied to construction and other non-IT fields. *PMI® Global Congress* . Florida: Project Management Institute.

Streule, T., Miserini, N., Bartlomé, O., Klippel, M., & Soto, B. G. (2016). Implementation of Scrum in the Construction Industry. *Procedia Engineering, 164* (pp. 269-276). Budapest, Hungary: Creative Construction Conference .

Sullivan, M. (2003). Integrated recovery management: A new way of looking at a delicate process. *The Australian Journal of Emergency Management, 18(2)*, 4-27.

Sullivan, M. (2003). Integrated recovery management: A new way of looking at a delicate process. *The Australian Journal of Emergency Management, 18(2)*, 4-27.

Sword-Daniels, V., Twigg, J., & Loughlin, S. (2015). Time for change? Applying an inductive timeline tool for a retrospective study of disaster recovery in Montserrat, West Indies. *International Journal of Disaster Risk Reduction, 12*, 125-133.

Tatum, M. C., & Terrell, F. (2012). Hurricane reconstruction in the United States Gulf Coast. *International Journal of Disaster Resilience in the Built Environment, 3(3)*, 199-219.

Tierney, K., Bevc, C., & Kuligowski, E. (2006). Metaphors Matter: Disaster Myths, Media Frames, and Their Consequences in Hurricane Katrina. *The ANNALS of the American Academy of Political and Social Science, 604*, 57-81.

UN, U. (2015). *Sendai Framework for Disaster Risk Reduction.* Geneva, Switzerland: The United Nations Office for Disaster Risk Reduction.

UN, U. (2019). *Country classification: World Economic Situation and Prospects.* New York: Department of Economic and Social Affairs, United Nations Secretariat.

UNDP. (2016). *Human Development Report 2016: Human Development for Everyone.* New York: United Nations Development Programme.

UNDRR. (2019). *Disaster Risk Reduction in Sri Lanka: Status Report 2019.* Bangkok, Thailand: United Nations Office for Disaster Risk Reduction (UNDRR).

UNDRR, U. (2017). *Global Assessment Report on Disaster Risk Reduction.* Geneva, Switzerland: United Nations Office for Disaster Risk Reduction (UNISDR).

Vahanvati, M., & Mulligan, M. (2017). A new model for effective post-disaster housing reconstruction: Lessons from Gujarat and Bihar in India. *International Journal of Project Management, 35(5)*, 802-817.

Vasconcellos , M. (2014). An Experience of the Use of the Cognitive Mapping Method in Qualitative Research. In O. Alexandra , T. Sherborne , & S. B. Shum , *Knowledge Cartography: Software Tools and Mapping Techniques (2nd ed.)* (pp. 471-490). London, UK: Springer.

Wickramaratne, S., Ruwanpura, J., Ranasinghe, U., Walawe-Durage, S., Adikariwattage, V., & Wirasinghe, S. (2012). Ranking of natural disasters in Sri Lanka for mitigation planning. *International Journal of Disaster Resilience in the Built Environment, 3(2)*, 115-132.

Wu, J., & Leifer, D. (2006). Learning from Projects: A Life-Cycle Perspective.

Wysocki, R. K. (2014). *Effective Project Management: Traditional, Agile, Extreme (7th ed.).* Indiana: John Wiley & Sons, Inc.

Yin, R. K. (2009). *Case study research: design and methods (4th ed.).* California: SAGE Publications, Inc.

Yin, R. K. (2014). *Case Study Research: design and methods (5th ed.).* London, UK: SAGE Publications, Inc.

INTERVIEW GUIDE

…………….
………………….,
………………….,
…………………...

Dear Sir/Madam,

Introduction to the Interview

I am Ubesingha ABK, a post graduate student at University of Moratuwa, currently researching on the area of Post Disaster Reconstruction in Sri Lanka. In order to collect data to carry out the research I require to conduct Interviews with stakeholders of selected Post disaster reconstruction projects. Therefore this interview is part of the Post graduate research that's being carried out associated to MSc. in Project Management, Department of Building Economics, attached to University of Moratuwa, Sri Lanka.

I would like to assure you that this research do not contain any commercial benefits and its sole intentioned use is academic purposes only. Upon your due consent, I would like to record this interview in order for me to listen to it in detailed manner during interview analysis. Further, please be certain that this interview will be confidential, and the identity of you and the organization will not be revealed at any instance.

Prior to commencing the interview, let me thank you for taking your time off from your busy schedule to participate in this research study and giving me the opportunity to carry out this interview.

Yours faithfully,

_____

Ubesingha ABK,
Post Graduate Student,
Department of Building Economics,
Faculty of Architecture,
University of Moratuwa.
buddhinie_k@yahoo.com

Supervisor:

Dr. Sachie Gunathilake,
Senior Lecturer,
Department of Building Economics,
Faculty of Architecture,
University of Moratuwa.

Semi- Structured Interview Guide

Date of Interview: ……………

Time of Interview: From ………… To ……..   (No of minutes: …….mins)

SECTION A: GENERAL INFORMATION

Basic details about the Interviewee

1. Name of Interviewee: ……………………………………
2. Name of Organization: ………………………………..
3. Job title/Occupation: …………………………………….
4. Experience in years:
    a. In construction industry:
        ………………………………………………………
    b. In Post disaster reconstruction:
        …………………………………………….

Basic details about the PDR Project

5. Name of the PDR project you were involved with: ……………………………
6. Location: ……………………………………………………………………….
7. What is the particular natural disaster that generated the PDR project? ………
8. When was the commencement of Project: ………………………………………….
    End of the project: ………………………………………………………………….
9. No of Houses? Estimated………………. Built …………………...
10. What was the total construction area of the project? …………………………
11. What was the total cost of the project? ……………………………………………
12. What is the approach used for housing reconstruction?
    Ex. Owner driven / Donor driven / other: …………………………..

Involvement of the Interviewee

13. What category best represent your organization?
    Project Managers and Coordinators / Consultant/ Donor/ Constructor/ other

    ……………….
14. What was the designation/role you played in the project? ……………………
15. Were you involved in the project from initiation to completion? …..................
16. If No, at which stage you were involved in the project? And how long was it?
    ....

SECTION B: ASSESSMENT AND CONCEPTUALIZATION

This research consider four (04) stages that a PDR project comprised with. They are (1) *Assessment and Conceptualization*, (2) *Planning*, (3) *Designing and Implementation*, and (4) *Closure.*

17. What are the Managerial Processes you were involved with during **Assessment and Conceptualization stage** of your project?
18. Who were the key stakeholders that were involved in during this stage?
19. What were the key considerations taken into account in carrying out Managerial Process during this stage?

Managerial Process	Key Considerations	✓
1. Understand the context	Understand the geography, society, economics, politics, climate and hazards	
2. Assess impact of the disaster	Define guidelines for assessment	
	Assess housing conditions	
	Assess social conditions	
	Identify Victims	
	Assess the state of infrastructure systems	
3. Understand local governance structures, regulatory framework	Understand the responsible group for disaster reconstruction, regulatory framework, standards, etc.	
4. Set reconstruction policy	Designate the agency responsible for reconstruction policy	
	Consult stakeholders	
	Establish basic parameters of the reconstruction policy	
5. Assess local needs and capacities	Understand particular needs of groups and individuals (men, women, elderly, children)	
	Assess locally available human resources	
	Assess locally available materials	
6. Establish the lead coordination and communication agency and the strategy	Decide on the lead agency to develop communications strategy	
	Plan for the project communications strategy	
	Develop stakeholder communication plans	
	Establish effective stakeholders communication channels	
	Agree on feedback mechanism	
7. Understand funding steams and timescales	Search for donors and determine the total amount of money available	
	Understand the timescale it can be spent.	
	Understand other donor requirements	
8. Identify beneficiaries	Determine eligibility criteria	
	Identify eligible beneficiaries	
	Obtain approval from the government for list of beneficiaries.	
9. Decide whether to Relocate or Not to Relocate	Initiate an analysis of disaster risk management	
	Identify whether relocation is needed to mitigate the risk	
	Define the policy framework for relocation	
	Quantify the population subject to relocation	
	Obtain community opinion on relocations	
10. Land selection and resolve issues of land tenure	Follow an adequate site selection procedure	
	Plan to restore livelihoods and social conditions.	
	Incorporate beneficiaries to identify relocation sites	
	Identify relocation sites	
	Access land ownerships	
11. Decide on Reconstruction Approach	Decide on level/method of assistance to provide	
	Decide and agree on benchmarks for all reconstruction approaches	
	Decide which reconstruction approach/s (method of implementation) is/are most suitable	
12. Establishing partnerships with other stakeholders	Make partnerships with government, other agencies or local organizations.	
	Request support from other partners	

13. Develop Project Charter	Define Project authority (sponsor, project manager)	
	Define Purpose.	
	Define Key assumptions, constraints & risks.	
	Define Stakeholders.	
	Define Resources and budget	
	Define Milestones.	
	Define Prediction of benefit.	
14. Develop Preliminary Project Scope Statement	Identify preliminary project scope (objectives, boundaries, deliverables, constraints, milestones)	

SECTION C: PLANNING

20. What are the Managerial Processes you were involved with during **Planning** stage of your project?
22. Who were the key stakeholders that were involved in during this stage?
23. What were the key considerations taken into account in carrying out Managerial Process during this stage?

Managerial Process	Key Considerations	✓
15. Recognize potentially risky natural hazards	Understand what natural hazards are likely to occur and their potential impact	
16. Time Schedule Development (milestone based)	Determine milestone dates and establish project time frame	
17. Planning Fund distribution	Decide on a system for delivering funds	
	Designate the agency to manage and monitor reconstruction financing	
	Develop a viable reconstruction finance strategy	
	Establish an expenditure tracking system at the national level, integrated with tracking at the project level	
18. Cost Budgeting	Assign cost to each milestone.	
19. Cost Estimating	Identify cost for labour,	
	Identify cost for material,	
	Identify cost for travel	
20. Resource Planning	Identify HR/construction team	
	Staffing management plan	
21. Risk Management Planning	Identify the treats to the project,	
	Build a contingency plan	
22. Plan Purchases/procurement and Acquisitions	Engage qualified and dedicated procurement experts to manage resource procurement	
	Assess resource requirements based on sufficient quality, availability, supply point and time of resource need	
	Map resource markets and make provision for price variations due to seasonal variations and changing market conditions	
	Identify sellers and Identify distribution channels	
	Identify a methods to expedite the approval process.	
23. Stakeholder management planning	Decide on a plan to manage stakeholders	
	Study land use plan and assess available land	

Managerial Process	Key Considerations	✓
24. Land use and Physical planning	Decide whether revisions to existing land use plan, regulations needed	
	Decide whether existing land use plan contributed to the disaster	
	Determine how land use should be revised to mitigate future disaster risk	
	Assess available land	
	Plan land allocation	
	Plan road layout	
	Plan plot layout	
	Plan for infrastructure and services	
	Plan for public buildings and social infrastructure	
25. Environmental planning/ minimize the environmental impact of reconstruction	Decide on the legal framework for environmental management	
	Plan and coordinate the debris management	
	Provide environmental guidance to all institutions active in reconstruction	
	Evaluate the ecological footprint of a relocation site	
	Develop mitigation measures for the project and construction	
26. Cultural heritage conservation planning	Appoint an agency to address damage to resources of national significance	
	Ensure cultural resources are considered in post-disaster damage and loss assessments	
	Identify cultural resources that require conservation during recovery and reconstruction	
27. Infrastructure and services delivery	Assess the state of infrastructure systems	
	Assess capability to restore/provide infrastructure services,	
	Publicize the infrastructure standards	
	Decide how to ensure interim and permanent infrastructure to reconstruction sites	
	Build back better and conform to standards	
28. Quality planning	Provide quality management plan	
	Provision of special training workshops for supervisory(including beneficiary) and management personnel on project inspection, supervision and enforcement	
	Provision of capacity development workshops for management personnel	
29. Planning for monitoring and control	Establish multi-tiered institutional arrangements	
	Include a dedicated management agency	
	Decide on area authority	
	Local monitoring and control units at all organizational and geographical levels	

SECTION D: DESIGNING AND IMPLEMENTATION

24. What are the Managerial Processes you were involved with during **Designing and Implementation** stage of your project?
26. Who were the key stakeholders that were involved in during this stage?
27. What were the key considerations taken into account in carrying out Managerial Process during this stage?

Managerial Process	Key Considerations	✓
30. Establish quality of reconstruction	Understand the quality from the occupant's perspective.	
	Provide new/improved building codes and construction guidelines	

31. Design houses and communal buildings	Analyze the disaster impact on common housing designs and construction technologies (HDCT)	
	Select the HDCTs to be used in reconstruction	
	Ensure that they are fully integrated into the reconstruction policy	
	Design fit for purpose schools, health centers etc.	
32. Incorporate disaster risk reduction strategies	Adhere to international standards and best practice guidelines	
	Influence local building practices and planning processes so that they support safer construction in the long term.	
33. Community Organizing and Participation	Analyze the community's capacity and preferences for participation	
	Define the role of communities in planning and managing reconstruction	
	Agree with the community on the activated and outcomes they deliver	
	Decide how to support and empower communities to contribute for reconstruction	
	Decide how to monitor and evaluate the involvement	
34. Institutional options for reconstruction management	Design the outline of the institutional mechanism	
	Equipped with a structure, a mandate, a policy, and a plan	
	Strengthened the central and local governments, so that they can adequately manage reconstruction	
	Set up reliable monitoring and evaluation procedures to guarantee accountability and transparency.	
35. International, National and local partnership in reconstruction	Request support from the UN or other partners	
	Identify the roles best suited to the UN, other humanitarian agencies, NGOs, and civil society organizations (CSO)s,	
	Establish a monitoring and evaluation system for all NGO and CSO activity and mechanisms	
36. Mobilizing financial resources and other reconstruction assistance.	Design the assistance delivery system	
	Activate delivery system for cash that is accessible for recipients/suppliers	
37. Direct and Manage Project Execution	Setout buildings and execute construction	
38. Acquire Project Team	Mobilize and/or recruit local artisans, construction workers, volunteers and beneficiaries	
	Import workers	
	Engage construction industry actors	
39. Develop and Train Project Team/ Training requirements in reconstruction	Decide how reconstruction training will be managed	
	Ensure that adequate staff and resources are available for the lead training agency	
	Design the training program	
	Recruit the core team, the trainers, and the field teams	
	Set standards and procedures for monitoring and evaluation of training activities	
	Obtain expertise support from Civil society organizations, building trades and academic institutions	
	Train on General management skills, Technical skills and Ground rules	
	Educate and develop skills and capacity of recruited workers	
	Develop and utilize multi-skilled workers	
	Activity reporting	
	Provide technical guidance to community participants	
40. Information Distribution	Distribute drawings, schedules, specifications, etc. on time	
	Obtain quotes and detains from sellers	

41. Request Sellers Response and Select Sellers	Implement the select seller process	
	Letter of agreement with partners and sellers	
42. Implement monitoring and controlling	Daily/weekly/monthly activities including changes	
	Recruit and deploy experienced management personnel or experts with requisite technical managerial skills to adequately monitor and apply control measures in reconstruction	
	Deploy professionals and trained personnel and local representatives to monitoring units	
	Set-up monitoring committees/work groups at local community level	
	Ensure beneficiary participation in monitoring process to ensure that housing aligns with community needs and expected standards	
	Establish monitoring and control and evaluation systems	
	Establish project communication mechanism during construction	
	Monitor and control the project team	
	Manage stakeholders	
	Risk monitor and control	

SECTION E: CLOSURE

33. What are the Managerial Processes you were involved with during project **closure** stage of your project?
34. Who were the key stakeholders that were involved in during this stage?
35. What were the key considerations taken into account in carrying out Managerial Process during this stage?

Managerial Process	Key Considerations	✓
43. Close the project	Implement exit strategy	
	Handover assets, activities, functions etc. to correct agency	
	Close internal activities that the implementing agency has established	
	Close internal activities that the implementing agency has established with other parties	
44. Implement demobilization	Ensure safety and demobilize human resources	
	Ensure safety and demobilize equipment, non-consumable goods	
45. Handover to Beneficiaries	handover of the houses to their future owners and end-users	
	Agree on a finite period during which the agency is responsible for defects	
46. Closeout reports with lessons learned	Collect knowledge acquired during the project.	
	Prepare close-out report with lessons learned	
	Provide feedback report to donors	
47. Contract closure	Close contracts that are applicable to internal support	
	Close contracts that were established with outside parties	
48. Post occupancy evaluation	Conduct post occupancy survey	
	Evaluate whether reconstruction acted as a catalyst for recovery	

APPENDIX –B: EXAMPLE OF AN INTERVIEW TRANSCRIPT
CASE STUDY B – OTHER CONSULTANT

Semi- Structured Interview Guide

Date of Interview: 22.12. 2017

Time of Interview: From 16:38 to 19:13 (No of minutes: 2hrs 35mins)

SECTION A: GENERAL INFORMATION

Basic details about the Interviewee

5. Name of Interviewee: Amal
6. Name of Organization: ORGAB
7. Job title/Occupation: Planner
8. Experience in years:
   a. In construction industry: 4.5 years
   b. In Post Disaster Reconstruction: 4.5 years

Basic details about the PDR Project

17. Name of the PDR project you were involved with: XYZ
18. Location: Anuwara, Kegalle District
19. What is the particular natural disaster that generated the PDR project? Land slide
20. When was the commencement of Project: immediately after the disaster
    End of the project: donor driven projects are completed. Owner driven projects

are in progress.

21. No of Houses?
Estimated: total -1962, selected donor driven project - 56

Built: total -93%, selected donor driven project – 56, 100%

22. What was the total construction area of the project? Not calculated
23. What was the total cost of the project? Not calculated
24. What is the approach used for housing reconstruction?
    Ex. Owner driven / Donor driven / other: Donor Driven

Involvement of the Interviewee

29. What category best represent your organization?
    Project Managers and Coordinators/ Consultant/ Donor/ Constructor/ other

    ……………….

30. What was the designation/role you played in the project? Officer in charge of the project. All technical coordination happened via me
31. Were you involved in the project from initiation to completion? yes
32. If No, at which stage you were involved in the project? And how long was it? --

SECTION B: ASSESSMENT AND CONCEPTUALIZATION

This research consider four (04) stages that a PDR project comprised with. They are (1) *Assessment and Conceptualization*, (2) *Planning*, (3) *Designing and Implementation*, and (4) *Closure.*

37. What are the Managerial Processes you were involved with during **Assessment and Conceptualization stage** of your project?

Disaster happened on 17th May. Project started from that day. It's still on going. By 30th Nov 2017, 93% of the houses has started construction. All technical coordination happened via me. I was involved from beginning. There were two types know. Donor driven and owner driven. 90% of donor driven is completed. I don't have a clear idea about how much the whole project costed. I know how much one house cost. District Secretariat would know the cost of the whole project. We didn't do anything related to cost. We worked at the policy level. We gave them an estimate of one house. District Secretariat was the one who requested for funds.

All technical coordination happened via me. Project coordination happened via District Secretariat. Actually no one invited us to be a part of this project. We realized the need of us in it. About 2000 houses there. We prepared plans for these houses, and they were disaster resilient. We realized that GA can't do this alone. He doesn't have a capacity know. So talked to the ministry and got involved.

So we made a policy etc. because we wanted to do this in a systematic manner. We didn't had a policy. I made this after I go to Anuwara. Our first involvement is for land selection. Verifying whether a land is disaster prone or not is a general task of ORGAB district offices. Our districts office has geologists only. They check whether land has a landslide risk or not. We realized, that just because a land has no risk for landslide doesn't make it suitable for a habitat. That's why we got involved. So we prepared a set of criteria's to select land. And landslide risk was made only one criteria. There were many other criteria that we incorporated. Thereafter we expanded our scope.

We go for their meetings and we realized that they can't handle this. Funds got approved from the Ministry but the GA didn't has an idea as to how to manage. He had no

Program. They didn't has the capacity. They had an engineer and a disaster management office, they have got together and have decided to give money to people in 8 installments. But they didn't had an idea as to when to release money how to evaluate the work done stage by stage. So I sat and discussed this with the GA (District Secretary) and I prepared this program.

Soon after the disaster we were involved with the initial assessment. When a big landslide this happened, I addition to the main incident, many other small incidents happen around that. Soil in the surrounding area also get unstable and they get cracked. So ORGAB has a task to go to all these places and to access the risk of those other incidents also. We didn't had enough staff to do that. So we called additional staff from our other district offices. And did a landslide risk assessment. After we assess the risk we decided who should be relocated and who doesn't need to relocate. It's completely based on geological conditions. If the land belongs to high risk area, they have to be relocated. Medium risk can do a mitigation and live there. After we identify there three different types of land, we get a quota of who lives in high risk, so so need to be relocated is identified. And direct victims of the landslides also become beneficiaries. Then we prepare a list of beneficiaries and give that to relevant divisional secretariat.

We had some challenges during this. High risk lands were identified based on geological conditions. So one land can be at high risk and the adjoining land may not be high risk. So the neighbor who is not high risk worries on the accuracy of it. They don't understand the geological conditions know. Then they come to approach us through their political links. I'm not aware of any corruption at that time. Some people, when they realized that high risk people get about 12, 16 lacks, they try to make their land high risk and get the money. We didn't even check whether all families we identified got houses or not. Coz it's not our job know. They may have got. After that we informed people through respective divisional secretaries that we have these options for them and they were asked to apply for the option they prefer.

So some people said they have land and they would like to build there, some preferred to buy houses and some prefer to go to government land. Must say that initial, the government decision was to do all these almost 2000 by government with the help of tri forces. HE the president wanted to get the Forces involved. Then when we looked at logistics of Forces etc., forces requested an addition of .4 million, in addition to

allocated 1.2 million per house for their expenses. Since the government did not agree to that that proposal was withdrawn. Then we decided to go for donor driven and donor driven method.

We didn't has a structure as such to respond a disaster. No regulatory frame work. We, ORGAB is the one who made the framework and prepared a policy and influenced them. Even after XYZ disaster which happened before that which all of us involved, we still have not made any attempt to prepare guidelines or policy to post disaster reconstruction. After I got engaged with XYZ resettlement, I took a little extra effort to address the issue by an academic research on the subject area.

Now after the disaster, people were homeless know, then government get worked up, and told us to three draw plans. We did plans for XYZ also know. Told us to make estimates for them. We did it. It came to 1.2 million. We send it to parliament. It got approved. It was a one two week quick job. That's how this 1.2 million got approved.

Actually it took us about a year to finalize the beneficiary list. We didn't had enough staff. Even after started constructing some houses, we identified some more beneficiaries. So, scope of the project was not known at the beginning. So, didn't know how much it's going to cost. So no one told us we give this much for this project, do it within that budget. Bit for XYZ it was not difficult. Victims were identified. And we identified beneficiaries. This project also didn't had a defined end. It's hard to define that we finish the work by this date.

Scope of the project was not identified. Not even know who should be identifying the project. This policy was something I drafted on 1st Jan while at home. I did it in pencil. I have a friend who is an engineer, I write it, take a pic of it and send it to my engineer friend. That's how we did it. This is the draft policy I did (he shows a photograph of it).

We faced political interferences. We had a committee called district disaster committee (DDC). Politicians come for this meeting. They come and say, this family has not got selected, and there are some families and they have not got listed. And we didn't had enough staff. Very high work load. Didn't had enough resources. Then politicians complain that ORGAB do not work up to the speed etc. so we had political pressure. And a very high pressure from media also. They gave us the biggest pressure.

No one really had an enthusiasm to do this project right. All of them wanted to paste a plaster and patch it up. All what politicians wanted was to give some sort of house as fast as possible. GA was also the same. When we tried to prepare a process and systemize it, GA and everyone took us as a trouble to the project. They took us as a bother. We wanted to systemize the ad-hock process they were following. So they didn't like our involvement. They even told us to leave. GA once told us, your task was to identify land know, now that you have done that, you can leave. They all have identified ORGAB as an org who identify landslide lands. That is only one task of ORGAB. We have a planning department know.

When selecting land, sometimes land may not have a landslide risk, but still we rejected it due to other reasons. So people asked, if it doesn't have a landslide risk, why you reject it. Some lands that officers have suggested were too far away, no roads, no water. So we rejected. But it didn't happened from the beginning. Coz at the beginning only geologists were involved with land selection. We got involved only later. Geologists looked at only whether it has a landslide risk or not only. Now after I got involved to select land I had problems from Geologists who were senior than me. They were challenges we faced due to multidisciplinary approach we took.

Actually we were able to build a policy only because of my boss. Actually he was also not for that at the beginning. He was complaining me all the time. 3, 4 months after being on the program, he called me in to his room and ask me to step down from the project. I was in Kegalle, 30th or 31st he asked me to come to Colombo. And I got scolded like hell. He has asked me to come, coz he has planned to hand over the project to someone else. I told him, I don't like to step down, I will come up with a proper process and do this. 1st Jan was a Sunday. I went home and I drafted this program all by myself. I didn't get scolded thereafter.

We discussed the guideline we prepared with the GA. And GA looked at it and said this what we were looking for and he appreciated it very much and he accepted it as it tis then and there. We sent it to the parliament and they were ok with it. That's how this policy came into place. This framework came out while land selection was going on. Then we started to follow this policy. So accordingly we considered land use for land selection. Land use policy planning department was involved with that. It is there in every district. They are now preparing land use plans. Coz of that they had some idea.

During land selection we look at availability of roads, water etc. a representative of GA also come for these meetings know, so if a possible land has no water, GA rep says that they can give water. So not to reject the land. But actually, they didn't give water. XYZ, divisional secretariat provided water by bowers. In all other owner driven sites, people brought in water from distance and managed it.

There were some issues with land acquisition too. Some plantations didn't like to give the land. They instead showed us inappropriate land. And land acquisition took a lot of time. There was no guideline for land acquisition. It's not one of our tasks. Anyway that process itself take a long time. We don't have a policy in Sri Lanka to acquire land at a disaster. When selecting land we looked at physical planning. We looked whether there is any UDA declared land in the area and whether they have a development plan. Mostly they were not UDA declared areas. These were rural areas. We also looked whether the selected land is at min .5km to transport facilities and 2km to other facilities like school, hospitals, etc. there was one land which did not meet this criteria. That was the land we recommended to obtain the community willingness to relocate there. But GA didn't follow our recommendation and acquired the land. At that time they had no plans to introduce such facilities to that land. I don't think it's there yet.

38. Who were the key stakeholders that were involved in during this stage?
39. What were the key considerations taken into account in carrying out Managerial Processes during this stage?

Managerial Process	Key Considerations	✓, X
1. Understand the context	Understand the geography, society, economics, politics, climate and hazards	X
2. Assess impact of the disaster	Define guidelines for assessment	✓
	Assess housing conditions	✓
	Assess social conditions	X
	Identify Victims	✓
	Assess the state of infrastructure systems	X
3. Understand local governance structures, regulatory framework	Understand the responsible group for disaster reconstruction, regulatory framework, standards, etc.	✓
4. Set reconstruction policy	Designate the agency responsible for reconstruction policy	X
	Consult stakeholders	X
	Establish basic parameters of the reconstruction policy	✓
5. Assess local needs and capacities	Understand particular needs of groups and individuals (men, women, elderly, children)	X
	Assess locally available human resources	✓
	Assess locally available materials	X
6. Establish the lead coordination and communication agency and the strategy	Decide on the lead agency to develop communications strategy	X
	Plan for the project communications strategy	✓
	Develop stakeholder communication plans	✓
	Establish effective stakeholders communication channels	✓

	Agree on feedback mechanism	X
7. Understand funding steams and timescales	Search for donors and determine the total amount of money available	✓, X
	Understand the timescale it can be spent.	✓
	Understand other donor requirements	✓
8. Identify beneficiaries	Determine eligibility criteria	✓
	Identify eligible beneficiaries	✓
	Obtain approval from the government for list of beneficiaries.	✓
9. Decide whether to Relocate or Not to Relocate	Initiate an analysis of disaster risk management	✓
	Identify whether relocation is needed to mitigate the risk	✓
	Define the policy framework for relocation	✓
	Quantify the population subject to relocation	✓
	Obtain community opinion on relocations	✓
10. Land selection and resolve issues of land tenure	Follow an adequate site selection procedure	✓
	Plan to restore livelihoods and social conditions.	X
	Incorporate beneficiaries to identify relocation sites	✓
	Identify relocation sites	✓
	Access land ownerships	✓
11. Decide on Reconstruction Approach	Decide on level/method of assistance to provide	✓
	Decide and agree on benchmarks for all reconstruction approaches	✓
	Decide which reconstruction approach/s (method of implementation) is/are most suitable	✓
12. Establishing partnerships with other stakeholders	Make partnerships with government, other agencies or local organizations.	✓
	Request support from other partners	✓
13. Develop Project Charter	Define Project authority (sponsor, project manager)	✓
	Define Purpose.	X
	Define Key assumptions, constraints & risks.	X
	Define Stakeholders.	X
	Define Resources and budget	✓
	Define Milestones.	X
	Define Prediction of benefit.	X
14. Develop Preliminary Project Scope Statement	Identify preliminary project scope (objectives, boundaries, deliverables, constraints, milestones)	✓

SECTION C: PLANNING

40. What are the Managerial Processes you were involved with during **Planning** stage of your project?

In terms of environmental planning, we rejected any risky land, line drains were a must. Have to prevent erosion, reservations for streams etc. were considered (Showed me the guideline). How to build on slopes and conditions were also provided. Ex. One site was in a dense forest area. We studies, analyzed and gave a report and recommended it as not suitable for development (showed me the report). But I got covered only after we got involved. We tried to create linkages with other related institutes like NHDA. I went to their district office and requested to take part. But they had no interest.

In XYZ, we selected the site as no land risk, but in order to make internal slopes divisional secretariat has cut the slope in a crazy way and have made a big blunder. Those days I was not

assigned to Kegalle. But I wrote them a letter. Then GA has got together with our district office and hide the letter (he showed the letter and images).It happened because of that Divisional Secretarial, FRIK. He thinks he knows everything. So he tried to build houses fast. That may be political influence also. And it could also be lack of awareness. He didn't know who to consult.

We got appointed to the project. Enginner, town planner, geologist, architect, Technical officer. We didn't had objectives, time needed, resources etc., identified, at the beginning of the project. Objectives also sorted later. No project management plan, no purchasing plan. This project was not planned at all. No goal identified, no understanding on institutes. No shared understanding on stockholders. So people were following their own objectives.

Now our objectives was to build a 650 sqft resilient house. Gas objective was to find a donor and do some house. Not really resilient. We have prepared this 650 house for an average family. We can't give small house for a small family and a big house for a big family. If we do that, we can never do this project. We don't have provision for that in the policy also. We have considered a family of 4. But however our housing policy allow only for 550 sqft. No government program in the country has allowed 650 house. We are the one who proposed for this 650 and we are the one who got the cabinet approval for that. This is a big house.

Some donors didn't coordinate with us at all. They have done 550 house with no resilient features. This is an example (shows me a picture) now this land has been cut. The slope. And build the temporary house right at the middle. Now they have to demolish the temporary house to build the permanent house. This was done without our consultation. There was a project called Regalle. We gave our recommendation saying obtain community acceptance for that land. But they have built without getting that. And people have not gone to that land.

46. Who were the key stakeholders that were involved in during this stage?
47. What were the key considerations taken into account in carrying out Managerial Process during this stage?

Managerial Process	Key Considerations	✓,X
15. Recognize potentially risky natural hazards	Understand what natural hazards are likely to occur and their potential impact	✓
16. Time Schedule Development (milestone based)	Determine milestone dates and establish project time frame	✓
17. Planning Fund distribution	Decide on a system for delivering funds	✓
	Designate the agency to manage and monitor reconstruction financing	✓
	Develop a viable reconstruction finance strategy	X
	Establish an expenditure tracking system at the national level, integrated with tracking at the project level	X
18. Cost Budgeting	Assign cost to each milestone.	X
19. Cost Estimating	Identify cost for labour,	✓

	Identify cost for material,	✓
	Identify cost for travel	X
20. Resource Planning	Identify HR/construction team	✓
	Staffing management plan	✓
21. Risk Management Planning	Identify the treats to the project,	X
	Build a contingency plan	X
22. Plan Purchases/procurement and Acquisitions	Engage qualified and dedicated procurement experts to manage resource procurement	X
	Assess resource requirements based on sufficient quality, availability, supply point and time of resource need	X
	Map resource markets and make provision for price variations due to seasonal variations and changing market conditions	X
	Identify sellers and Identify distribution channels	X
	Identify a methods to expedite the approval process.	X
23. Stakeholder management planning	Decide on a plan to manage stakeholders	X
24. Land use and Physical planning	Study land use plan and assess available land	✓
	Decide whether revisions to existing land use plan, regulations needed	X
	Decide whether existing land use plan contributed to the disaster	X
	Determine how land use should be revised to mitigate future disaster risk	X
	Assess available land	✓
	Plan land allocation	✓
	Plan road layout	✓
	Plan plot layout	✓
	Plan for infrastructure and services	X
	Plan for public buildings and social infrastructure	X
25. Environmental planning/ minimize the environmental impact of reconstruction	Decide on the legal framework for environmental management	X
	Plan and coordinate the debris management	X
	Provide environmental guidance to all institutions active in reconstruction	X
	Evaluate the ecological footprint of a relocation site	✓
	Develop mitigation measures for the project and construction	✓
26. Cultural heritage conservation planning	Appoint an agency to address damage to resources of national significance	X
	Ensure cultural resources are considered in post-disaster damage and loss assessments	X
	Identify cultural resources that require conservation during recovery and reconstruction	X
27. Infrastructure and services delivery	Assess the state of infrastructure systems	X
	Assess capability to restore/provide infrastructure services,	X
	Publicize the infrastructure standards	X
	Decide how to ensure interim and permanent infrastructure to reconstruction sites	✓
	Build back better and conform to standards	X
28. Quality planning	Provide quality management plan	✓
	Provision of special training workshops for supervisory(including beneficiary) and management personnel on project inspection, supervision and enforcement	✓
	Provision of capacity development workshops for management personnel	X
	Establish multi-tiered institutional arrangements	X
	Include a dedicated management agency	✓

29. Planning for monitoring and control	Decide on area authority	✓
	Local monitoring and control units at all organizational and geographical levels	X

SECTION D: DESIGNING AND IMPLEMENTATION

48. What are the Managerial Processes you were involved with during **Designing and Implementation** stage of your project?

We designed house plans, structural designs. House plans were partially done for this project. We had to design houses before land selection. So we had type designs suitable for flat, medium, steep slopes. So we didn't had big problems. Some type designs didn't fit in to lands at all. After doing the block out, we realized that plots are too narrow. So we redesigned houses to suite that. There was no community involvement for house designs. that's one failure.

BOQ preparation. Gave our technical assistance for layout planning. It is good to get community participation for decision making but it didn't happened. They ask the house design in one week time. A design of a permanent house. So there is no time to get community involved. Beneficiaries are not even identified at that time. So we allowed them to use their house plans if they want. Also allowed for minor design changes to our house designs. Also design has the flexibility to extend the house in the future. Some changed the hearth, toilet, certain changes to walls due to astrological cross etc. we told them to made any changes to the design with the approval of the TO.

We prepared guidelines to ensure quality of products they use. We conducted awareness programs also for that. Trained TO's. Had awareness programs for people. Had training programs for masons. We prepared Log books. If at the time the TO visit the site if baas is not there, they can write it on the log book. So bass is aware of what to do.

We didn't had the need to try different construction techniques. Some lands were acquired by tea estates. After they give us the land they remove all trees in it. And remove roots also. We told them to remove roots only in the foundation area and to keep other roots unremoved. Coz if we remove them, there will be erosion there. They don't give us the land with trees. We also didn't allow them to do sewerage pits closer to streams and wells.

We didn't had enough resources for land section. So there was a delay. We didn't had enough staff for monitoring also. We could go only for about 1 site per month out of 48 sites. We fist had only 2 staff. Then we recruited and became 4. We also reduced our involvement. We communicated other institutions via letters emails and also had meetings. We needed to follow up. Otherwise things do not happen in Sri Lanka. It took 6 months to complete XYZ. Land

development was done by the divisional secretariat. They do roads, cut trees etc. We gave guidance. Some time they follows guidance some time they did the way they want.

In donor driven projects, we tested building material at our labs. We told them to send us samples. Bricks, steel etc. Sometimes they haven't followed our instructions at site. We have specifies 12 steel and they have put 10 steel. So we rejected them and asked them to redo. There was a labor shortage. Coz there was a big demand know. Same with materials. Material cost got increased. We prepared BOQ amount a year ago. So price has increased. Contingency was also not enough to meet that

Rhino houses were done by rhino and they gave a full labor contract to one of their party. Army houses had about 10 assigned per house

We didn't give any training to people in XYZ. They were donor riven know. So they didn't really needed to get involved with construction. But when Army was building they helped on their own willingness. There were no people to build among the people. Half the people have died. We can't even talk. They cry. They have very emotional stories.

They may have corruption in this project. That IRS (Individual resettlement sites) was there know. Some political people, business met etc. have blocked out their land and given to AGA and some misconduct has happened there. I heard about them. So I think corruption was there. After we approve material samples we send a portion of that to the army. So at site they check whether all materials they get to the site are of same. In cases that it was not, they rejected the supply.

MAAM foundation gave a donor driven house to a family that was in high risk. That was against what we decided. That is due to political influences. We didn't try to manage stockholders. It was not ours. At the time of hand over we gave a certificate to each house at XYZ. Confirming that they include disaster resilient features. For dialog houses Sierra provided project management free of charge. Dialog also had a manger

53. Who were the key stakeholders that were involved in during this stage?
54. What were the key considerations taken into account in carrying out Managerial Process during this stage?

Managerial Process	Key Considerations	✓,X
30. Establish quality of reconstruction	Understand the quality from the occupant's perspective.	X
	Provide new/improved building codes and construction guidelines	✓
31. Design houses and communal buildings	Analyze the disaster impact on common housing designs and construction technologies (HDCT)	✓
	Select the HDCTs to be used in reconstruction	✓
	Ensure that they are fully integrated into the reconstruction policy	✓

	Design fit for purpose schools, health centers etc.	X
32. Incorporate disaster risk reduction strategies	Adhere to international standards and best practice guidelines	✓
	Influence local building practices and planning processes so that they support safer construction in the long term.	X
33. Community Organizing and Participation	Analyze the community's capacity and preferences for participation	X
	Define the role of communities in planning and managing reconstruction	X
	Agree with the community on the activated and outcomes they deliver	✓
	Decide how to support and empower communities to contribute for reconstruction	X
	Decide how to monitor and evaluate the involvement	X
34. Institutional options for reconstruction management	Design the outline of the institutional mechanism	X
	Equipped with a structure, a mandate, a policy, and a plan	X
	Strengthened the central and local governments, so that they can adequately manage reconstruction	X
	Set up reliable monitoring and evaluation procedures to guarantee accountability and transparency.	X
35. International, National and local partnership in reconstruction	Request support from the UN or other partners	X
	Identify the roles best suited to the UN, other humanitarian agencies, NGOs, and civil society organizations (CSO)s,	X
	Establish a monitoring and evaluation system for all NGO and CSO activity and mechanisms	X
36. Mobilizing financial resources and other reconstruction assistance.	Design the assistance delivery system	X
	Activate delivery system for cash that is accessible for recipients/suppliers	✓
37. Direct and Manage Project Execution	Setout buildings and execute construction	X
38. Acquire Project Team	Mobilize and/or recruit local artisans, construction workers, volunteers and beneficiaries	✓
	Import workers	X
	Engage construction industry actors	X
39. Develop and Train Project Team/ Training requirements in reconstruction	Decide how reconstruction training will be managed	X
	Ensure that adequate staff and resources are available for the lead training agency	X
	Design the training program	X
	Recruit the core team, the trainers, and the field teams	X
	Set standards and procedures for monitoring and evaluation of training activities	X
	Obtain expertise support from Civil society organizations, building trades and academic institutions	X
	Train on General management skills, Technical skills and Ground rules	✓
	Educate and develop skills and capacity of recruited workers	X
	Develop and utilize multi-skilled workers	X
	Activity reporting	X
	Provide technical guidance to community participants	✓
40. Information Distribution	Distribute drawings, schedules, specifications, etc. on time	✓
41. Request Sellers Response and Select Sellers	Obtain quotes and detains from sellers	?
	Implement the select seller process	✓
	Letter of agreement with partners and sellers	X
	Daily/weekly/monthly activities including changes	X

42. Implement monitoring and controlling	Recruit and deploy experienced management personnel or experts with requisite technical managerial skills to adequately monitor and apply control measures in reconstruction	X
	Deploy professionals and trained personnel and local representatives to monitoring units	X
	Set-up monitoring committees/work groups at local community level	X
	Ensure beneficiary participation in monitoring process to ensure that housing aligns with community needs and expected standards	X
	Establish monitoring and control and evaluation systems	✓
	Establish project communication mechanism during construction	✓
	Monitor and control the project team	X
	Manage stakeholders	X
	Risk monitor and control	X

SECTION E: CLOSURE

66. What are the Managerial Processes you were involved with during project **closure** stage of your project?

We didn't take inventories at the time of taking over. We were not the consultant. We provided tech guidance only. There was no consultant to the project. No one did the overall project management. Basically, cost, Quality, Time was not managed. Log book was showed. Leaflet distributed at awareness programs were showed.

We had a problem know. Media says that people were in tents yet etc. know. So we guided people to first build part of the house and a toilet and to move in. we did a model also to show them that. Like that we introduced them three stages. So they don't have to stay in tents know. Sooner they moved in the tent was demolished. Temporary houses were just there. There were goods and bad about it. But if managed well, it was good. But most those houses needed to be broken down to start permanent house coz the tem house was build right at the middle of the land. Later I did an awareness program to them and they understood that they were wrong.

We had a database to manage the project. (its showed). Site locations are mentioned there. It's an online data base. It's linked on phone. We in Colombo and we don't know what happen at site know. So I made them a mobile app. They update that the moment they go to site. When they go to site they update. Progress need to be entered at every visit. No government input for these. I did this for my satisfaction. I stay at office till late night and did this. Sooner someone update this, database get updated automatically and we also get a notification email. If they have no signal at site they can save it in phone and it get synced when they have reception

I think District Secretariat is not suitable for this. They don't have resources. This guideline is not a regulation. It's not a must to follow that. We need an act. Need a recovery period. A

defined period. Even if it's a massive disaster, we can't keep people in shelter for a long time. So there has to be one fixed recovery period. And need to increase resources according to the magnitude. Otherwise there are a lot of political interferences.

69. Who were the key stakeholders that were involved in during this stage?
70. What were the key considerations taken into account in carrying out Managerial Process during this stage?

Managerial Process	Key Considerations	✓
49. Close the project	Implement exit strategy	✓
	Handover assets, activities, functions etc. to correct agency	✓
	Close internal activities that the implementing agency has established	✓
	Close internal activities that the implementing agency has established with other parties	✓
50. Implement demobilization	Ensure safety and demobilize human resources	✓
	Ensure safety and demobilize equipment, non-consumable goods	✓
51. Handover to Beneficiaries	handover of the houses to their future owners and end-users	✓
	Agree on a finite period during which the agency is responsible for defects	X
52. Closeout reports with lessons learned	Collect knowledge acquired during the project.	X
	Prepare close-out report with lessons learned	X
	Provide feedback report to donors	X
53. Contract closure	Close contracts that are applicable to internal support	✓
	Close contracts that were established with outside parties	✓
54. Post occupancy evaluation	Conduct post occupancy survey	✓
	Evaluate whether reconstruction acted as a catalyst for recovery	X

APPENDIX –C: GUIDELINE TO ASSESS THE IMPACT OF THE DISASTER

ආපදා නිවාස හානි ප්‍රතිපූර්ණය කිරීමේ පිරිවැය ඇස්තමේන්තුව
ජාතික ආපදා සහන සේවා මධ්‍යස්ථානය
ආපදා කළමනාකරණ අමාත්‍යාංශය.

නිවාස වර්ගය -
නිවාස හානි – පූර්ණ අර්ධ

දිස්ත්‍රික්කය - .... ප්‍රා.ලේ කො. - .... වසම .... ගමේ නම ....

සිදුවී ඇති ආපදාව .... ආපදාව සිදු වූ දිනය..................................

නිවසේ හිමිකරුගේ නම :...

ලිපිනය :..

ජාතික හැඳුනුම්පත් අංකය:.. පවුලේ සමාජිකයින් ගනන:.........................

හානියට පත් නිවසේ හිමිකාරත්වය : (ඉල්ලුම්කරු /භාර්යාව/ස්වාමිපුරුෂයා/වෙනත් ....). සකුස.

හානියට පත් නිවස ඉදිකර ඇති ඉඩමේ අයිතිය : (සින්නක්කර/බදු/හිමිකම් සහතික/ බලපත්‍ර/රක්ෂිත/LRC/වෙනත් ....)

දිනය අත්සන

No	Type	Description	Unit	Rate	Quantity	Amount	Remarks
	වහලය	මැටිඋළු(සිංහල උළු/රටඋළු					
		ඇස්බැස්ටෝස්					
		කොන්ක්‍රීට් ස්ලැබ්					
		යකඩ තහඩු					
		පොල් අතු/පිදුරු/තල් අතු					
		දැවමය රාමුව					
		සීවිලිම + දැවමය රාමුව					
	වැහිපිහිලි	වැහි පිහිලි (දිග් අඩි)					
		වැහි පිහිලි නල(දිග් අඩි)					
	ගෙබිම	මැදූ සිමෙන්ති ගෙබිම(සුද තැබීම)					
		ටයිල් ගෙබිම					
		ටෙරාසෝ					
		මැටි/වැලි ගෙබිම					
		කළුගල් ගෙබිම					
		පදම් කල දැව ගෙබිම					
	පිටත බිත්තිය බිත්තිය+කපරුව	ගඩොල් (9 සනකම)					
		කබොක් ගල්					
		බ්ලොක් ගල්(4 සනකම)					
		මැටි/වැලි බිත්ති					
		යකඩ තහඩු					
		පොල් අතු/පිදුරු/තල් අතු					
		දැවමය					
	බිත්තිය පමණක්	9 සන කම ගඩොල් බිත්තිය					
		4 ½ සන කම ගඩොල් බිත්තිය					
	කපරාරුවපමණක්	ඇතුලත බිත්ති					
		පිටත බිත්ති					

No	Type	Description	Unit	Rate	Quantity	Amount	Remarks
	අත්තිවාරම	(9 සනකම) ගඩොල් -අත්තිවාරම කැපිමද ඇතුලත්ව					
		වැරගැන්වූ කොන්ක්‍රීට් අත්තිවාරම අත්තිවාරම කැපිමද ඇතුලත්ව					
		කැටගල් - අත්තිවාරම කැපිමද ඇතුලත්ව					
	දොර/උළුවහු - උපාංග සහිතව	දැව					
		ඇළුමිනියම්					
	තීන්ත පිරියම් කිරිම	පිටක බිත්තිය					
		ඇතුලත බිත්තිය					
		දොර/උළුවහු					
		ගෙබිම					
	විදුලිය/ජල නල	ගෘහ විදුලිබල පද්ධතිය					
		ගෘහ ජල නල පද්ධතිය					
	ජල කරාම පද්ධතිය සහිත වැසිකිලිය	නිවසට ඇදන ලද මූලික උපාංග සහිත වැසිකිලිය					
		නවීන උපාංග සහිත වැසිකිලිය					
	නිවාස පිරිසිදු කිරිම	ආපදාවට පත් නිවස පිරිසිදු කිරිම- කුණු ඉවත් කිරිම ද ඇතුලත්ව					
	ලිද පිරිසිදු කිරිම						
	මුළු එකතුව						

2016.......... දින සිදු වූ........................... ආපදාව නිසා...................... ග්‍රාම නිලධාරි කොට්ඨාශයේ ඉහත නිවස 2016
.... දින සඳහන් නිලධාරින් විසින් පරික්ෂා කර බලන ලදී. ඒ අනුව නිවසට සිදුවූ හානිය අනුව තක්සේරු
වටිනාකම රු........................... බව වාර්තා කරන අතර නිවාස සහනාධාරය සඳහා ද නිර්දේශ කරමු

කමිටු සමාජිකයින්ගේ නම   අත්සන
01...   ....
02...   ....
03...   ....
04...   ....
05...   ....

APPENDIX – D: ELIGIBILITY CRITERIA TO SELECT BENEFICIARIES OF CASE B

පියවර 02: ප්‍රතිලාභීන් තෝරා ගැනීම

"නිවසට නිවසක්" සංකල්පය මත පදනම්ව නිවාස සඳහා රජය මගින් මූලාධාර සපයනු ලබයි. එහි දී නිවසෙහි ජීවත් වූ පවුල් ප්‍රමාණය සැලකිල්ල නොගත යුතුය.

මෙම වැඩසටහනට යටතේ ප්‍රතිලාභීන් තෝරා ගැනීම, අදාළ ප්‍රාදේශීය ලේකම්වරු විසින් සිදු කළ යුතුය.ඒ සඳහා හඳුනාගැනීමේ කමිටුවක සහාය ලබා ගත යුතුය. එහිදී,

- නාය යෑම් මගින් සෑහීයවම හානි වූ නිවාස හිමිකරුවන්
- ජාතික ගොඩනැගිලි පර්යේෂණ සංවිධානය විසින් අධි අවදානම් ලෙස හඳුනාගත්, ඉවත් කිරීමට යෝජිත නිවාස හිමිකරුවන්

ප්‍රතිලාභීන් ලෙස හඳුනාගත යුතුය.
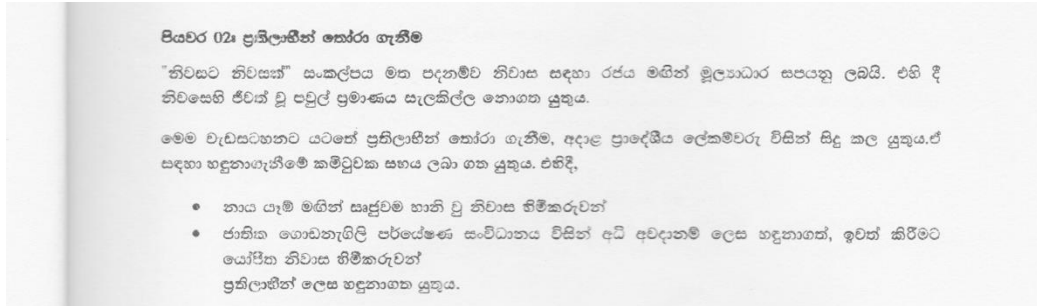
APPENDIX – E: LAND SELECTION CRITERIA OF CASE B

පියවර 05:නැවත පදිංචි කිරීම සඳහා ඉඩම් තෝරා ගැනීම

ප්‍රාදේශීය ලේකම්වරයා විසින් නැවත පදිංචි කිරීම සඳහා ඉඩම් හඳුනා ගැනීමේදී උපයෝජ්‍යතාව අනුව ප්‍රවාහන, වාණිජ, ජල , විදුලිය සහ ප්‍රවේශ මාර්ග යන පොදු අවශ්‍යතා පහසුවෙන් සපයා ගත හැකි ඉඩම් තෝරා ගැනීම කළ යුතුය.

ඒ සඳහා වන පහසුපොදු සම්මුතයන් පරිදි ඉඩම් තෝරා ගැනීම වඩාත් සුදුසුය.
- ඉඩමේ සිට ආසන්නතම නගරයට/කඩමණ්ඩියට දුර කි. මී. 2.5 වඩා අඩු විය යුතු ය.
- ඉඩමේ සිට පවතින ප්‍රවේශ මාර්ගයට දුර කි. මී. 0.5 වඩා අඩු විය යුතු ය.
- නාගරික සංවර්ධන අධිකාරිය මගින් ප්‍රකාශිත ප්‍රදේශයක් නම්, ඒ සඳහා අදාළ අනුමැතියන් ලබා ගත යුතු ය.
- ජලය සහ විදුලි පහසුකම් සැපයීමේ හැකියාව

නැවත පදිංචි කිරීම සඳහා ඉඩම් තෝරා ගැනීමේ දී, පහත සඳහන් ආයතන වල වෘත්තිකයන්ගෙන් සැදුම් ලත් ඉඩම් තෝරා ගැනීමේ කමිටුවක් ස්ථාපිත කළ යුත ය. ප්‍රාදේශීය ලේකම්වරයා විසින් හඳුනා ගත් සියලු ඉඩම් කමිටුව මගින් අධීක්ෂණය කොට නැවත පදිංචි කිරීමේ ව්‍යාපෘතිය සඳහා නිර්දේශ කළ යුතු ය.

APPENDIX – F: OBJECTIVES OF THE PROGRAMME: GUIDE TO RESETTLE DISASTER VICTIMS- CASE B

වැඩසටහනෙහි මූලික අරමුණු:

- ස්වභාවික ආපදා වලින් පූර්ණ භානියට පත් වන සහ ජාතික ගොඩනැගිලි පර්යේෂණ සංවිධානය විසින් අධි අවදානම් නිසා ඉවත් කළ යුතුලෙස හඳුනාගත් පවුල් සඳහා "නිවසට නිවසක්" සංකල්පය මත "මූලික නිවස" තැනීමේ මාර්ගෝපදේශය සහ මූල්‍ය සහය ලබාදීම

- "වඩා යහපත් ලෙස යළි ගොඩනගමු" (Built Back Better) යන සංකල්පය යොදා ගනිමින් නිවාස ඉදිකිරීමට යොමු කිරීම

- ආපදා ප්‍රත්‍යාස්ථීතික(Resilient) නිවසක් ලෙස ඉදිකෙරේද යන්න ප්‍රත්‍යක්ෂ කර ගැනීම
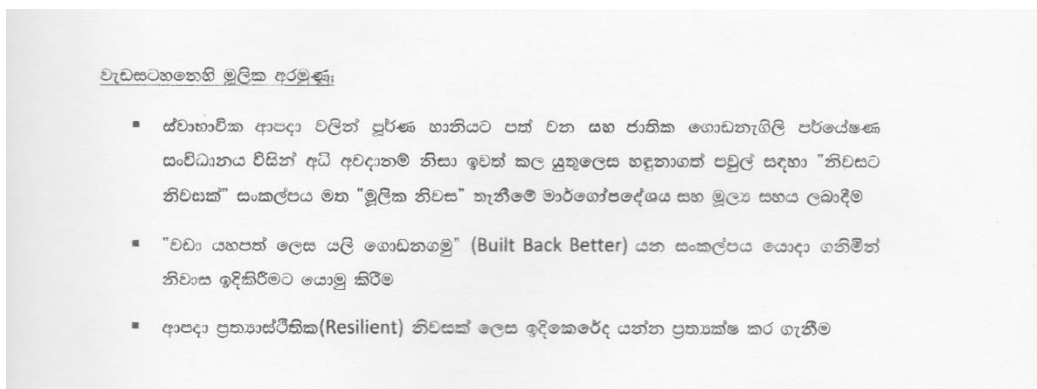
APPENDIX – G: HDCT USED IN CASE B

නැවත පදිංචි කිරීමේ වැඩසටහනෙහි මූලික සම්මතයන්

මූලික නිවස ඉදිකිරීමේදී එහිතිබිය යුතු නියමයන්,

- ජාතික ගොඩනැගිලි පර්යේෂණ සංවිධානය මගින් සකස් කල කැබිනට් මණ්ඩලය විසින් අනුමැතිය ලද නිවාස සැලසුම් ඉදිකිරීම සඳහා යොදා ගත යුතුය.

අනෙකුත් සැලසුම් සඳහා,

- අවම වශයෙන් වර්ග අඩි 650 ක ගෙබිමක් සහිත නිවසක් වීම
- ප්‍රත්‍යස්ථීතික අත්තිවාරම සහ උපරි වහලය (ජා. ගො. ප. ස. නිර්දේශයට අනුවඉදිකිරීම)
- නිදන කාමර 2 ක්(වර්ග අඩි 100ක් සහිත) හෝ වර්ග අඩි 120කට නොඅඩු තනි කාමරයක්
- මුළුතැන්ගෙය
- ස්ථීර වහලය
- ජල මුදිත වැසිකිළිය සහ පුනිත ටැංකිය
- ජලය, විදුලිය සහ ප්‍රවේශ මාර්ග සැපයීම

APPENDIX – H: INSTITUTIONAL MECHANISM OF THE STEERING COMMITTEE OF CASE B

පියවර 01:නැවත පදිංචි කිරීමේ ව්‍යාපෘතිය සඳහා ක්‍රියාකාරී කමිටුවක් ස්ථාපිත කිරීම

නැවත පදිංචි කිරීමේ ව්‍යාපෘතිය ක්‍රියාත්මක කිරීම දිස්ත්‍රික් ලේකම්වරයාගේ මූලිකත්වයෙන් යුතු ව ස්ථාපිත කරනු ක්‍රියාකාරී කමිටුවක් හරහා සිදු කල යුතු ය. නැවත පදිංචි කිරීමේ ක්‍රියාකාරී කමිටුවට අයත් විය යුතු ආයතන සහ ඒවායේ කාර්යභාරයන් පහත වගුවෙන් දැක්වේ.

ආයතනය	වගකීම්
දිස්ත්‍රික් ලේකම් කාර්යාලය	සමස්ථ වැඩසටහන සම්බන්ධීකරණය
ප්‍රාදේශීය ලේකම් කාර්යාලය	ප්‍රාදේශීය මට්ටමින් වැඩසටහන සම්බන්ධීකරණය
	ප්‍රතිලාභීන් හඳුනා ගැනීම සහ තෝරා ගැනීම
	ඉඩම් හඳුනා ගැනීම සහ අත්පත් කර ගැනීම
දිස්ත්‍රික් සහ ප්‍රාදේශීය ආපදා සහන සේවා නිලධාරී	සමස්ථ වැඩසටහන සම්බන්ධීකරණය සඳහා දිස්ත්‍රික් ලේකම්සහ ප්‍රාදේශීය ලේකම්ට සහය දැක්වීම
	ව්‍යාපෘතියෙහි ප්‍රගතිය වාර්තා කිරීම
දිස්ත්‍රික් ආපදා කළමනාකරණ ඒකකය	අන්තර් ආයතන සම්බන්ධීකරණය
ජාතික ගොඩනැගිලි පර්යේෂණ ආයතනය	ප්‍රතිලාභීන් හඳුනා ගැනීම, ඉඩම් තෝරා ගැනීම සහ ඉඩම් සංවර්ධනය සඳහා අවශ්‍ය නිර්දේශ ලබා දීම
	නිවාස සැලසුම් සම්පාදනය සහ ඇස්තමේන්තු සැකසීම
	ඉඩම් අනු බෙදුම්, පිරිසැලසුම් සහ නිවාස සැලසුම් තෝරා ගැනීමට අවශ්‍ය තාක්ෂණික උපදෙස් ලබාදීම
	ඉඩම් සංවර්ධනය සහ නිවාස ඉදිකිරීම කටයුතු සඳහා අවශ්‍ය තාක්ෂණික උපදෙස් ලබාදීම සහ අධීක්ෂණය කිරීම
	සමස්ථ ක්‍රියාවලිය සඳහා අවශ්‍ය තාක්ෂණික උපදෙස් ලබාදීම
වාරිමාර්ග දෙපාර්තමේන්තුව	ගංවතුර ආපදා ප්‍රදේශ වලට අදාල ප්‍රතිලාභීන් හඳුනා ගැනීම, ඉඩම් තෝරා ගැනීම සහ ඉඩම් සංවර්ධනය සඳහා අවශ්‍ය නිර්දේශ ලබා දීම
තාරික සංවර්ධන අධිකාරිය ජාතික භෞතික සැලසුම් දෙපාර්තමේන්තුව	ඉඩම් තෝරා ගැනීම සහ ඉඩම් සංවර්ධනය සඳහා අවශ්‍ය නිර්දේශ ලබා දීම
	පිරිසැලසුම් සකස් කිරීමට අදාල නිර්දේශ ලබා දීම
	නැවත පදිංචි කරන ඉඩම් සඳහා ඉඩම් පරිහරණ රෙගුලාසි හඳුන්වාදීම
නිවාස සහ ඉදිකිරීම් අමාත්‍යාංශය ජාතික නිවාස සංවර්ධන අධිකාරිය	නිවාස සහ ඉදිකිරීම් අමාත්‍යාංශය විසින් සිදුකරන නිවාස ව්‍යාපෘති සමඟ ඒකාබද්ධව ව්‍යාපෘතිය ක්‍රියාත්මක කිරීම.
	නිවාස ඉදිකිරීම් කටයුතු සඳහා අවශ්‍ය තාක්ෂණික උපදෙස් ලබාදීම සහ අධීක්ෂණය කිරීම
වතු යටිතල පහසුකම් අමාත්‍යාංශය	වතු යටිතල පහසුකම් අමාත්‍යාංශය විසින් සිදුකරන නිවාස ව්‍යාපෘති සමඟ ඒකාබද්ධව ව්‍යාපෘතිය ක්‍රියාත්මක කිරීම.
මිනින්දෝරු දෙපාර්තමේන්තුව	ජාතික ගොඩනැගිලි පර්යේෂණ ආයතනයේ මාර්ගෝපදේශයන්ට අනුකූලව ඉඩම් මැනුම්, අනු බෙදුම් සිදු කිරීම
ඉඩම් පරිහරණ ප්‍රතිපත්ති සැලසුම් දෙපාර්තමේන්තුව	ඉඩම් තෝරා ගැනීම සහ ඉඩම් සංවර්ධනය සඳහා අවශ්‍ය නිර්දේශ ලබා දීම
	නැවත පදිංචි කරන ඉඩම් සඳහා ඉඩම් පරිහරණ සැලසුම් සකස් කිරීම
ජාතික ජල සම්පාදන මණ්ඩලය	යටිතල පහසුකම් සැපයීම සඳහා අවශ්‍ය සැලසුම්, ඇස්තමේන්තු සකස්
විදුලි බල මණ්ඩලය	කිරීම සහ ඒවා සැපයීම.
මාර්ග සංවර්ධන අධිකාරිය	
පළාත් පාලන ආයතන	සෞඛ්‍ය සහ සනීපාරක්ෂක පහසුකම් සැපයීම, නිවාස සැලසුම් අනුමත කිරීම, ප්‍රවේශ මාර්ග හා කානු පද්ධති ඉදිකිරීම සහ නඩත්තු කිරීම
පළාත් සභාව	නැවත පදිංචි කිරීමේ වැඩසටහනට අදාල සමාජ ආර්ථික කාරණා සඳහා මැදිහත් වීම.

***දිස්ත්‍රික් ලේකම්වරයාට අවශ්‍යතාව මත පදනම්ව අනෙකුත් රජයේ සහ පෞද්ගලික ආයතන, නැවත පදිංචි කිරීමේ ව්‍යාපෘතිය සඳහා ක්‍රියාකාරී කමිටුව කැඳවිය හැක.

APPENDIX – I: OUTLINE OF TRAINING PROGRAMMES – CASE B

පියවර 07: පුහුණු සහ දැනුවත් කිරීමේ වැඩසටහන්

පහත සඳහන් පුහුණු සහ දැනුවත් කිරීමේ වැඩසටහන් පුාදේශීය ලේකම් කාර්යාල සහ ආපදා සහන සේවා මධ්‍යස්ථානය විසින් ජාතික ගොඩනැගිලි පර්යේෂණ සංවිධානයේ සහයෝගය ඇතිව ක්‍රියාත්මක කල යුතු ය.

පුහුණු සහ දැනුවත් කිරීමේ වැඩසටහන්	ඉලක්ක ගත කණ්ඩායම
කඳුකර පුදේශ වල ඉඩම් මැනුම් කටයුතු සහ බිම් කට්ටි සැලසුම් සකස් කිරීම	මිනින්දෝරුවන්
කඳුකර පුදේශ වල ඉදිකිරීම් කටයුතු සඳහා බිම් සැකසීම සහ සංවර්ධන කටයුතු	ඉදිකිරීම් යන්ත්‍රෝපකරණ ක්‍රියාකරුවන්
කඳුකර පුදේශ වල සහ ගංවතුර ආපදා සහිත පුදේශ වල ඉදිකිරීම් කටයුතු සඳහා බිම් සැකසීම සහ ආපදා ප්‍රතාහාස්ථ ඉදිකිරීම් ක්‍රමවේද	ආපදා සහන සේවා නිලධාරීන්, තාක්ෂණික නිලධාරීන්, පෙදරේරුවන්, නිවාස සිමිකරුවන්

189