

A FRAMEWORK FOR RESILIENT RURAL COMMUNITY ON
NATURAL DISASTER IN MALAYSIA

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DEDICATION

This thesis is dedicated to: The sake of Allah s.w.t., my Creator and my Master, My great teacher and messenger, Mohammad s.a.w. (May Allah s.w.t. bless and grant him), who taught us the purpose of life, My ma, baba and mama, who loves me unconditionally, My dearest husband (Anas Fathi bin Mohd Yusuff), who lead me with light of hope and support, My beloved brothers and sisters (in-laws); My beloved kids: Mimi, Yaya, Chichik, Ayeep, and Athif, whom I can't force myself to stop loving. To all my family, my symbol of love and giving, My friends who encourage and support me, All the people in my life who touch my heart, I dedicate this research.

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ABSTRACT

Natural disasters events have put many lives everywhere at risk, particularly those in the rural areas. It is estimated that 4.82 million people in Malaysia are affected annually by flooding events. The growing body of literature on climate change, disaster risk reduction (DRR), and community resilience indicates an increased focus on research works to understand the phenomena of natural disasters and to build a resilient community. Developing a community-based disaster preparedness is increasingly considered as an important component of DRR with the potential to increase the community's resilience to natural disasters through identification of community capitals, role of local knowledge for interventions, and/or responses to natural disasters. This study therefore aims to achieve the following five objectives. (1) to identify the concept of a resilient rural community in relation to international agenda for DRR and determine the practical form of framework for application in a local context, (2) to determine the rural communities' current DRR-related practices and gather information on community capitals which are vital for building a resilient rural community against natural disasters, (3) to assess the state of community capitals that comprises the economic, social, and environmental components, (4) to examine the relationships between community capitals and factors that influence resilience towards natural disaster, (5) to formulate a disaster resilience rural community (DRRC) operational framework for local disaster managers and committees. Through a literature review, a conceptual framework for disaster resilience rural community (DRRC) towards disaster is proposed and later assessed in a field-testing. Three rural communities in the East Coast of Peninsular Malaysia were selected as case-study areas, namely (1) Lubok Setol village in Kelantan; (2) Teladas village in Terengganu, and (3) Gajah Mati village in Pahang. A total of 90 respondents sampled from stratified random sampling participated in the household survey. The survey of the local stakeholders was based on questionnaire-guided interviews carried out by the researcher with assistance provided by local informants. Assessment for determining level of community resilience was carried out using Descriptive and Frequency Analysis, and the influential factors for community resilience were analysed using Relative Importance Index (RII) Value and Interpretation. Findings from the fieldwork were confirmed or validated by a group of experts via interviews. The results showed that community resilience to flooding in all the three communities is strongly linked to internal and external factors, namely the individual's adoption of local knowledge combined with intervention and support from related government agencies and nongovernmental organisations (NGOs). These findings were then integrated into the conceptual framework, which was further validated through the experts' engagement and semi-structured interviews. In total, seven (7) experts in DRR consisting of academicians, practitioners, government officials, and NGOs participated in the validation process. Index Analysis was adopted to determine the suitability uptakes of the proposed components of the framework. The final proposed framework consists of four major components: (1) community capital of economic, social and environment, (2) modelling DRRC to natural disasters, (3) key drivers for DRRC, and (4) key deliverables of DRRC. This framework can be applied as a tool to assist our local disaster managers and committees towards building a resilient rural community against natural disaster events in Malaysia.

ABSTRAK

Kejadian bencana alam mendatangkan risiko terhadap penduduk termasuk di kawasan luar bandar. Dianggarkan 4,820,000 penduduk Malaysia terjejas akibat banjir setiap tahun. Terdapat peningkatan dalam kajian berkenaan perubahan iklim, pengurangan risiko bencana (DRR), dan daya tahan komuniti untuk memahami fenomena bencana, serta pembangunan komuniti berdaya tahan. Dengan itu, membangunkan kesediaan bencana berasaskan komuniti semakin ditekankan sebagai komponen penting DRR dengan potensi meningkatkan daya tahan masyarakat kepada bencana melalui identifikasi keupayaan modal masyarakat, peranan pengetahuan lokal, dan tindak balas terhadap bencana. Kajian ini bertujuan mencapai lima objektif: (1) mengkaji semula konsep masyarakat luar bandar berdaya tahan yang dikaitkan dengan agenda DRR di peringkat antarabangsa dan menentukan kerangka yang praktikal dengan konteks setempat bagi pelaksanaan, (2) mengkaji amalan DRR semasa oleh komuniti luar bandar dan mengumpulkan maklumat sumber masyarakat yang menunjukkan tahap daya tahan masyarakat terhadap bencana, (3) menilai keadaan sumber masyarakat terdiri daripada ekonomi, sosial, dan alam sekitar, (4) mengkaji hubungan antara sumber masyarakat dengan faktor-faktor yang mempengaruhi ketahanan terhadap bencana, dan (5) merumuskan kerangka berdaya tahan bencana operasi bagi pengurus dan jawatankuasa bencana setempat. Melalui kajian literatur, kerangka konseptual masyarakat luar bandar yang berdaya tahan terhadap bencana (DRRC) dicadangkan, dan kerangka ini kemudiannya dinilai dalam ujian lapangan. Tiga komuniti luar bandar Pantai Timur Semenanjung Malaysia dipilih sebagai kajian kes, iaitu (1) Kampung Lubok Setol, Kelantan; (2) Kampung Teladas, Terengganu, dan (3) Kampung Gajah Mati, Pahang. Seramai 90 orang responden diambil daripada persampelan rawak berstrata dalam tinjauan ketua isi rumah. Kajian terhadap pihak berkepentingan setempat adalah berdasarkan temu bual dipandu penyelidik. Penilaian untuk menentukan tahap daya tahan masyarakat dijalankan menggunakan Analisis Deskriptif dan Kekerapan, dan faktor-faktor mempengaruhi ketahanan masyarakat dianalisis menggunakan Nilai Indeks Kepentingan Relatif (RII) dan Interpretasi. Dapatan kajian daripada kerja lapangan disahkan oleh sekumpulan pakar melalui temu bual. Hasil menunjukkan ketahanan masyarakat terhadap banjir di ketiga-tiga kes kajian ini dikaitkan dengan faktor-faktor dalaman dan luaran, iaitu penerapan pengetahuan lokal individu yang digabungkan dengan intervensi dan sokongan daripada agensi berkaitan dan organisasi bukan kerajaan. (NGO). Dapatan kajian ini seterusnya diintegrasikan dengan kerangka konseptual, kemudiannya disahkan melalui penglibatan para pakar dalam sesi temu bual separa berstruktur. Secara keseluruhannya, tujuh (7) orang pakar dalam DRR terdiri daripada ahli akademik, pengamal, pegawai kerajaan, dan badan bukan kerajaan (NGO) terlibat dalam proses pengesahan. Analisis Indeks digunakan untuk menentukan kesesuaian komponen kerangka yang dicadangkan. Cadangan akhir kerangka tersebut mengandungi empat komponen utama: (1) modal ekonomi, sosial dan alam sekitar masyarakat, (2) pembentukan model DRRC terhadap bencana, (3) pemacu utama DRRC, dan (4) hasil utama DRRC. Rangka kerja ini boleh digunakan sebagai panduan pengurus dan jawatankuasa bencana setempat bagi membina masyarakat luar bandar berdaya tahan terhadap bencana alam di Malaysia.

TABLE OF CONTENTS

	TITLE	PAGE
	DECLARATION	iii
	DEDICATION	iv
	ACKNOWLEDGEMENT	v
	ABSTRACT	vi
	ABSTRAK	vii
	TABLE OF CONTENTS	viii
	LIST OF TABLES	xiv
	LIST OF FIGURES	xix
	LIST OF ABBREVIATIONS	xxiii
	LIST OF APPENDICES	xxiv
CHAPTER 1	INTRODUCTION	1
1.1	Introduction	1
1.2	Problem Statement	2
1.2.1	Context	2
1.2.2	The Lack of Understanding of the Concept of Resilient Community among Stakeholders	4
1.2.3	Imbalance between the Top-Down and “Community-Centric” DRR Approaches in Building Resilience Agenda	6
1.2.4	Absence of Framework for Building Disaster Resilience for Rural Community in Malaysia	10
1.3	Research Questions	12
1.4	Research Goal and Objectives	12
1.5	Expected Outcomes	13
1.6	Research Implications	14
1.7	Organization of Thesis	15

CHAPTER 2	CONCEPT OF COMMUNITY RESILIENCE IN THE CONTEXT OF DISASTER RISK REDUCTION (DRR)	18
2.1	Introduction	18
2.2	Disaster Phenomena and Climate Change	19
	2.2.1 Disaster Phenomena at Global Stage	20
	2.2.2 Is Climate Change and Disaster Phenomenon Interrelated?	22
2.3	The Concept of Resilience	24
	2.3.1 Nature of Resilience	25
	2.3.2 Application of Resilience Concept to Community Planning	28
2.4	Disasters Resilience	32
	2.4.1 Impacts of Disasters on Human Activities and Rural Livelihood	32
	2.4.2 The DRR Framework and Sustainable Development Goals (SDGs)	33
	2.4.3 Linking Resilience Concept to Agenda 2030	36
2.5	The Conceptual Model of Community Resilience towards Disaster	38
	2.5.1 Disaster Resilience Models and Frameworks	39
	2.5.2 Components of a Resilient Rural Community	50
	2.5.3 Integration of Local Knowledge in Building Community Resilience	52
	2.5.4 Disaster Management Cycle – Prevention/Mitigation, Preparedness, Response, and Recovery	56
	2.5.5 Adaptive Capacity	57
	2.5.6 Social Safety Nets (SSNs)	59
	2.5.7 Self-help, Mutual Assistance, Public Assistance and Steps in Building Social Capital	61
	2.5.8 A Disaster-Resilient Rural Community: Top-Down vs Bottom-Up Approach	64
	2.5.9 Best Practice of Community Resilience to Disaster	67
2.6	Summary	70

CHAPTER 3	DISASTER RISK REDUCTION (DRR) INITIATIVES IN MALAYSIA	72
3.1	Introduction	72
3.1.1	Natural Disasters in Malaysia	72
3.1.2	Government Allocation for Disaster Recovery	75
3.1.3	Social Safety Nets for DRR	78
3.2	DRR Components in Disaster Management Agencies and Physical Planning	80
3.2.1	National Policy Management Mechanism and Disaster Aid – Directive No.20	84
3.2.1.1	Command and Control (Top-Down Approach) in Malaysia Disaster Management	86
3.2.1.2	Disaster Risk Management Cycle in Malaysia	88
3.2.2	National Rural Development Policy (NRDP) 2030	89
3.2.3	National Rural Physical Planning Policy 2030	91
3.2.4	Melaka Declaration on DRR (MD-DRR)	95
3.2.5	National Civil Defense (APM) – CDERT-C	96
3.2.6	Building Resilient Communities Initiatives by MERCY	97
3.3	Challenges in Implementing DRR in Malaysia	98
3.3.1	The Imbalance Between the Top-Down and Bottom-Up Approaches to DRM	98
3.3.2	Lack of Coordination in Executing the Disaster Management Cycle (DMC) among Agencies	99
3.3.3	Financial Limitation	99
3.4	Proposed Conceptual Framework for DRR in Rural Area of Malaysia	100
3.5	Summary	109
CHAPTER 4	RESEARCH METHODOLOGY	111
4.1	Introduction	111
4.2	Research Approaches	113
4.2.1	Adoption of Case Study	115

4.2.2	Single Case Study vs Multiple Case Study	118
4.3	Data Collection Techniques	119
4.3.1	Household Survey using Questionnaire	119
4.3.2	Semi-structured Interviews	121
4.3.3	Field Observation and Photograph	122
4.3.4	Review of Secondary Sources	123
4.3.5	Field Enumerator Assistance	124
4.3.6	Expert Interviews – Stage of Validation of Framework	127
4.4	Data Collection Procedure	128
4.4.1	Preliminary Site Investigation	129
4.4.2	Pilot Study	130
4.4.3	Actual Field Study	131
4.4.4	Limitation and Challenges in Data Collection Process	131
4.4.5	Overcoming the Challenges	132
4.5	Data Analysis	133
4.6	Triangulation	134
4.7	Validity and Reliability	135
4.8	Background of the Study Area	138
4.9	Profile of the Three Communities	149
4.9.1	Kampung Lubok Setol, Kelantan	150
4.9.2	Kampung Teladas, Terengganu	158
4.9.3	Kampung Gajah Mati, Pahang	164
4.9.4	Inventory of Public Amenities	170
4.10	Summary	170
CHAPTER 5	DATA ANALYSIS AND RESULTS	172
5.1	Introduction	172
5.2	Presentation of Results	173
5.2.1	Profile of Respondents	173
5.2.2	Gender and age structure	173
5.2.3	Level of Education	175

5.2.4	Occupation and Household Income	176
5.3	Respondent's Perception on Local Disaster Risk Reduction Practices	179
5.3.1	The Impacts of Floods to Community	183
5.3.2	Local DRR Measures Implementation	188
5.3.2.1	Kampung Lubok Setol, Kelantan	188
5.3.2.2	Kampung Teladas, Terengganu	192
5.3.2.3	Kampung Gajah Mati, Pahang	193
5.4	Assessment of Community Capitals for Resilience	195
5.4.1	State of Community: Economic Capital	196
5.4.2	State of Community: Social Capital	200
5.4.3	State of Community: Environmental Capital	205
5.4.4	The State of Resilience based on Community Capital Assessment	210
5.5	Analysis of Perception on Factors for Disaster Resilience Rural Community (DRRC)	213
5.6	Analysis of Key Components to DRRC	220
5.6.1	Kampung Lubok Setol	225
5.6.2	Kampung Teladas	230
5.6.3	Kampung Gajah Mati	235
5.6.4	Analysis of Key Drivers of DRRC	241
5.6.5	Analysis of DRRC Key Deliverables	243
5.7	Summary	245
CHAPTER 6	PROPOSED FRAMEWORK FOR A RESILIENT RURAL COMMUNITY ON NATURAL DISASTER (DRRC)	251
6.1	Introduction	251
6.2	The Nature of the Framework	251
6.3	Framework Development Resulted from Literature Review and Local Communities Survey	253
6.3.1	DRRC Community Capitals State and Readiness	254
6.3.2	DRRC Key Drivers	256
6.3.3	DRRC Key Deliverables	256

6.4	Validation of the DRRC Framework	257
6.4.1	Validation of the Proposed DRRC Framework through Expert Interviews	257
6.4.1.1	Design of questionnaire for validation of framework	259
6.4.2	Validation of DRRC Framework: Analysis and Results	260
6.4.2.1	Background of Experts	260
6.4.2.2	Validation of Proposed DRRC Framework	260
6.4.2.3	Perceived Effectiveness of Proposed Framework	267
6.4.2.4	Usability of Proposed Framework	268
6.4.2.5	Benefits of Proposed Framework	269
6.5	Finalizing the DRRC Framework	270
6.5.1	Modelling DRRC for Implementation at Community/Local Level	272
6.6	Limitations and Challenges in the Implementation of the DRRC Framework	273
6.7	Summary	274
CHAPTER 7	CONCLUSION	275
7.1	Introduction	275
7.2	Research Contribution	275
7.3	Recommendations for Future Research	277
7.4	Summary	278
	REFERENCES	279
	LIST OF PUBLICATIONS	328

LIST OF TABLES

TABLE NO.	TITLE	PAGE
Table 2.1	Twenty natural disasters globally from the year 1997 – 2016 (CRED), 2015)	21
Table 2.2	Resilience concept in various fields of research (review of literature)	25
Table 2.3	Resilience community defined in previous studies (review of literature)	26
Table 2.4	Resilience community indicators (adopted from (Wilson (2011); Cutter, Ash, & Emrich. (2014;); Kamarudin, Razak, Ngah, Ibrahim, & Harun (2015;); and Sharifi (2016))	31
Table 2.5	Disaster impacts on human activities and rural livelihood	32
Table 2.6	Definition of resilience, community, and rural official (review of literature)	51
Table 2.7	Local knowledge as term and defined by scholars (source: review of literature)	53
Table 2.8	Social Protection and Labour Market Intervention Area and ASPIRE Classification of SSN Programs	60
Table 3.1	Natural Disaster in Malaysia Year 1997 – 2016 (EM-DAT, 2017)	73
Table 3.2	History of Natural Disaster Incident in Malaysia (Center for Excellence in Disaster Management and Humanitarian Assistance, 2016; Chan, 2012; Mohamed Shaluf & Ahmadun, 2006)	74
Table 3.3	Distribution of compassionate payment for disaster victims 2012-2018	76
Table 3.4	Implementation of SSN and total spending in 2018 (annual spending as a percentage of GDP) by Malaysia (World Bank, 2018)	79
Table 3.5	Detail descriptions of three key elements circles of DRRC	105
Table 4.1	Summary of the three main research methodological approach based on review of literature (Keraminiyage, 2010)	111
Table 4.2	Advantages and disadvantages of research models	112

Table 4.3	Major differences between deductive and inductive approaches in research (Saunders et al. 2008)	113
Table 4.4	Compilation of previous community resilience studies that adopted case study as a research strategy	116
Table 4.5	Advantages and disadvantages of mix method (Creswell, 2016; Saunders et al., 2008)	117
Table 4.6	Distribution of survey sample according to villages	120
Table 4.7	Data collection techniques	126
Table 4.8	Case Study Research Validity and Reliability adopted in the research	136
Table 4.10	Selection of study area criteria's	139
Table 4.11	Flood area in Malaysia (2014/2015) (Malaysia Drainage and Irrigation Department (DID), 2017, p. 102)	140
Table 4.12	Village classified as disaster risk village in Malaysia (PLANMalaysia, 2016c)	141
Table 4.13	Disaster Risk Village based on Type of Village (PLANMalaysia, 2016c)	142
Table 4.14	Disaster Assistance based on Disaster Type (Department of Social and Welfare Malaysia (JKM), 2016a)	144
Table 4.14	List of villages engaged by MERCY in implementing CBDRM	147
Table 4.16	Total number of evacuated victims in the State of Kelantan during 2014 Flood (Director of Kelantan State Development, 2015)	151
Table 4.16	Total number of damaged houses in the State of Kelantan	151
Table 4.17	Inventory of public amenities and infrastructure of Kampung Lubok Setol	156
Table 4.18	Inventory of public amenities and infrastructures of Kampung Teladas	162
Table 4.19	Inventory of public amenities and infrastructure of Kampung Gajah Mati	168
Table 4.20	List of public amenities and infrastructure for three villages	170
Table 5.1	Gender of respondents (all villages) (n=90)	173
Table 5.2	Level of education of respondents in all villages (n=90)	175
Table 5.3	Occupation of respondents in all villages (n=90)	177

Table 5.4	Gross monthly income of respondents in all villages (n=90)	178
Table 5.5	Respondents' length of stay in the village (n=90)	180
Table 5.6	Assessment of respondents' awareness and preparedness towards flood in case study areas: analysis of mean value and standard deviation of (n=90)	181
Table 5.7	Respondents who experienced loss after a disaster event in all villages (n=90)	184
Table 5.8	Respondents social loss due to disaster in all villages (n=90)	187
Table 5.9	Assessment of DMC measures implemented by the local community, government agencies, and NGOs in Kampung Lubok Setol	189
Table 5.10	Assessment of DMC measures implementation by the local community, governmental agencies, and NGOs in Kampung Teladas.	192
Table 5.11	Assessment of Implementation of DMC measures by the local community, governmental agencies, and NGOs in Kampung Gajah Mati	194
Table 5.12	Indicators for measuring economic capital	196
Table 5.13	Resilience level of 14 economic capital indicators	199
Table 5.14	Assessment of resilience community based on economic capital	199
Table 5.15	Indicators for measuring social capital	200
Table 5.16	Resilience level of 16 social capital indicators	203
Table 5.17	Assessment of community resilience based on social community capitals	204
Table 5.18	Indicators for measuring environmental capital	205
Table 5.19	Resilience level of 14 environmental capital indicators	207
Table 5.20	Assessment of community resilience based on environmental capital	209
Table 5.21	Internal factors that contribute to disaster resilience among the rural community (n=90)	219
Table 5.22	External factors contributing to disaster resilience among the rural community (n=90)	219
Table 5.23	Ranking of factors for resilience community using RII value/score (n=90)	221

Table 5.24	Ranking of the 10 most important factors contributing to DRRC – all components	223
Table 5.25	Ranking of 10 Least Important Factors Contributing to DRRC	224
Table 5.26	Mean value of RII and ranking of resilience key components	224
Table 5.27	Ranking of factors for resilience community using RII value/score by the respondents from Kampung Lubok Setol (n=37)	225
Table 5.28	Most important factors contributing to the DRRC as rated by the respondents from Kampung Lubok Setol	227
Table 5.29	The least important factors contributing to DRRC as ranked by the respondents from Kampung Lubok Setol	229
Table 5.30	Mean value of RII and ranking of resilience key components of Kampung Lubok Setol	229
Table 5.31	Rank of factors for resilience community using RII value/score by respondents of Kampung Teladas (n=32)	230
Table 5.32	Ranking of 10 most important factors contributing to DRRC by respondents from Kampung Teladas	233
Table 5.33	Ranking of the 10 least important factors contributing to DRRC by the respondents from Kampung Teladas	234
Table 5.34	Mean value of RII and ranking of resilience key components of Kampung Teladas	235
Table 5.35	Ranking of factors for resilience of community using RII value/, as rated by the respondents from Kampung Gajah Mati (n=21)	236
Table 5.36	Ranking of the 13 most important factors contributing to DRRC by the respondents from Kampung Gajah Mati	238
Table 5.37	The least important factors contributing to DRRC as ranked by the respondents of Kampung Gajah Mati	240
Table 5.38	Mean value of RII and ranking of resilience of key components of Kampung Gajah Mati	240
Table 5.39	Assessment of respondents' perception on DRRC key drivers	241
Table 5.40	Link between key drivers for DRRC and dimension of resilience community capitals	243
Table 5.41	Assessment of respondents' perception on DRRC key deliverables	245

Table 5.42	Summary of measures implemented by the communities, government, and NGOs	248
Table 6.1	Respondent's Background	260
Table 6.2	Respondents' responses on the contribution of the proposed framework towards policies	261
Table 6.3	Experts' validation of community capitals through index analysis	262
Table 6.4	Validation of DRRC key drivers by expert through index analysis	263
Table 6.5	Linking key drivers with community capital indicators based on expert inputs	264
Table 6.6	Validation on DRRC key deliverables	265
Table 6.7	The ranking of practices based under each planning process using RII value/score given by respondents (n=7)	266

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
Figure 1.1	Research gap – challenges in initiatives and policy directions for making cities in Malaysia more resilient (Rosly, 2015)	6
Figure 1.2	Organization of research	17
Figure 2.1	Climate change causals: natural and man-made (Banholzer et al., 2014; McMichael, 2013; Whitaker, 2008)	23
Figure 2.2	Resilient community capitals (Wilson, 2012)	27
Figure 2.3	Explanation of resilience concept from four (4) different scenarios in schematic (adaption from Bruneau & Reinhorn (2006); Wilson (2012); DFID, 2011 in (Akter & Mallick, 2013))	29
Figure 2.4	Four priorities for action in Sendai Framework for DRR (UNISDR, 2015)	34
Figure 2.5	List of Sustainable Development Goals (SDGs)	35
Figure 2.6	SFDRR and SDGs indicators for reporting and monitoring (UNISDR, 2019)	35
Figure 2.7	Resilience concept as catalyst to SDGs illustrated in lifeline model	37
Figure 2.8	Resilience towards disaster illustrated in the mathematical model (Hayashi, 2017)	41
Figure 2.9	Resilience towards disaster illustrated in lifeline (adaptation from Akter & Mallick, 2013; Bruneau & Reinhorn, 2006; Hayashi, 2017; Wilson, 2012)	42
Figure 2.10	DROP model illustrated in schematic form (Cutter et al., 2008)	45
Figure 2.11	Local disaster resilience conceptual model illustration (Ross, 2013)	47
Figure 2.12	The community resilience framework – emBRACE (Kruse et al., 2017)	48
Figure 2.13	PEOPLES framework dimensions (Renschler et al., 2010)	49
Figure 2.14	Review of literature on definition of local knowledge word cloud (http://worditout.com/word-cloud/create). Retrieved on 29 March 2018.	54

Figure 2.15	Integration of local knowledge and scientific knowledge in disaster risk management	55
Figure 2.16	Illustration of adaptive capacities (adapted from Matarrita-Cascante et al., 2017)	58
Figure 2.17	Social protection and labour market intervention area (SPL) and ASPIRE Classification of SSN Programs (adopted from World Bank, 2018)	61
Figure 2.18	The dynamics of disaster resilient communities adopted in Japan (Office of Disaster Reconstruction, 2011)	62
Figure 2.19	Integration of concept of (1) self-help, mutual assistance and public assistance with the different levels of (2) social capital building. Adopted from (Mathbor, 2007; Office of Disaster Reconstruction, 2011)	63
Figure 2.20	Top down versus bottom up approach to resilience community	66
Figure 2.21	The community resilience ladder by LACCDR.	69
Figure 3.1	Example of state structure plan and district local plan (PLANMalaysia@Selangor, 2019; PLANMalaysia@Pahang, 2019)	81
Figure 3.2	Integration of physical planning and disaster management in Malaysia (adapted from JKM, 2016b; PLANMalaysia, 2016b, 2016c; APM, 2017a; Department of Mineral and Geoscience Malaysia, 2017; UNISDR, 2019)	83
Figure 3.3	Malaysia's disaster management structure (adapted from (Center for Excellence in Disaster Management and Humanitarian Assistance, 2016, p. 30))	85
Figure 3.4	Command and control approach implemented in Malaysia disaster management (adapted from (APM, 2017a; Economic Planning Unit, 2015a; MERCY Malaysia, 2018a; National Security Council (NSC), 1997)	87
Figure 3.5	Malaysia disaster management structure (adapted from (Center for Excellence in Disaster Management and Humanitarian Assistance, 2016, p. 30)	89
Figure 3.6	NRDP 2030 – main thrust, strategies and steps in relation to DRR (KPLB, 2019b)	90
Figure 3.7	Initiatives by PLANMalaysia in DRR through three legal binding documents at national level (EPU, 2015; UNISDR, 2015; PLANMalaysia, 2016c, 2016b)	93
Figure 3.8	Melaka Declaration on DRR elements (Tan et al., 2013)	96

Figure 3.9	Road map for integrating knowledge, action and stakeholder for DRR (adopted from Gaillard & Mercer, 2013)	101
Figure 3.10	Proposed conceptual framework for resilient community towards disaster in Malaysia (adopted from (Kamarudin, 2013; PLANMalaysia, 2016c, 2016b; Tan et al., 2013; Wilson, 2012))	103
Figure 4.1	Main components of research process included in research onion (Saunders et al., 2008, p.138)	113
Figure 4.2	Basic types of designs for case studies (adopted from Yin, 2014)	119
Figure 4.3	Using photograph is crucial for capturing activities related to DRR and storing evidence for future references.	123
Figure 4.4	Flow Chart of Research Design	129
Figure 4.5	Relative Importance Index (RII)	133
Figure 4.6	Appointment of the Manager and Evacuation Center Committee by JKM (Department of Social and Welfare Malaysia (JKM), 2016b)	145
Figure 4.7	Distribution of Village in the Natural Disaster Risk Area (Source: (PLANMalaysia, 2016c, p. 86))	148
Figure 4.8	Location map of three case study areas (www.google.com.my/map, 2017 (PLANMalaysia, 2016a))	150
Figure 4.9	Land-use map of Kampung Lubok Setol	154
Figure 4.10	Lubok Setol flood map during ordinary and severe flood events	155
Figure 4.11	Lubok setol village SRS Committee	157
Figure 4.12	Land use map of Kampung Teladas (Research fieldwork in 2018)	160
Figure 4.13	Teladas village flood map during ordinary and severe flood events	161
Figure 4.14	The evacuation center committee by JKM is posted clearly on the evacuation center	163
Figure 4.15	Gajah Mati village land use map	166
Figure 4.16	Gajah mati village map during ordinary and severe flood events	167
Figure 4.17	Kampung Gajah Mati evacuation center committee	169

Figure 5.1	Distribution of respondents age in all villages (n=90)	175
Figure 5.2	Gross monthly income before and after mega flood event in 2014 for all villages (n=90)	179
Figure 5.3	Respondents economic loss due to disaster by village (n=90)	185
Figure 5.4	Summary of local community livelihood and twelve months planning cycle in relation to DRR practices	186
Figure 5.5	Physical damages causes by flooding (a) wooden house damaged by flood, (b) debris in the river after flood recede, (c) soil erosion and failure of slope at nearby riverbank, (d) main road in the village was covered by thick mud.	188
Figure 5.6	Respondent's assessment on economic community capital by village.	197
Figure 5.7	Respondent's assessment on social community capital by village.	202
Figure 5.8	Respondents assessment on environmental community capitals by village	206
Figure 5.9	Summary of community capitals for resilient rural community to disaster (all villages)	212
Figure 5.10	Community capitals state and readiness of economic, social and environmental indicators by village	212
Figure 5.11	Respondents' perception on flood recovery progress (all villages) (n=90)	214
Figure 5.12	Respondents' perception on flood recovery progress (by village) (n=90)	215
Figure 5.13	Respondent recovery period (all villages) (n=90)	215
Figure 5.14	Respondents recovery period by village (n=90)	216
Figure 5.15	Financial resources for recovery (all villages) (n=90)	217
Figure 5.16	Financial resources for recovery by village (n=90)	218
Figure 5.17	DRRC key drivers and key deliverables	250
Figure 6.1	Proposed framework of DRRC based on the review of literature and survey of community.	255
Figure 6.2	Validation procedure	258
Figure 6.3	Final version of DRRC Framework after validation process.	271

LIST OF ABBREVIATIONS

ADRC	-	Asian Disaster Reduction Center
APM	-	Malaysia Civil Defence Force
CBDRM	-	Community-Based Disaster Risk Management
CDRI	-	Climate Disaster Resilience Initiative
CRED	-	Centre for Research on the Epidemiology of Disaster
DID	-	Department of Drainage and Irrigation
DRM	-	Disaster Risk Management
DRR	-	Disaster Risk Reduction
DRRC	-	Disaster Resilient Rural Community
EMDAT	-	Emergency Events Database
HFA	-	Hyogo Framework for Action
IPCC	-	Intergovernmental Panel on Climate Change
JKM	-	Department of Social and Welfare
JKR	-	Ministry of Works
KPLB	-	Ministry of Rural Development
NADMA	-	National Disaster Management Agency Malaysia
NPP	-	National Physical Plan
NRPPP	-	National Rural Physical Planning Policy
NSC	-	National Security Council
PLANMalaysia	-	Federal Department of Town and Country Planning Peninsular Malaysia
SFDRR	-	Sendai Framework for Disaster Risk Reduction
SSN	-	Social Safety Nets
UN	-	United Nation
UNISDR	-	United Nation International Strategy for Disaster Reduction

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix A	Community Resilience Framework/Assessment Tools	308
Appendix B	Summary of the roles and responsibility of agencies according to DRM	310
Appendix C	Research Philosophy	312
Appendix D	Questionnaire	315
Appendix E	Background of Expert Panels	323
Appendix F	Expert Interview Questions	324

CHAPTER 1

INTRODUCTION

1.1 Introduction

The current magnitude of natural disaster events suggest that Malaysia is no longer spared from facing major natural disasters such as earthquake, flood, and tsunami (Jani et al., 2016; Khailani & Perera, 2013; Zahari, Ariffin, Asmawi, & Ibrahim, 2013). A country with tropical climate, Malaysia, is highly vulnerable to the risk of flooding, landslide, and mudslide (Center for Excellence in Disaster Management and Humanitarian Assistance, 2016; Mohamed Shaluf & Ahmadun, 2006). According to a report by the Center for Excellence in Disaster Management and Humanitarian Assistance in 2016, three (3) major natural disasters have occurred in the rural regions of Malaysia between 2014 – 2015: the landslides and mudslides in Cameron Highland (in November 2014), the major floods in the East-Coast and Northern Region of Peninsular Malaysia (in December 2014), and the recent earthquake with a magnitude of 6.0 Richter scale shook Kota Belud, Sabah (in June 2015). The occurrence of natural disasters would significantly affect the livelihood of the community in rural areas, causing fatalities and forcing people to evacuate from their home. The events would also impose various types of socio-economic losses to the rural people and deteriorate the quality of the environment, including soil erosion and damaging agriculture land, significant reduction of tourists and visitors arrivals, and damage of critical infrastructure (Ross, 2014). As for the victims and/or communities involved, they have experienced the decline of household income, permanent loss or discontinuity of local jobs, and increasing community risks and vulnerability to disasters and uncertainties (Arouri, Nguyen, & Youssef, 2015; Joakim & Wismer, 2015; Nazari, Rad, Sedighi, & Azadi, 2015).

Despite the pertinent challenges mentioned above and the disturbances caused by a series of natural disasters, some cases note the ability of some rural communities

to rise above adversity and become resilient due to their ability to acquire strong economic, social and environmental capitals and cohesion (Townshend, Awosoga, Kulig, & Fan, 2015; Wilson, 2012). It is therefore essential that the potential elements for community strength and their coping mechanism be determined in dealing with such adversity. This is potentially a new and interesting area which requires further investigation because knowledge and inputs gathered from disaster-affected rural communities (who are able to restore their functions when facing adversity) may have values for relevant stakeholders in improving DRR practices and in promoting a planning process for rural community resiliency in developing countries in general and in rural Malaysia in particular. In this light, this research was initiated by a strong realisation that changes in environment are inevitable, and as shown in many cases, have greatly affected the livelihood of the rural communities. Therefore, it is important for this research to thoroughly examine fundamental elements of building a resilient rural community hence contributing towards developing an operational framework for enhancing the planning and development of a disaster-resilient rural community (DRRC).

1.2 Problem Statement

1.2.1 Context

According to Emergency Database (EM-DAT) in 2020, for the past 23 years (1996-2019), approximately 1.74 million casualties were recorded in 15,969 cases involving disaster at the global stage. These statistics are including the casualties caused by (1) the Indian Ocean Tsunami in 2004 (nearly 230,000 casualties); (2) the Cyclone Nargis in Myanmar in 2008 (138,000 casualties); and (3) the 2010 Haitian earthquake (223,000 casualties). More than half of these casualties were caused by a geophysical disaster – either earthquake, tsunami, or volcanic eruption, and most were reported to have taken place in low- and middle-income countries. Although some high-income, developed countries such as New Zealand and Australia (Queensland) are also vulnerable to natural disasters, history shown that these countries were able

to maintain zero casualties even in an earthquake that occurs at the same magnitude as the Haitian earthquake in 2010 (CRED, 2015).

Malaysia, on the other hand, is not listed in the top-10 countries with major disasters by Emergency Events Database (EM-DAT) (2016a). Nevertheless, the frequent occurrence of disasters has alarmed the government considering the rising number of casualties and amount of economic losses as recorded by EM-DAT. For instance, a total of 1655 casualties were recorded, and a total of 3,074,429 people were directly affected by major natural disasters in Malaysia and with an estimation of USD 4 billion worth of damages between 1996 – 2019 (EM-DAT, 2020). These calamities then led to the identification and development of a suitable framework for disaster risk reduction (DRR) and to the building of a DRRC for better response during disaster for build back better. Having a community-based DRR framework will guide the community and their stakeholders in reducing the risk of fatality, as well as in precluding physical and economic losses (UNISDR, 2012).

At the international level, the agenda of disaster-resilient communities has come into the limelight prior to the adoption of the Hyogo Framework for Action 2005–2015: Building the Resilience of Nation and Communities to Disaster. However, researchers including Djalante, Garschagen, Thomalla & Shaw (2017), Djalante, Thomalla, Sinapoy and Carnegie (2012) and Aitsi-Selmi, Egawa, Sasaki, Wannous & Murray (2015) has maintained that the concept of a resilient community had been debated long before the Hyogo Framework discourse. Djalante (2012) contended the need for an awareness on the importance of managing disaster holistically, including disaster prevention, mitigation, rehabilitation and reconstruction, particularly after the adoption of the Yokohama Strategy for Safer World: Guidelines for Disaster Prevention and Mitigation in 1994. On 18 March 2015, the UN member countries agreed to adopt the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015 – 2030 to further address DRR. The framework emphasises reducing the risk and protecting human life and livelihood (Aitsi-Selmi et al., 2015).

Malaysia is one of the countries that rectified the SFDRR thus having an obligation to translate the international and regional DRR frameworks into the national

and local contexts for better application to disaster-prone communities in the rural areas. National Disaster Management Agency Malaysia (NADMA) as the central agency directly responsible for the SFDRR implementation is also the disaster monitoring agency at national and local levels with yearly reporting of progress to UNISDR (National Disaster Management Agency (NADMA) Malaysia, 2018). Despite the growing interest in adopting the DRR and mitigation efforts, different circumstances have been observed in the translation of the global efforts into the local initiatives. In 2016, the UNISDR announced five (5) outstanding countries that have been implementing DRR and shown sign of success in reducing mortalities caused by disaster. The countries are Africa towards Ebola, India and Nepal (earthquake and cyclone), Fiji (cyclone), and Peru (El Nino) (UNISDR, 2016). In the case of the El Nino in Peru, for example, the country managed to reduce the number of fatalities to only twenty victims, much lower compared to the 9,300 victims recorded in 1982/83. This was after the Ministry of National Disaster Management implemented the contingency planning and disaster-risk management to strengthen the disaster risk governance in the country.

Nonetheless, among the major gaps identified are the lack of study that identifies the influential factors for rural community resilience and the absence of a DRR framework that can guide the actions of the local communities in dealing with natural disasters. With the lack of inputs and information on the resilience of the local community and their ability to raise above adversity, the rural communities who were affected by disasters might experience greater challenges for in rebuilding their livelihood, particularly during post-disaster and recovery stages (Shaw, Pulhin, & Jacqueline Pereira, 2010).

1.2.2 The Lack of Understanding of the Concept of Resilient Community among Stakeholders

The community resilience concept has gained wider attention and recognition—by the Sendai/Hyogo at International—DRR and built back better. At national level, similar acknowledgement is also highlighted by the National Physical Plan (NPP) 3

(2017–2040) and the National Rural Physical Planning Policy (NRPPP) 2030 (PLANMalaysia, 2016b, 2016c). Despite the strong recognition, the discussion on community resilience at the national level was found to be most centred on urban and cities agenda and less in the rural context (PLANMalaysia, 2016c; Rosly, 2015; Shaw, Takeuchi, Joerin, & Fernandez, 2010). Understanding the rural-urban linkages is therefore important since both contexts represent a different façade in terms of level of community capital and level of infrastructure provision and development. The capacity of urban and rural community capitals tends to be at a different level (with rural community showing lower capacity) because of the vulnerable population, the lack of infrastructure in the rural areas, and the lack of diversification of economic based and geographical constrains in the rural areas. These shortcomings have created barriers to the communication and coordination among management organizations (Kapucu, Hawkins, & Rivera, 2013a). For instance, a research carried out in the United State found a distinct difference between the resilience of the urban and rural areas: the urban counties were found to be more resilient as than the rural counties. Economic and community capitals have significantly contribute to rural resilience, whereas economic, institutional, infrastructure, and social capitals are main contributors to urban resilience (Cutter, Ash, & Emrich, 2016).

The review of literature also indicated a research gap highlighted by the General Director of Federal Department of Town and Country Planning Peninsular Malaysia (PLANMalaysia) in promoting more resilient cities in Malaysia on disaster, particularly community resilience (refer to Figure 1.1). Even though the topic is more related to the planning for a resilience city, the challenges and gaps identified by Rosly, remain the same in regard to the resilience of the rural community.



Figure 1.1 Research gap – challenges in initiatives and policy directions for making cities in Malaysia more resilient (Rosly, 2015)

As shown in Figure 1.1, the PLANMalaysia identified seven (7) key components for building Malaysia’s cities that are resilient towards disasters. Three of the components are (i) strong partnership, (ii) shared information, and (iii) fragmented and less coordinated initiatives, which currently addressed by PLANMalaysia. The remaining four components i.e. community-based process, community’s connection to a place, social wellbeing, and community resilience, however, have not been thoroughly explored. Therefore, a comprehensive research on a resilient community is needed to bridge the gap hence providing the crucial inputs on the current trend of community resilience. From the point of view of the present study, the works carried out by PLANMalaysia appear to focus on promoting resilient urban/cities initiatives and little has been addressed in regard to the resilience of the rural areas or communities. This gap provides a strong justification for this research to be carried out in order to address the issues involving DRRC hence connecting the “missing link” as stated in Figure 1.1.

1.2.3 Imbalance between the Top-Down and “Community-Centric” DRR Approaches in Building Resilience Agenda

A review of the 11th Malaysian Plan (11MP) (2016–2020) with the theme “anchoring growth on people” (Economic Planning Unit, 2015b) resulted in the identification of a specific strategic trust known as “Pursuing Green Growth for

Sustainability and Resilience”. This trust explicitly highlights five focus areas, including strengthening resilience against climate change and natural disaster, which has three strategies: (1) D1–strengthening disaster risk management (DRM); (2) D2–improving flood mitigation; and (3) D3–enhancing climate change adaptation. It is worth noting the strategies D1 and D3 aim to improve the communication and awareness among the local communities towards disaster, the purpose being to enable better coordination among the stakeholders. Nonetheless, addressing a DRR agenda has been considered in the five-year 11MP.

Given the strategic importance of climate change adaptation and building a resilient nation, the NADMA, under the National Security Council (NSC), Prime Minister’s Department, was set up in October 2015. This agency is responsible for implementing the Disaster Risk Reduction (DRR) practices which comprise a recovery programme after a disaster, disaster emergency declaration, preparedness steps, and disaster prevention and mitigation at the federal, state and local levels (NADMA, 2016; Rahman, 2012). The agency also produced Malaysia Platform and Action Plan for Disaster Risk Reduction (MyDRR). NSC has also produced the Community Based Disaster Risk Management (CBDRM) toolkit, which has been implemented in the state of Perak, Terengganu, Kedah, Pulau Pinang, Kelantan, Pahang and Sabah (Tan, Rawshan, Koh, Lim, & Ismail, 2013). This program involves a systematic coordination between government agencies such as NSC, Malaysian Meteorological Department (METMalaysia), Health Department, Department of Social Welfare (JKM), and Department of Irrigation and Drainage Malaysia (DID), PLANMalaysia, Civil Defence Force (APM). From a physical planning point of view, PLANMalaysia¹ has begun to highlight the importance of incorporating community resilience towards disaster into the city planning and development plan discourses, particularly for the preparation of the District Local Plan (Cucuzza, Stoll, & Leslie, 2019; Khailani & Perera, 2013).

¹ PLANMalaysia is a federal government agency which responsible to assist and/or advise state government, local authorities and government agencies in preparing Development Plan i.e. State Structure Plans, District Local Plans and Special Area Plans.

Another document concerning the regulating of planning activities at the national level is the NRPPP, which is also produced by PLANMalaysia. The report does mention about resilient rural management being one of the five core components of the plan. The technical report briefly highlights two main issues directly related to rural community resilience: (1) the low resilience among the rural communities and (2) the lack of progress on disaster management for the rural community (PLANMalaysia, 2016c). However, the report does not elaborate the above issues further. Further review of the NRPPP indicates that the rural communities are currently facing challenges in terms of urban-rural development gap, deterioration of rural image and identity, low household income, low liveability rate compared to the urban communities, low social participation in local development, overlapping of village-related agency functions, and disaster. Similar report also highlights that 31% (7,983) of the 25,497 villages are identified as disaster-risk villages (PLANMalaysia, 2016c).

Preliminary interviews with the relevant officials from NADMA and APM and JKM were conducted by the researcher in 2017 to gather information about the acknowledgement of government agencies on their role and the rural community's preparation as the first responders during a disaster. Among the findings from the interview are that (1) the rural community possess vast knowledge about their environment due to long engagement with the place; and (2) the limited budgetary capacity, which, in turn, has restricted an agency's ability to upscale the various DRM programs, particularly in engaging the local community. These indicates that the local communities' active participations are vital in a DRM, and that building a resilient community is one of the focuses/strategies in reducing disasters risks and enabling better coping in disaster. This is in line with gap identified by Rosly (2015) (Figure 1.1), which highlights the need to strengthen community resilience. These findings therefore justify the need for the present study to address the gaps of low resiliency among the rural communities and DRR.

The review of literature also looked into the current initiatives for rural development under the Rural Transformation Plan (RTP) 2016–2020 (Kementerian Pembangunan Luar Bandar (KPLB), 2016), which was initiated by the Ministry of Rural and Regional Development (MRRD) (the federal agency directly involved in the

planning and development of the rural areas). The RTP report, however, does not delve further on the resilience of rural community; it merely highlights issues related to the planning for a resilient rural society. Meanwhile at the local level, the Local Plan for Cameron Highlands District (CHDLP) is the first District Local Plan to incorporate disaster-resilient attributes prior to its gazettement (Majlis Daerah Cameron Highlands (MDCH), 2015). The CHDLP is the first district local plan formulated to mainstream disaster-resilient attributes prior to the tragedy of landslide and mudslide in November 2014. PLANMalaysia has played a proactive role by reviewing the existing/outdated local plans and by incorporating disaster-resilient attributes into land-use planning and development control to reduce the disaster risks in Cameron Highlands.

While the government and various agencies have opted for a top-down approach (Chan, 2012; Angelo J. Imperiale & Vanclay, 2019; Shafiai & Khalid, 2016), a bottom-up, community-based approach is needed to ensure that the targeted community would agree to support and respond well to the programmes. According to Sinthumule & Mudau (2019), Li, Aderson, & Hallin (2019), Isidiho & Sabran (2016), Ludwig, van Slobbe & Cofino (2014), Wagner, Chhetri & Sturm (2014), the top-down and bottom-up approaches should be adopted in a DRM to complement each other. The combination is expected to result in the achievement of a more holistic, appreciable, and inclusive development goal. Perrow (2007 in Aldrich, 2010) argues that the local communities, including the local residents and neighbours, are the first party to respond when a disaster strikes (not the emergency personnel who are trained for that purposes). This statement somehow corresponds to the researcher's findings from the interview with agencies officials (discussed in the previous paragraph). As noted, the local communities possess the local knowledge and social capital but show limitation as the first responders following the lack of logistic support and equipment. Building a strong community resilience is often an endogenous process linked to the local customs which, at times, may operate, change, and influence decision-making outside the state policy realm. Furthermore, community-level actors cannot always be left alone to guide their own resilience pathway without interference from the state. This could be a high time to build a rural community that are resilient on natural disasters in Malaysia, particularly through a research on a proper policy and framework cross agencies and through the incorporation of inputs from community-based perspectives.

1.2.4 Absence of Framework for Building Disaster Resilience for Rural Community in Malaysia

In 1999, the United Nation International Strategy for Disaster Risk Reduction (UNISDR), was established by the UN Secretariat to facilitate the implementation of International Strategy for Disaster Risk Reduction (UNISDR, 2007). Prior to its establishment, UNISDR was responsible for supporting the implementation, follow up and monitoring of the Hyogo Framework Action (HFA) 2005–2015 and the Sendai Framework for Disaster Risk Reduction 2016-2030 (SFDRR) (Riyanti Djalante et al., 2012). For Asian countries, the implementation of the SFDRR is supported by the Asian Disaster Reduction Center (ADRC) with the mission to enhance disaster resilience, build safe communities, and create a society that practices sustainable development (ADRC, 2011). Also, the Asian Disaster Preparedness Center (ADPC), an independent regional non-profit organization, functions to promote the resilience and capacity building of people and institutions to the impacts of disaster and climate change (ADPC, 2017).

With a strong commitment to translate the international, and regional levels of DRR strategies into the Malaysian context, the federal government then amended the national policies and mechanisms of national disaster management and relief known as Directive No. 20 in 2012 (Rahman, 2012). Directive No. 20 shall incorporate all the elements of a DRM, including mitigation/prevention, preparedness, response, and recovery in facing disasters events for a more comprehensive approach (Khairilmizal et al., 2016). Furthermore, it is agreed that the additional legislations, directives and standard operating procedures must be made available to manage and regulate specific types of disaster response (Khairilmizal et al., 2016; UNISDR, 2014b). Many agencies identified under Directive No. 20 for DRR, however, have been focusing on implementing the command-and-control mechanism (Chan, 2012). Given this point, there is a gap in formulating a responsive policy and strategy that can promote a community resilient towards disaster. The integration of local stakeholders' knowledge and aspiration in a DRR has yet to be considered. In light of this shortcoming, an establishment of a rural community that is resilient towards disaster based on a bottom-up (community-centric) framework would complement the existing

top-down approach and practices by the government agencies (Baudoin, Henly-Shepard, Fernando, Sitati, & Zommers, 2016).

The review of literature indicated that various frameworks, models, and tools for a resilient community have been developed, and improved, including the emBRACE (Great Britain, Germany, Italy, Switzerland, Turkey), PEOPLES (western New York), DROP (United State of America), and CDRI2 (Kuala Lumpur and few other countries) (Cutter et al., 2008; Deeming, Fordham, & Swartling, 2014; Renschler et al., 2010; Shaw, Pulhin, et al., 2010). Among the common features/elements in these frameworks/models are the involvement of community resources/ capitals/ capacity and processes in the building of resilient communities. These indicates the importance of resilience community framework/model as a tool for translating a policy to implementation at the local level, particularly among communities (see Kruse et al., 2017; Renschler et al., 2010; Shaw, et al., 2010; Siebeneck, Arlikatti, & Andrew, 2015). As stated, the CDRI2 (Climate and Disaster Resilience Initiatives) have been implemented as a pilot study in Kuala Lumpur alone, furthermore, by a sponsored country (not locally funded initiatives). The review of literature also found that similar observation did not occur in the Malaysian context, particularly for the resilience of a rural community. The review of the existing framework/model provided a better understanding on the future framework that can suit the local needs and conditions. The review on the NRPPP 2030 indicates that the policy addresses an effective disaster risk management through two strategies: (1) preparing an effective disaster risk management system; and (2) by increasing the preparedness level of the government agencies and local community. By highlighting the involvement of a local community in DRM, a resilience community framework/model can be used to guide the local community to actively engage and better respond to disaster events.

1.3 Research Questions

The problem statement gives rise to the following research questions:

- (a) What is the concept of a resilient rural community to disaster and the extent to which this concept could contribute towards achieving sustainable rural development agenda?
- (b) What are the economic, social, and environmental capitals for resilience that are currently possessed by the communities in the study areas?
- (c) How to determine the communities' state of resilience by using a community capitals assessment?
- (d) What are the relationships between community capitals and factors that influence resilience towards disaster? and
- (e) How to establish/formulate a disaster resilient rural community operational framework that supports the local needs and condition via the incorporation of community capital, key drivers, and key deliverables.

1.4 Research Goal and Objectives

The aim of the research is to determine the economic, social and environmental capitals of a resilient rural community towards natural disaster based on a top-down (government agencies and NGOs) and bottom-up (local stakeholders) inputs. Results from the assessment of community capitals together with the key driven factors of resilience identified shall be incorporated in formulating an operational framework for a rural community that is resilient towards disasters in Malaysia.

The objectives of the study are as follows:

- (a) To identify the concept of resilient rural community in relation to international and local agenda for DRR and practical form of framework for application in local context;
- (b) To determine the rural communities' current DRR-related practices and community capitals which are vital for building a resilient rural community towards disaster;
- (c) To identify the state of community capitals comprises the economic, social and environmental components;
- (d) To examine the relationships between community capitals and factors that influence resilience towards disaster; and
- (e) To formulate a disaster resilience rural community operational framework for local disaster managers and committees.

1.5 Expected Outcomes

The research is expected to give the following implications:

- (a) The establishment of a set of indicators for a resilient rural community towards disaster which highlight the three main capitals—of economic, social, and environmental. These indicators shall serve as the components in proposing the framework of a resilient rural community to better suit the rural community particularly in the context of Malaysia;
- (b) The identification of community-based DRR practices, key driven factors and key deliverables of a resilient rural community based on the case study of three disaster prone communities in the East-Coast region of Peninsular Malaysia.

- (c) The establishment of an operational framework for a resilient rural community that addresses the national agenda for localizing DRR through bottom-up and community-based approaches. The proposed framework can be utilised by local disaster managers and committees to educate community members on matters related to DRR, hence enabling them to better cope and build back better after the disaster.

1.6 Research Implications

The theoretical implications from the study are as follows:

- (a) Deepening of the theoretical discourse on the resilient community concept and the role of bottom up/community-based approaches within the context of a developing country by focusing on rural planning and development dimension.
- (b) Establishment of a set of universal values for the resilience of rural community from the point of view of a developing country, which is derived from understanding of relationship between community capitals, key drivers, and key deliverables.

The managerial/practical implications are as follows:

- (a) Methodology designed for this research might have general application for similar research to be carried out in the future for identifying factors that influence rural community resilience towards disaster study;
- (b) The provision of a platform for community engagement and the enhancement of community sense of belonging in designing a DRR framework and program at community level; and

- (c) The operational framework for the resilience of rural community towards disaster that reflects and respects the local needs and condition and shall be applicable for implementation by local institutions and rural communities in Malaysia.

1.7 Organization of Thesis

Chapter one – This chapter introduces the background of the study and states the statements of research problems and research questions, and research objectives in sequence.

Chapter two – This chapter provides a review of the related to the relation between climate change and disaster impacts; concept of resilience; disaster resilience; community resilience frameworks/models towards disaster; local knowledge; disaster management cycle; adaptive capacity; social safety nets; self-help, mutual assistance and public assistance; top-down and bottom-up approaches.

Chapter three – This chapter provides a review of the disaster risk reduction (DRR) initiatives in Malaysia; implementation of DRR in physical planning and disaster management agencies; current policy related to DRR, disaster risk reduction policy and implementation, disaster management in Malaysia. The chapter also explains on the scope of disaster management agencies through the command-and-control (top-down) approach to the local community.

Chapter four – This chapter provides detailed explanations on the methodology based on the review in Chapter Two and Three. The chapter also describes the data collection techniques, data collection procedure, and data analysis, triangulation, validity and reliability. Chapter Four also describes the background of study areas.

Chapter five – This chapter describes the profile of the respondents, analyzes and synthesizes the perception and awareness on local DRR practices, assessment of community capitals for resilience, and perception on factors for disaster resilient rural community (DRRC). Using the relative importance index (RII), the key components and drivers to DRRC were identified.

Chapter six – Analysis and synthesis of the experts review of the proposed framework including the implementation process of the DRRC framework.

Chapter seven – This chapter provides the conclusion on the achievement of the research objectives, research contribution, research challenges and recommendation for future research.

The organization of the thesis illustrated in Figure 1.2.

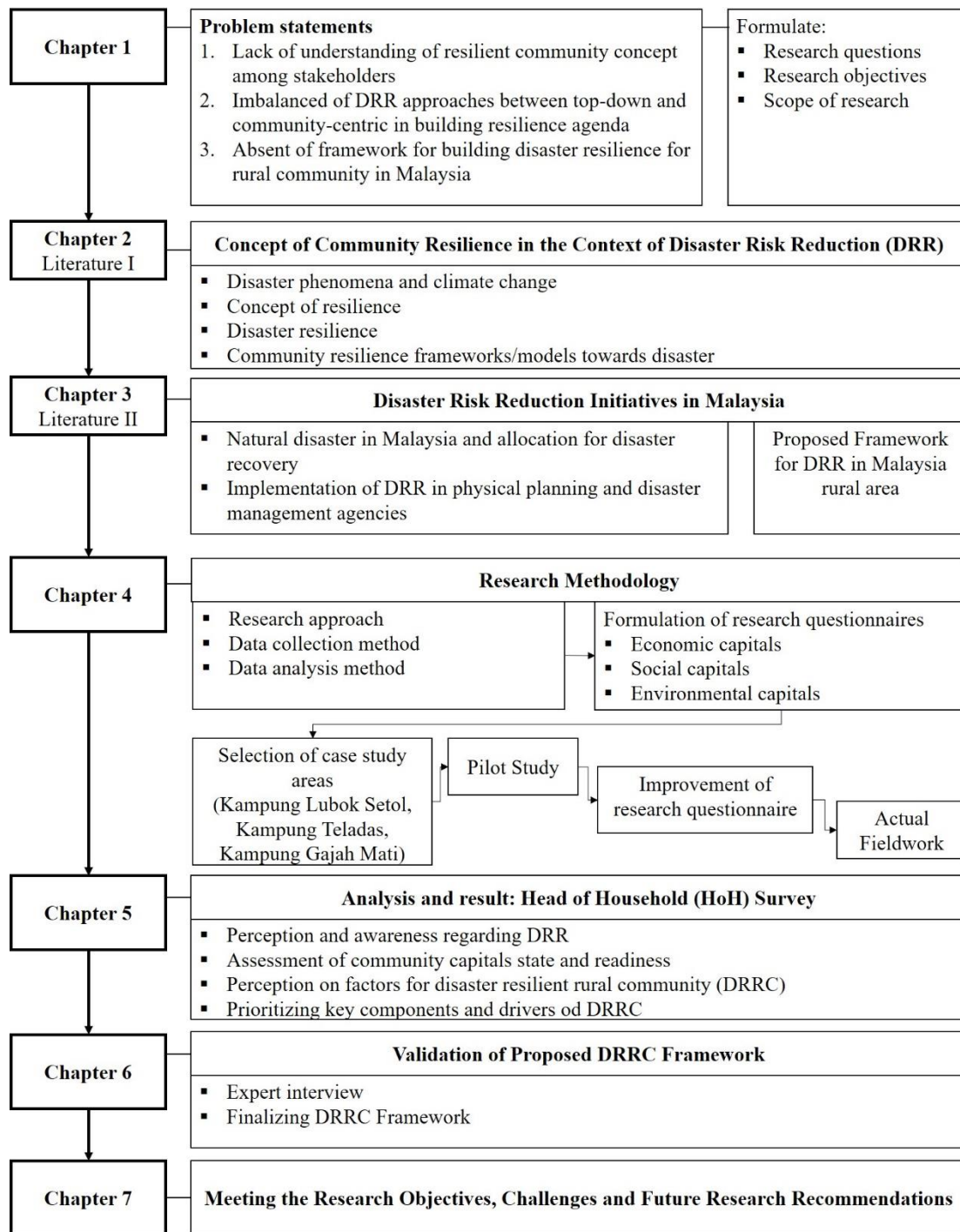


Figure 1.2 Organization of research

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