

**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 does 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

This research would not have been possible without the assistance and dedication of numerous individuals and organizations who committed their time, thoughts and support abundantly. Hence, it's my privilege to honour and acknowledge all of them.

First and foremost, I pay my heartiest gratitude to my dissertation supervisor Dr. Sachie Gunathilake, for distinct guidance, continuous encouragement, immense patience and constructive criticism provided throughout, for the successful completion of this research.

I would like to express my sincere thanks to Head of the Department Dr. Yasngika Sandanayake, Programme Directors Ch.Qs. Vijitha Disarathna and Ch.Qs. Indunil Seneviratne, all other Lectures, Programme Assistant Ms. Laksmi Siriwardane and other staff members for their invaluable support given throughout the Masters in Project Management programme at University of Moratuwa.

Special acknowledgement goes to all the professionals in the Construction Industry, Public Administration, State Ministries and Tri Forces who contributed by providing data to this research, sparing their valuable time and sharing their specific knowledge, despite busy schedules they competed with. Special mention goes to Mr. Krishanth Sugathapala and Anuruddha for generous assistance given during data collection.

My gratitude get extended to Prof. Dilanthi Amaratunga, Prof. Robert B. Olshansky, Dr. Gayan Wedawattha, for guidance and support given during the formation of research problem and data collection; Mr. Piyal Ganepola, Mr. Edward Fernando, Mr. Pradeep Kodippilai, Nithmi, Chathuranga, Raj Dhakal for assistance given in many different ways.

Further, my immense appreciation goes to Archt. Shashikala Ranasinghe, for augmenting the dissertation with her fine profoundness. Finally, but by no means least, I pay my gratitude to my colleagues and my dear parents for almost unbelievable support and tolerance rendered during the whole process.

CONTENTS

DECLARATION.....	I
ABSTRACT.....	II
ACKNOWLEDGEMENT.....	III
LIST OF FIGURES	VIII
LIST OF TABLES	X
LIST OF ABBREVIATIONS	XI
LIST OF APPENDICES	II
1 CHAPTER 1 – INTRODUCTION.....	1
1.1 Background	1
1.2 Problem Statement	4
1.3 Aim and Objectives	5
1.4 Research Methodology.....	5
1.5 Scope and Limitations	6
1.6 Chapter Breakdown.....	7
2 CHAPTER 2 – LITERATURE REVIEW.....	8
2.1 Introduction	8
2.2 Disasters	8
2.2.1 Impact of Disaster	9
2.2.1.1 On Human beings	9
2.2.1.2 On Economy	10
2.2.1.3 On Built Environment	10
2.2.2 Post Disaster Context.....	11
2.2.3 Disaster Management.....	12
2.3 Post Disaster Reconstruction Projects.....	13
2.3.1 Implementation Methods of PDR	14

2.3.2	Challenges of PDR Projects.....	15
2.4	Project Life Cycle (PLC).....	18
2.4.1	Relationship between Project Life Cycle and Project Management.....	20
2.5	Project Management.....	22
2.5.1	Managing PDR projects	22
2.5.2	Project Management Methodologies	23
2.5.2.1	Heavy-weighted Traditional Project Management Methodologies	24
2.5.2.2	Light-weighted Agile Project Management Methodologies	25
2.5.2.3	Mixed Project Management Methodologies.....	27
2.5.2.4	Heavy-weighted Traditional vs. Light-weighted Agile Project Management Methodologies.....	27
2.5.3	Project Management Methodologies of PDR projects.....	28
2.6	Managerial Processes (MPs) of PDR Projects	29
2.7	Key Considerations (KCs) of Managerial Processes of PDR Projects	32
2.8	Conceptual Framework to Manage PDR projects.....	37
2.9	Summery	39
3	CHAPTER 3 – RESEARCH METHODOLOGY	40
3.1	Introduction	40
3.2	Research Process	40
3.3	Identifying the Research Problem	41
3.4	Literature Review	41
3.5	Research Approach	42
3.6	Research Design.....	43
3.6.1	Case Study Design	45
3.6.2	Identification of Unit of Analysis	46
3.6.3	Selection of Cases	46
3.6.4	Case study Protocol.....	51

3.7	Research Methods	52
3.7.1	Data collection methods.....	52
3.7.1.1	Interviews	53
	Interview Protocol.....	55
3.7.1.2	Documents Review.....	55
3.7.2	Data Analysis Methods	55
3.7.2.1	Content Analysis.....	56
3.7.2.2	Cognitive Mapping.....	56
3.7.2.3	Cross Case Analysis	57
3.7.2.4	Developing the Framework	57
3.8	Research Validity	57
3.9	Ethical Considerations.....	58
3.10	Summery	59
4	CHAPTER 4 – DATA ANALYSIS AND RESEARCH FINDINGS.....	60
4.1	Introduction	60
4.2	Findings from Case Study Analysis	60
4.2.1	Stages of PDR Projects	60
4.2.1.1	Case A.....	60
4.2.1.2	Case B.....	63
4.2.1.3	Cross Case Analysis	66
4.2.2	Managerial Process (MPs) of PDR Projects	68
4.2.2.1	Case A.....	68
4.2.2.2	Case B.....	71
4.2.2.3	Cross Case Analysis	74
4.2.3	Key Considerations (KCs) of Managerial Processes of PDR Projects ..	76
5	CHAPTER 5 - DISCUSSION AND DEVELOPMENT OF FRAMEWORK	
	109	

5.1	Introduction	109
5.2	Project Life Cycle (PLC) of PDR Projects in Sri Lanka.....	109
5.3	Managerial Processes (MPs) of PDR Projects in Sri Lanka	112
5.3.1	Stage 1- Assessing and Designing	114
5.3.2	Stage 2 - Common Planning (CP).....	114
5.3.3	Stage 3 - Phase Planning (PP).....	115
5.3.4	Stage 4 - Phase Implementation (PI)	115
5.3.5	Stage 5 - Phase Closure (PC).....	115
5.3.6	Stage 6 - Complete Closure (CC)	116
5.4	Key Considerations (KCs) of Managerial Processes of PDR Project in Sri Lanka	116
5.5	Project Management Methodology for PDR projects in Sri Lanka	137
5.6	Proposed Framework to Manage PDR Projects.....	139
6	CHAPTER 6 – CONCLUSIONS AND RECOMMENDATIONS.....	144
6.1	Introduction	144
6.2	Overview of the Research	144
6.3	Conclusion.....	144
6.4	Recommendations	147
6.5	Future Research Directions	149
	REFERENCES.....	150
	APPENDICES	164

LIST OF FIGURES

Figure 2-1: Deaths due to Natural Disasters in Sri Lanka form 1974-2017	10
Figure 2-2: Houses Destroyed due to Natural Disasters in Sri Lanka form 1974-2017	11
<i>Figure 2-3: Disaster Cycle</i>	12
Figure 2-4: Resources over phases of project life cycle adopted from Pinto & Prescott (1988), Kerzner (2009) and PMI (2013).....	20
Figure 2-5: Managerial Processes by project phases adopted by (Cleland & Ireland, 2002; Adams & Brandt, 1988).....	21
Figure 2-6: Waterfall development methodology adopted from (Charvat, 2003).	24
Figure 2-7: Spiral methodology adopted from Boehm (1988)	25
Figure 2-8: Outline proposal to arrive at a framework to manage Post disaster Resettlement projects	37
<i>Figure 2-9: Conceptual framework to Manage PDR projects</i>	38
Figure 3-1: The research process adopted in this study	40
Figure 3-2: Basic types of case study designs (Yin, 2014).....	45
Figure 3-3: Affected area from landslide (left). Relocated site (right)	48
Figure 3-4: Images of completed houses of Case A	48
Figure 3-5: Impact of the main landslide occurred in 2016 in Kegalle Disaster	49
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	50
Figure 4-1: Linkages between stages of Case A	62
Figure 4-2: Linkages between stages of Case B	65
Figure 4-3: Linkages between stages of Cases A and B	68
Figure 4-4: Cognitive map illustrating distribution of managerial process during PLC stages of Case A.....	69
Figure 4-5: Cognitive map illustrating distribution of managerial process during PLC stages of Case B	72
Figure 4-6: Sample of coding used to identify key considerations of each managerial process.....	76
Figure 4-7: Selected land of Case A. Source: NBRO, 2017	88

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).....	102
Figure 4-9: Interface of the App developed for monitoring the project (left), Cover of the Log Book (right).....	105
Figure 5-1: Project Life Cycle (PLC) of PDR projects in Sri Lanka.....	109
Figure 5-2: Framework to successfully manage PDR projects in Sri Lanka – Level 1	140
Figure 5-3: Framework to successfully manage PDR projects in Sri Lanka – Level 2	142

LIST OF TABLES

Table 2-1: Implication methods of Post Disaster Reconstruction projects.....	14
Table 2-2: Challenges of PDR Projects identified by literature	16
Table 2-3: Compilation of Phases of Project Life Cycle	18
Table 2-4: Comparison of heavy-weighted traditional vs light-weighted agile project management	27
Table 2-5: Suggested management approaches by various authors for PDR projects	28
Table 2-6: Managerial processes of PDR projects.....	31
Table 2-7: Managerial process of PDR projects and their key considerations	32
Table 3-1: Types of Research Designs	43
Table 3-2: Summary of cases selected.....	50
Table 3-3: Case study protocol adopted.....	51
Table 3-4: Qualitative data collection methods adopted from Creswel (2014), Flick (2009) and Yin (2014).....	52
Table 3-5: Types of Interviews in data collection	53
Table 3-6: Profiles of interviewees	53
Table 3-7: Interview Protocol of the research.....	55
Table 3-8: four critical conditions related research validity	58
Table 4-1: Stages PLC of Case A	61
Table 4-2: Stages of PLC of Case B	64
Table 4-3: Cross case analysis of stages of Case A and B.....	67
Table 4-4: Distribution of managerial processes of cases	74
Table 4-5: Managerial processes by project Life Cycle Stages of Cases	75
Table 4-6: Managerial processes and Key considerations obtained from the filed	76
Table 5-1: PLC Stages of PDR Projects	110
Table 5-2: Distribution of Managerial Process amongst PLC stages of PDR projects in Sri Lanka.....	112
Table 5-3 : Managerial Processes (MPs) of PDR projects in Sri Lanka.....	113
Table 5-4: Key Considerations of Managerial Processes of PDR projects in Sri Lanka	116

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

Appendix –A: Interview Guideline.....	164
Appendix –B: Example of an Interview Transcript Case Study B – Other Consultant 171	
Appendix –C: Guideline to Assess the Impact of the Disaster	185
Appendix – D: Eligibility Criteria to Select Beneficiaries of Case B.....	187
Appendix – E: Land Selection Criteria of Case B	187
Appendix – F: Objectives of the Programme: Guide to Resettle Disaster Victims- Case B	187
Appendix – G: HDCT used in Case B	188
Appendix – H: Institutional Mechanism of the Steering Committee of Case B.....	188
Appendix – I: Outline of Training Programmes – Case B.....	189