

Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Leng, Bunlong

Title:

Walk the talk: mainstreaming climate change adaptation in donor-aided projects in Cambodia

Date:

2016

Persistent Link:

<https://hdl.handle.net/11343/172321>

Terms and Conditions:

Terms and Conditions: Copyright in works deposited in Minerva Access is retained by the copyright owner. The work may not be altered without permission from the copyright owner. Readers may only download, print and save electronic copies of whole works for their own personal non-commercial use. Any use that exceeds these limits requires permission from the copyright owner. Attribution is essential when quoting or paraphrasing from these works.

Walk the Talk: Mainstreaming Climate Change Adaptation in Donor-aided Projects in Cambodia



By Bunlong Leng*

Thesis Submitted in Fulfilment of the Requirements for the Degree of Doctor of Philosophy,

University of Melbourne*

Orcid ID: 0000-0003-3841-405X

Date: 16 June 2017

Simon Batterbury, Principal Supervisor and Associate Professor*

Adam Bumpus, Co-Supervisor and Senior Lecturer*

Abstract

Scholars have focused on climate change vulnerability and looked in some detail at measures to reduce it or to adapt; however, the act of mainstreaming climate change adaptation (CCA) into the development investments of multilateral donors in developing countries is under-researched. Multilateral donors provide financial and technical support to least-developed countries in several climate-sensitive sectors such as agriculture, water and infrastructure. Some business-as-usual development projects may actually increase vulnerability to the changing climate and even hamper the progress of sustainable economic growth. However, climate-resilient development practice can be designed to reduce climate risks, and support for road infrastructure is one important sector where this is needed.

As little research has been done on the act of addressing climate change vulnerability in donor-aided development projects, this research aims to fill in this gap. An interdisciplinary, qualitative case study approach is applied to investigate process, institutional change and challenges in implementing climate-resilient road projects in Cambodian floodplains. Building on the theoretical concept of institutional change and relating it to impact assessment, I explore how climate change adaptation is mainstreamed into the project decision-making process. The study of two road investments contributes to a growing interest in whether multilateral donors can play a leading role in mainstreaming CCA considerations into their current and future development investments. Change and accountability for these climate-resilient road projects were found to be constrained by at least three related capacities: institutional, technical, and financial.

I conclude that mainstreaming CCA at project-level leads towards more integrated and sustainable outcomes. However, ‘mainstreaming’ is unlikely to be the sole answer for safeguarding sustainability in the face of climatic impacts. Although the theory and practice of climate-resilient road projects is emerging, there are no affirmed methods of mainstreaming CCA. The research explored two different methods: climate-vulnerability reduction assessment and adaptation-integrated environmental safeguards procedure (e.g. IEE/EIA). There is no single best pathway for mainstreaming CCA, a finding that counters the arguments of scholars who uphold that mainstreaming CCA into ex-ante IEE/EIA is the way forward.

Preface

A part of Chapter 5 on making Borey Chulsar Commune Road climate resilience was presented at the Accountability in Global Environmental Governance Conference at the University of Sydney in 2015. It has been prepared for publication in the Journal for Global Policy.

Chapter 6 on ADB-aided climate-resilient provincial road improvement was presented at the 2015 Australian Climate Change Adaptation Research Network for Settlements and Infrastructure Workshop for PhD students and graduate researchers at Griffith University and the 2014 and 2016 Aid Conference hosted by the Australian National University. The chapter has been prepared for submission as an article to the Journal of International Association for Impact Assessment.

Conferences and workshop presentations that I delivered during this thesis development are summarised in the below table.

No	Presentation/Paper Theme	Conference/Workshop Event
1.	PhD Student Workshop on Climate Change Adaptation in Primary Industry	Victoria Climate Change Adaptation Facility, Melbourne Cricket Complex, 1 July 2013
2.	Experience from the Fieldwork about Mainstreaming Climate Change Adaptation into Development Projects in Cambodia	The PhD Fieldwork on Climate-Resilient Development Projects in Cambodia, University of Melbourne School of Land and Environment, 7 February 2014
3.	Mainstreaming Climate Change Adaptation into A Multilateral Development Bank-Funded Road Project in Cambodia.	Australasian Aid and International Development Policy Workshop, Australia National University Crawford School of Public Policy, 13 February 2014
4.	Mainstreaming environmental safeguards and climate change adaptation into ADB-aided road project in Cambodia: Institutional challenges	ACCARNSI Early Career Research Forum, Gold Coast 20-22 July 2015
5.	Accountability challenges of a donor-supported commune road investment project in Cambodia	Accountability in Global Environmental Governance Workshop, Sydney, 18-19 December 2015
6.	Donor-supported road projects in Cambodia: accountability challenges for climate-resilient practice	Australasian Aid Conference, 10-11 February 2016

Declaration

This thesis is my own original, unaided work and contains no material which has been previously submitted for a fulfillment of the Doctor of Philosophy or diploma at the University of Melbourne or any other institution. Due acknowledgement has been made in the text of all other materials used. This thesis is fewer than the maximum word limit of 100,000 in length.

Acknowledgements

I am very thankful to have come this far. However, without support of some individuals and institutions, I would not have realised this big dream. Therefore, I wish to make the following grateful and sincere thanks:

To my research participants for their assistance—I truly appreciated their generous efforts in answering my fieldwork questions and demonstrating the success or failure in the decision-making process of design and implementing the two cases of sustainable and climate-resilient road investments. I appreciated the generous risks and time of my research participants from donor agencies, implementing staff of the two Case Studies, local officials and residents for overwhelmingly welcoming and kindly supporting me to pursue this research fieldwork in each and every case project.

To Associate Professor Simon Batterbury, my Principal Supervisor, for his valuable kind guidance, worthwhile comments and continuous encouragement throughout this thesis work. This guidance and comments were very precious. To Dr. Adam Bumpus, my Co-Supervisor and Senior Lecturer, for his constructive ideas, comments, and criticism from which this thesis benefited significantly. I also thank them for their inquiries, corrections and suggestions throughout the study.

To Prof. Jon Barnett, Dr. Louis Lebel, Dr. Brian Cook, Dr. Ainka Granderson Dr. Colleen Fox, Dr. Alexander Cullen, Dr. Dany Va, Dr. Pheakkdey Nguon, and Dr. Makathy Tep who were willing to read and comment on my specific chapters and/or my thesis draft. To my Cambodian colleagues: Moa Nara, Young Sokphea, Nuth Monyroth, and batch scholars at University of Melbourne: Prativa Sapkota, Paula Satizabal, Haslina Hashim, Marcela Chaves Agudelo, Frankline Anum Ndi, and others for their encouragement and many chats over meals and coffees during the course of my PhD journey in Australia. Although I may not list all individual names, I am grateful for their support, encouragement, wisdom and inspiring talks to make my research meaningful throughout the study period.

To my editor, Dr Amanda Bayliss, for her editing to help improve the clarity and information flow of my writing in this thesis. My supervisors also assisted me with editing many sections of the thesis. To the Australian Department of Foreign Affairs and Trade, the former AusAID,

through its Australian Leadership Award for funding my doctoral study and paving the best way to achieve this academic goal and to complete this piece of work.

Finally, yet importantly, I wish to express sincere thanks, gratitude and appreciation to my parents and siblings (the Mao's extended family) in Cambodia for their ongoing motivation and spiritual support. I appreciated my beloved San Tea, Bonita Bunlong Leng and Billy Bunlong Leng for their companionship to make this academic journey meaningful and less frustrating.

List of Abbreviations

ADB	Asian Development Bank
C/S PIM	Commune/Sangkat Fund Project Implementation Manual
CCA	Climate Change Adaptation
CDP	Commune Development Plan
CIF	Climate Investment Fund
CIP	Commune Investment Plan
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
IAIA	International Association for Impact Assessment
IEE	Initial Environmental Examination
IPCC	Intergovernmental Panel on Climate Change
KCI	Korean Consultants International Ltd.,
LGCC	Local Governments and Climate Change
MOE	Ministry of Environment
MPWT	Ministry of Public Works and Transport
NCDDS	National Committee for Decentralization and Deconcentration Secretariat
NGO	Non-Governmental Organisation
PBCR	Programme Based Climate Resilience
PPCR	Pilot Programme for Climate Resilience
PRIP	Provincial Roads Improvement Programme
SPCR	Strategic Programme for Climate Resilience or PPCR Phase II
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
VRA	Vulnerability Reduction Assessment

Table of Contents

Abstract	2
Preface	3
Declaration	4
Acknowledgements	5
List of Abbreviations.....	7
Table of Contents	viii
List of Figures.....	xi
List of Tables	xii
List of Boxes	xii
Chapter 1. Introduction	1
1.1. The research gap.....	1
1.2. Research rationale	5
1.3. Research aim and questions.....	6
1.4. Conceptual and analytical foundation	8
1.5. Analytical framework.....	10
1.6. Thesis outline	13
1.7. Summary	15
Chapter 2. Literature Review and Conceptual Foundation	17
2.1. Understating institutional change and analysis	17
2.2. Understanding climate change adaptation	20
2.3. Linking climate change adaptation to development	22
2.4. Multilateral development aid and road infrastructure	24
2.5. Climate change impacts on road infrastructure in Cambodia	29
2.6. Entry points for mainstreaming climate change adaptation	31
2.7. Mainstreaming at the project-level	34
2.7.1. Climate vulnerability reduction assessment.....	35
2.7.2. Adaptation-integrated IEE/EIA	39

2.8. Challenges	43
2.9. Summary	45
Chapter 3. Research Design and Methodology	46
3.1. Theoretical and methodological perspective	46
3.2. Case study methodology	48
3.3. Case study selection	50
3.4. Research coordination schema.....	51
3.5. Data collection	54
3.5.1. Gaining access.....	54
3.5.2. Sampling method	55
3.5.3. Primary data collection	56
3.5.4. Secondary data collection	61
3.6. Data management and analysis	63
3.7. Summary	65
Chapter 4. Background Case Studies.....	67
4.1. Contextual factors of Borey Chulsar Commune Road.....	67
4.1.1. Funding milestones and key activities.....	68
4.1.2. Performance-based climate resilience funding	71
4.1.3. Geographical and biophysical conditions.....	74
4.1.4. Actors and implementation arrangements.....	75
4.2. Contextual factors of Provincial Road 150B investment.....	79
4.2.1. Funding milestones.....	81
4.2.2. Key activities	82
4.2.3. Geographical and biophysical conditions.....	85
4.2.4. Actors and implementation arrangements.....	87
4.3. Summary	89
Chapter 5. Climate Resilience of Borey Chulsar Commune Road ..	90
5.1. Borey Chulsar Commune Road and climate resilience	90
5.2. Evaluative criteria and analysis of climate-resilient practice	95
5.2.1. Review commune investment project needs.....	96
5.2.2. Prepare commune investment project and entry points	97
5.2.3. Selection and appraisal of commune investment project	101
5.2.4. Implementation and monitoring.....	104
5.3. Discussion	106

5.3.1. Technical capacity	109
5.3.2. Institutional capacity.....	114
5.3.3. Financial capacity	119
5.4. Summary and key findings.....	123
Chapter 6. Climate Resilience of Provincial 150B Road.....	125
6.1. Provincial Road 150B and climate resilience	125
6.2. Evaluative criteria and analysis	128
6.2.1. Climate vulnerability assessment as the mainstreaming entry point	129
6.2.2. Initial environmental examination as the mainstreaming entry point	133
6.3. Discussion	138
6.3.1. Technical capacity and human resources	138
6.3.2. Institutional capacity.....	140
6.3.3. Financial capacity	147
6.4. Summary and key findings.....	152
Chapter 7. Discussion and Conclusion	154
7.1. Revisiting the research aim and questions	155
7.2. Discussion	164
7.3. Contribution to knowledge	167
7.4. Contribution to development practice	173
7.5. Limitations and further research.....	176
References	179
Appendix A. Data Collection Methods, Ethics, and Quality Criteria	199
Appendix B. Interview Guides and Observation Checklist	202
Appendix C: List of Research Participants	205

List of Figures

Figure 1.1 Institutional analysis and development	9
Figure 1.2 A modified analytical framework for this thesis.....	10
Figure 1.3 Thesis structure	14
Figure 2.1. Mainstreaming climate change adaptation and institutional relationships...	25
Figure 2.2 Mainstreaming climate change adaptation at different levels.....	33
Figure 2.3 Adaptation-integrated IEE/EIA.....	40
Figure 3.1 The Methodological Research Process	48
Figure 3.2 Field interviews and participatory observations	57
Figure 3.3 The process of data analysis.....	65
Figure 4.1 Climate-resilient investment and lessons-learn sharing in Borey Chulsar....	70
Figure 4.2 Illustration to differentiate top-up and co-financing a commune road investment project.....	72
Figure 4.3. Map of climate-resilient road in Borey Chulsar commune	74
Figure 4.4. Commune investment project and its multi-level governance structure	76
Figure 4.5 Conditions of Provincial Road 150B before climate-resilient investment....	84
Figure 4.6 Locational Sketch of Provincial Road 150B funded by the regional ADB fund and PPCR investment Fund	86
Figure 5.1 Commune investment project cycle	96
Figure 5.2 A sample result of an annual district integration in Khmer	103
Figure 7.1 A proposed analytical framework of climate-resilient development projects adopted and developed from Ostrom's and Goldman's institutional change concepts	170

List of Tables

Table 2.1. Adaptation definitions by different actors	21
Table 2.2 Historical thinking and linking adaptation to sustainable development in climate change debates	23
Table 2.3: Climate vulnerability reduction assessment	36
Table 2.4: Incorporating adaptation in IEE/EIA	41
Table 3.1: The Interview protocol	60
Table 3.2 Collection of the secondary data	62
Table 4.1 Climate proofing of Borey Chulsar Commune Road 2011-2013.....	68
Table 4.2. Breakdown financial costs (per kilometre) of Provincial Road 150B.....	82
Table 4.3. Lengthen of Provincial Road 150B	84
Table 5.1 Account of flood damage and road rehabilitation	91
Table 5.2 Criteria for assessing and prioritizing climate resilience top-up grant.....	93
Table 6.1 Indicators to assess mainstreaming climate change adaptation.....	129

List of Boxes

Box 4.1 Local Government and Climate Change (LGCC)	68
Box 4.2 Provincial Road 150B (PRIP, 2011-2015).....	80

Chapter 1. Introduction

“A wisest course of action in response to climate change ... involves ... adapting to most of the remaining impacts so as to minimize damage to society and the environment” (Palutikof, Parry, Stafford Smith, Ash, Boulter, & Waschka, 2003, p. 3).

This introductory chapter describes the background and research gap with regards to an overview of climate change paradigms in the development context. The research¹ aim and questions of the thesis are then introduced, following which the analytical framework of and rationale behind the research aim are specified. This chapter further examines the theoretical concept of climate-resilient development project. Importantly, the last section concludes by outlining the thesis structure and process for conducting it.

1.1. The research gap

Climate change adaptation (CCA) at a large scale was little discussed in climate change debates before the 2000s because of the historical expectation of success of climate mitigation measures, and a lack of conviction about anthropogenic climate change in some organisations. The present scientific debate about anthropogenic global warming in the world’s universities and research institutions has led to a consensus that the world is more vulnerable to extreme climate events than ever before (Batterbury, 2008). A rise in the impacts of climate change is partly due to the intensity and severity of weather-related extreme events (Lasco, Pulhin, Jaranilla-Sanchez, Delfino, Gerpacio, & Garcia, 2009) and to infrastructure issues (Wim Douven, Buurman, Beevers, Verheij, Goichot, Nguyen, Truong, & Ngoc, 2012; WJAM Douven, Goichot, & Verheij, 2009; Serrao-Neumann, Choy, van Staden, Crick, Sahin, Guan, & Chai, 2011). The contemporary climate science shows that even if the most stringent mitigation measures of climate change were put in place today, vulnerability to climate change impacts would still continue for centuries with adverse impacts on development efforts related to poverty and economic growth (Ayers & Dodman, 2010; Lasco et al., 2009; Schipper & Burton, 2009). Likewise, multilateral donors have recognized that efforts to overcome poverty and advance

¹ Research and thesis are used interchangeably.

development can no longer ignore the most urgent need to adapt to inevitable climate change issues in developing countries.

CCA is increasingly recognized as a major challenge that the governments in many developing countries will face, with consequences for poverty alleviation and economic growth. The Intergovernmental Panel on Climate Change (IPCC)'s fifth assessment report IPCC (2014) confirms that mainstreaming CCA is unavoidable in light of the potential impacts of climate change now and in future. The assessment reports IPCC (2007b, 2014) show that most developing countries have limited adaptive capacity and are highly vulnerable to climate change. Furthermore, risks associated with climate change are increasingly evident and are intensified where the adaptive capacity and policy environments to respond are not well developed (Schipper & Burton, 2009). CCA is relevant to cope with the current and future climatic conditions, which could hamper or reverse the progress of economic development and poverty alleviation (Lasco et al., 2009; Sietz, Boschütz, & Klein, 2011). Sietz, Boschütz, Klein, Lotsch, and World Bank (2008) further state that the future impacts of climate change are likely to increase threats to development activities and consequently motivates a stronger environment for donors and recipient governments to consider mainstreaming CCA into their development programs and projects.

The rhetoric of mainstreaming CCA considerations into the development activities at different scales such as policy, strategy, sectoral planning, and project is frequently referred to in the development debates and scholarly work (Sietz et al., 2011; Suraje, Xianfu, & James, 2005). However, if adaptation to climate change is necessary (Adger, Lorenzoni, & O'Brien, 2009b; Boakye-Agyei, 2011; Sok, Boruff, & Morrison-Saunders, 2011), why does it take years for multilateral donors and recipient governments to start acting for the benefit of all?

Multilateral Development Banks², which include the World Bank and Asian Development Bank (ADB) that support Cambodia, have recognized that efforts to overcome poverty and sustainable development can no longer ignore the urgent need to address the adverse impacts of climate change (Boakye-Agyei, 2011; Seballos & Kreft,

² Other scholars refer to Multilateral Development Banks (MDBs) as Multilateral Financial Institutions (Boakye-Agyei, 2011) and Multilateral Organizations (OECD, 2009).

2011). However, little scholarly research explicitly examines what multilateral donors have actually done, from the perspective of their institutional values and decision-making power for funding, to address CCA issues. It is also unclear how they have supported the recipient governments (e.g. Cambodia in this research) to enhance climate-resilient development practice.

The idea of climate-resilient development somehow overlaps with the goal of investment sustainability and adapting to the changing climate. The emerging body of literature shows that mainstreaming CCA focuses more on national and sub-national development policy and sectoral policy (Ayers & Huq, 2009; ICEM, 2015; R. J. T. Klein, Schipper, & Dessai, 2005; Persson & Klein, 2008), whereas the international development funding and development activities are implemented at the project level. Most notably, scholars have been relatively silent on whether the funders' corporate environmental assessment safeguards³ provide guidance to address the CCA challenges present to the recipient governments, affected communities, and the global commons (Agrawala, Matus Kramer, Prudent-Richard, Sainsbury, & Schreitter, 2012; Boakye-Agyei).

Conversely, scholars such as Goldman (2005) and independent conservation watchdogs such as the NGO Forum on ADB (2010); and NGO Forum on Cambodia (2015) have been complaining for a long time about the poor environmental and natural resource protection of large international donor projects, especially when it comes to large investments such as hydropower dams and other infrastructure projects designed in the 1980s and 1990s. With regards to the global warming problem, Berrang-Ford, Ford, and Paterson (2011) established that the majority of academic studies report on climate change vulnerability and have looked in some detail at measures to reduce it (or, intentions to adapt). However, little research has been done on the act of mainstreaming CCA into infrastructure development investments that multilateral donors finance in aid-dependent countries such as Cambodia, and this is a hitherto understudied research topic. Specifically, this research investigates the act of project-level mainstreaming under two different new global initiatives namely the (Global) Cambodia Climate Change Alliance fund and the Strategic and Pilot Programme for Climate Resilience fund. These two

³ Environmental safeguards here refer to a legalized rule or policy requiring a developer or an implementing agency to identify potentially adverse environmental impacts and mitigation measures. The term "environmental safeguard" is interpreted widely to include the safeguards of the people, natural, physical, socio-cultural and other resources Ostrom (2011, p. 10).

climate resilience initiatives are funded by the industrialized countries that have largely polluted the earth and created the problems associated with climate change.

Multilateral donors have played a leading role in development policy and funding (i.e. grant and lending). Some social groups and scholars often criticize the use of loopholes or the ignorance of multilateral donors in ensuring environmentally and socially sustainable development practice. Bilateral aid agencies (e.g. Australian Department of Foreign Affairs and Trade (DFAT)) have also started injecting some development lending in infrastructure and other economic sectors in collaboration with multilateral donors as well as replicating the Multilateral Development Bank investment model. Among the bilateral aid agencies, China is a new, major foreign funder who provides development aid to Cambodia with no strings attached to natural resource protection requirements, environmental safeguards due diligence, or safety and disaster risk management practices. The government statistics show grants and loans provided to Cambodia by China from 1992 to June 2012 reached USD 2.6 billion. Many development experts and academics (Brautigam, 2009; Burgos & Ear, 2010; Pheakdey, 2015) are concerned that China's "unconditional" aid has exacerbated pressure on Cambodia's natural resources, environment, and specifically that it may hinder the efforts to address the impacts of climate change. Some scholars even argue that the competitive economic ambitions are a principle cause of vulnerability to anthropogenic climate risks themselves (Barnett, 2001; Barnett, Barnett, & O'Neill, 2010; Batterbury & Forsyth, 1999; Nielsen & Sejersen, 2012).

As previously mentioned, limited research has investigated the act of mainstreaming climate change adaptation (CCA), especially in donor-aided development projects in Cambodia. This thesis therefore aims to fill in this gap by applying an interdisciplinary, ethnographic approach to study the first generation of two road investment types, which are technically and financially aided by different multilateral donors and global climate resilience funders. Although substantial funds are donated in the form of international development aid to many of the world's least developed nations, the impact of these donations is not always positive.

1.2. Research rationale

Multilateral donors provide financial and technical support to least-developed countries largely in climate-sensitive sectors such as agriculture, water and infrastructure (CIF, 2011; Seballos & Kreft, 2011). Their business-as-usual projects may actually increase climate vulnerability and even hamper the progress of more sustainable economic growth. However, development projects, especially the infrastructure investments that they support, can be (re)designed to adapt to climate change, while still promoting economic growth and poverty reduction.

Scholars have not investigated in sufficient depth two pivotal and interrelated issues relevant to mainstreaming CCA considerations at the project-level in theory and practice. Only a few scholars such as Adger et al. (2009b); Boakye-Agyei (2011); and Sok et al. (2011) have highlighted these issues in their research and in the academic arena. The literature review, in Chapter 2, questions the assumption that multilateral donor investments can elevate the ability to support economic growth, tackle poverty reduction, and deliver well-being improvements in the face of climate threats and uncertainty.

There is a common paradox in the funding choice for development investments: either to separately fund adaptation projects or to fund climate-resilient or the climate-proofing development model). Many scholars such as Boakye-Agyei (2011); Curtis, Ness, and Ironwood (2005); and Sok et al. (2011) are in favour of the latter. Academics and practitioners commonly recognize the lack of continuing empirical evidence and acknowledge the importance of further research on climate-resilient development practices. For instance, scholars have broadly discussed the importance of mainstreaming adaptation, if at all, but have not yet determined any clear method for the design and implementation of climate resilient development, particularly given the weak institutional capacity in developing countries. Though the literature shows no standards for mainstreaming adaptation into development projects, I have observed two different methods of mainstreaming CCA in the project life cycle.

The first method opts for a formal procedure of climate vulnerability assessment, or the related climate risks management approach outside the existing environmental impact assessment. This method of climate vulnerability assessment has been introduced in the new or present national and sub-national development policies and planning (OECD,

2009) and has particularly been used by non-governmental organizations such as Care International (2010) for small-scaled agriculture or community livelihood development projects.

The second method employs project-environmental impact assessment (EIA) as a vehicle to include climate risks and adaptation options into the project life cycle. In this case, adaptation is treated as one project-related issue, for which the project-EIA can address (Agrawala et al., 2012; Boakye-Agyei, 2011; P. H. Byer, Lalani, & Yeomans, 2009; Curtis et al., 2005; Sok et al., 2011). Most scholars emphasize a preference for the latter. However, both methods are neither straightforward nor easily accomplished. That means a clear understanding and empirical evidence of mainstreaming adaptation in the broader climate and development debate should be studied theoretically and practically. I have done this by investigating the climate vulnerability assessment and the adaptation-incorporated IEE/EIA procedure under the present climate change strategies and environmental assessment safeguard procedures of multilateral donors working in Cambodia. The characteristics of each mainstreaming method is discussed in Chapter 2 of literature review and further compared and contrasted with the research findings.

In short, the literature has asserted that further studies on mainstreaming CCA into the development in general and into an individual development project in specific are necessary. The latter, mainstreaming CCA into an individual development project is the central focus of this research.

1.3. Research aim and questions

The aim of this research is derived from two interrelated processes in mainstreaming CCA, and institutional change and development challenges in the design and management of climate-resilient investment projects assisted by donors. The research centres on how multilateral donors and their aid investments have addressed the impacts of climate change (an emerging external factor). The aim is to examine how the CCA considerations have been mainstreamed into the design and implementation of donor-aided projects. The contribution is to overcoming a gap in knowledge concerning the formal and expert guidance needed to comprehensively address the identified need for climate-resilient development practice. In seeking to address this aim, the following subsidiary questions are posed:

- 1) To what extent have concerns with climate change adaptation been included in the project, in particular, as part of environmental safeguards policy and practice?
- 2) Why and to what extent has climate resilience funding conditionality been introduced to influence development decision-making?
- 3) How do donors ensure the recipient government mainstreams of climate change adaptation measures into development decision-making?
- 4) What are the challenges and implications raised at the nexus between the recipient government and donors?

The four subsidiary questions were formulated to seek insights into how the implementers and involved actors are responsible for the adherence to climate change adaptation. They further seek to explore and explain what the knowledge about project requirements is, and what has been experienced with similar projects, including matters such as managing community engagement consultants and contractors. Further issues to be explored include: Is there a process for the review and reporting of CCA management? How does the project identify and allocate human, technical and financial resources, including the use of external experts? And, what are the challenges in terms of responsibilities and accountability of personnel who manage work affecting issues related to CCA?

Stemming from political ecology, public policy, and international development studies it is important to investigate why aspirations and measures stated in development project policy and project documents are often unpracticed in an aid-dependent context (Watts & Peet, 2004). This thesis aims to provide a contribution to understanding whether the donors (through funding requirements and conditionality) can play a leading role in the promotion of CCA in their current and future infrastructure investments at the micro, operational level, which directly benefits the local people. The research will contribute to understanding the institutional changes needed for climate-resilient practice, and the accountability challenges faced, when coping with competing priorities in an individual development investment. The research will also contribute to filling the knowledge gaps concerning the policies or rules-in-use discussed further in Chapters 4 to 6 and the procedure needed to comprehensively address the identified need for climate-resilient development practice under contemporary anthropogenic change.

1.4. Conceptual and analytical foundation

The research analysis is drawn on the concepts of the institutional change related to project-based impacts assessment (see Goldman, 2005) and institutional analysis and development related to local infrastructure development (Ostrom, 2011). The notion of institutional change and institutional analysis for development provides a powerful explanation for the transformation of individual actions and institutional behaviour in incorporating cross-cutting issues such as gender, poverty alleviation, environmental protection into the decision-making process of development project policy and practice. Based on my literature review, the two concepts complement each other and are fit for studying the issues and challenges in the policy change and practices of international development projects. Ostrom's institutional analysis and development is more relevant to a higher, broader contextual analysis of sub-national (e.g. municipality) or sub-sectoral (e.g. land use, fishery) or community-level development planning. Whereas, Goldman's institutional change is more workable at the operational level, especially international development or development aid projects, in terms of application, compliance, consequences, and implications of a particular development rule-in-use or development funding conditionality as a critical driver of transforming rationalities to govern climate change concerns (Käkönen, Lebel, Karhunmaa, Va, & Try, 2014).

The institutional change and institutional analysis concepts were originally designed for the analysis of the dynamics of institutions and their formation. The original concept is particularly relevant given that CCA enabled by donor funding criteria and open demonstrations that the criteria were often “informal” before they become “formalized and institutionalized.” Institutional change (Goldman, 2005; Park, 2015) and institutional analysis (Cuevas et al., 2015; Kakegawa, 2012) are relevant to examine and explain the accountability challenges in theory and practice. The institutional change and institutional analysis approaches have overlapping variables and are complementary to one another for undertaking critical analysis (Ostrom, 2011). One issue of the institutional analysis concept is that it fails to explicitly account for dynamic institutional aspects such as the institutional change factors that are highly relevant to the interplay between different ‘rules-in-use’ (Young, 2002).

As explained by Ostrom (2011), one analytical framework is usually compatible with or composed of multiple theories including social choice theory, theories of change, and

theories of common goods. The institutional analysis concept, specifically, has five fundamental elements, namely (1) exogenous factors outside the system studied, but influenced by the action arena and interactive patterns (2) the action arena that comprises the actors and institutional arrangement, (3) interactive patterns generated by these first two factors to frame the CCA mainstreaming, (4) evaluation criteria are substituted with the accountability challenges of complying with rules that were identified through the empirical data and an extensive review of the literature. The evaluative criteria that determine the factors (e.g. challenging elements) that shape the outcome of interactive patterns (Cuevas et al., 2015), and (5) performance outcomes as shown in Figure 1.1.

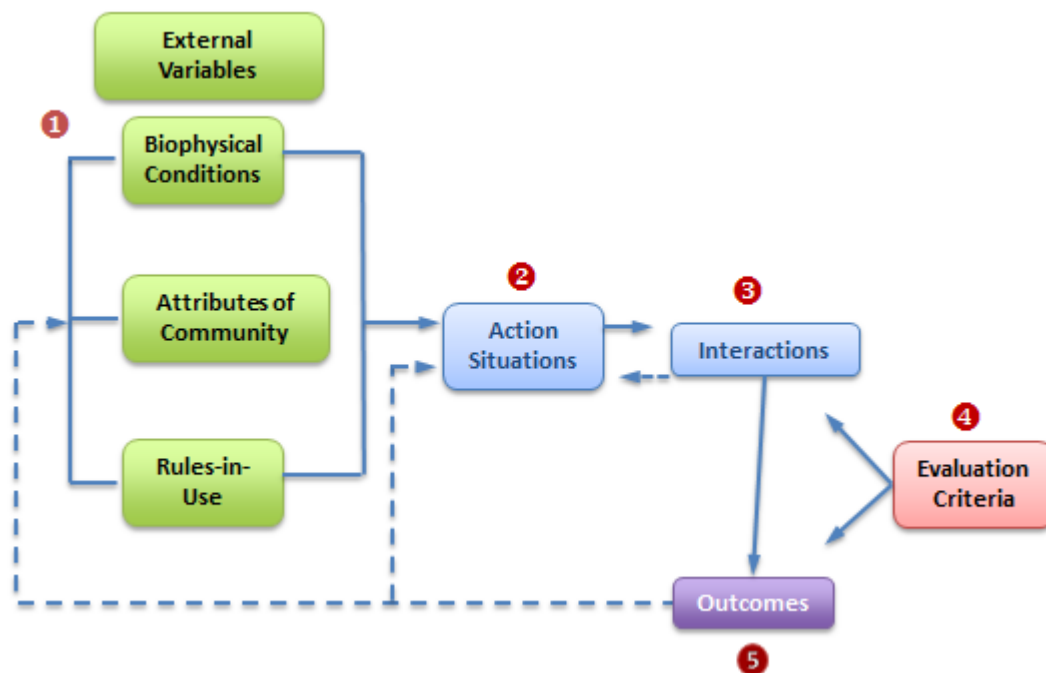


Figure 1.1 Institutional analysis and development

Source: Ostrom (2009, p. 15)

In this study, the first two elements of external variables and action arena (or contextual factors) are integrated as part of the background Case Studies in Chapter 4. The elements of interactive patterns and evaluation criteria are critical for any research analysis as they determined how the process outcomes of climate-resilient road investments are examined. Hence, I modified variables in the interactive patterns and evaluation criteria to make them more effective in the analytical framework discussed in Figure 1.2 in the next section.

1.5. Analytical framework

According to Cuevas et al. (2015); Goldman (2005); Kakegawa (2012); Ostrom et al. (1993); and Yasuda (2015), the principles of institutional change and institutional analysis can be operationalized well for conducting evaluation research, especially in examining the practice of international development policies and projects. This thesis applies them for gaining better understanding of the creation of climate-related policies, rules, or norms leading to evolutionary change and accountability in an individual development project-aided by different multilateral donors. The exogenous contextual factors and particularly the rules-in-use influence the action arena where two or more actors interact and jointly produce the targeted outcomes (Yasuda, 2015). The key actors in studies of international development projects (Ahsan & Gunawan, 2010) are the multilateral donors, the government implementing agencies, the contracted consultants, and the beneficiaries. As recommended by Ostrom (2011), the institutional analysis concept is divided into five phases to discover how climate change impacts and adaptation measures are integrated into project-decision-making. Details of each phase are modified in and explained after Figure 1.2:

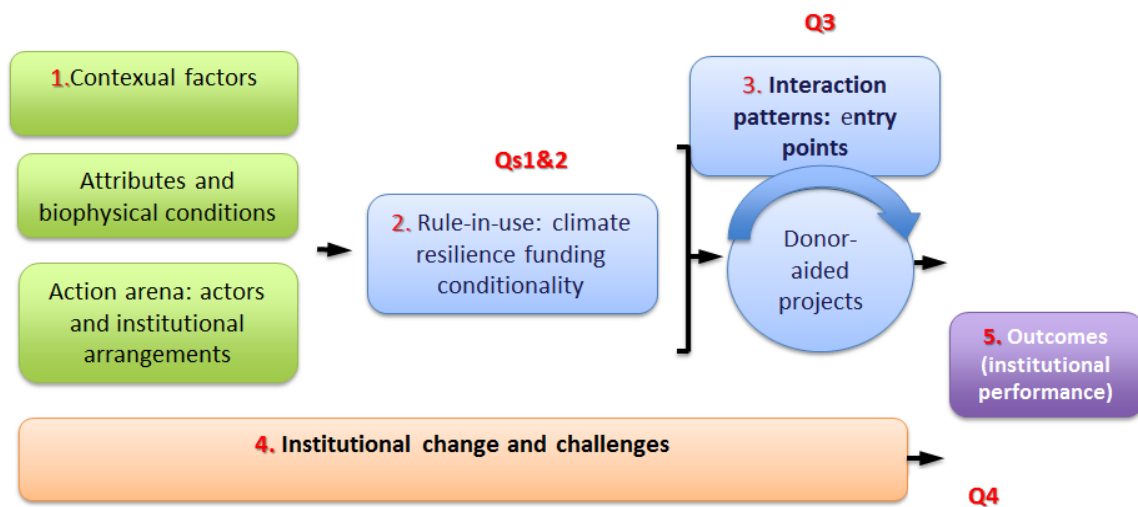


Figure 1.2 A modified analytical framework for this thesis

Source: Adapted by the author from Ostrom (2011, p. 10) and Goldman (2005)

Phase one is an empirical section to illustrate contextual factors, establishing background information and fundamental principles to seek insights to the research aim and questions. According to Ostrom (2011), the contextual factors can include the project background, biophysical conditions, and action arena. The biophysical conditions illustrate the nature of physical, environmental and material elements where actors evolve (Clement, 2008)

and the attributes of an individual project. The action arena includes two elements: project actors and implementation arrangements that illustrate the power nexus of the involved actors for making decisions (Ostrom, 2011). Ostrom defines action arena as the social space where the actors “interact and activities take place” (Yasuda, 2015, p. 38). The actors encompass “individuals, groups of individuals or organisations” such as donors, government implementing agencies, and community people in the context of an individual donor-aided project (Ahsan & Gunawan, 2010; Clement, 2008). Actors are mainly influenced by the way they acquire process, retain and use their technical knowledge and the financial resources they can use. The action arena can greatly influence the patterns of interaction (Yasuda, 2015), which result in the performance outcomes. However, Ostrom admits that it might cause confusion to include all “action arena and actors” in the institutional analysis concept as the actors are already an embedded part of an action arena (Ostrom, 2011). This thesis equally focuses on the implementers, funders and other actors in the action arena and interactions of the pre-determined institutional arrangements. The contextual factors might greatly influence the actions arena (Ostrom, 2011; Yasuda, 2015) and are pre-determined to fit the research aim and scope.

Phase two addresses the first two questions, concerning the relationship between the rules-in-use—which can include policies, procedures, requirements or criteria—for funding, and the actual implementation or practices on the ground (i.e. to what extent have concerns with climate change adaptation been included in the environmental safeguards policy and climate resilience funding conditionality). The rules-in-use are the working rules used by the actors involved (Ostrom, 2011, p. 19; Yasuda, 2015, p. 37). Ostrom defines the rules-in-use and working rules as the set of procedures, principles, standards, framework, and norms to which the participants or actors “would make reference if asked to explain and justify” their logic of appropriateness to the public or a particular society (Yasuda, 2015, p. 37). The working rules include informal operational requirements can shape the way development projects are managed (Mosse, 2004; Rosien, 2010). For instance, a donor’s new climate resilience top-up or funding conditionality is used to justify whether the actors should or should not pursue certain actions.

In this context, Phase two starts with a content review of the compliance of the CCA originated by their donor requirements. According to the emerging rules or climate resilience conditionality, multilateral donors are, to a large extent, legitimized to play a leading role in supporting the recipient government in addressing climate change issues. Furthermore, the joint declarations by international donors such as the European Commission (2010) and Multilateral Development Banks (2013) for reporting adaptation finance promotes a mechanism to examine the struggle and multi-level power nexus between donors and the recipient government. Multi-Level refers to “local, provincial, national, regional, global units of governance” (McGinnis, 2011, p. 6). In this regard, the drivers of institutional change for this research analytical framework are characterized as:

- Inclusion of an aspiration or statement of aims to improve climatic risks management in order to obtain sufficient resources and skills for the informed option of development practice (Sietz et al., 2008; Tang, 2011)—the need to set a context of considering the adverse impacts not only *from* and but also *to* the individual project;
- Ability to learn and develop individual skills through emerging opportunities (Sietz et al., 200)—institutional values and arrangements, and a capacity to assess, identify, manage and assess negative environmental issues and climate change issues; and
- Ability to act and legitimize actions through adequate allocation of responsibilities and resources (Tang, 2011)—linking project activities to environmentally-sound and climate-resilient development.

Phase three seeks to identify how donors have ensured that the government adheres to the rules-in-use. Therefore, Phase three examines the interaction patterns that result from the actors and institutional arrangements in the action arena; and possible entry points (e.g. impact assessment tools such as IEE/EIA and climate vulnerability reduction assessment (VRA) for the project-screening, scoping, assessing, analyzing, and prioritizing measures for managing climatic impacts. The project cycle’s typical steps—such as preparation, appraisal, implementation, and monitoring—can be integrated with challenges and solutions of CCA (Agrawala et al., 2012; Boakye-Agyei, 2011; Sok et al., 2011).

Phase four addresses the final question concerning the challenges encountered by the involved actors, resulting from the transformational change required to enact climate-resilient development practice, and the implications raised. Phase four illustrates the evaluative criteria that are used to assess the performance of institutional arrangements. The criteria are developed depending on the particular research aim and scope. Thus, institutional change and accountability are used for guiding the interaction patterns and for examining the power nexus of the donors and the recipient government. Phase four explores key drivers of institutional change that donors and the recipient government choose to exert themselves to act on addressing climatic impacts in the project-decision-making process (Sok et al., 2011). Importantly, Phase Four is a platform to explore and explain a structured methodological and empirical process for mainstreaming CCA in relation to influential internal factors: technical, financial, and institutional values. However, it is important to note that the institutional analysis may not represent all possible challenges (Cuevas et al., 2015) that the in-charge institutions encounter in addressing issues of CCA in an individual development project.

Finally, Phase Five considers and evaluates the process outcomes, which are expected or actually delivered from the interaction patterns in Phase Three and institutional change in Phase Four. It aims to conclude the outcomes resulting from the exercise of addressing climatic impacts including precise reactions, and perceptions if it is premature to assess. In other words, this final phase highlights the extent to which there is improved welfare for the majority. It then discusses how the mainstreaming exercise can thus be legitimized and reproduced into future projects as well as development policy, planning, and budgeting systems.

1.6. Thesis outline

This thesis aims to examine and analyse the climate-resilient practice as shown in Figure 1.3.

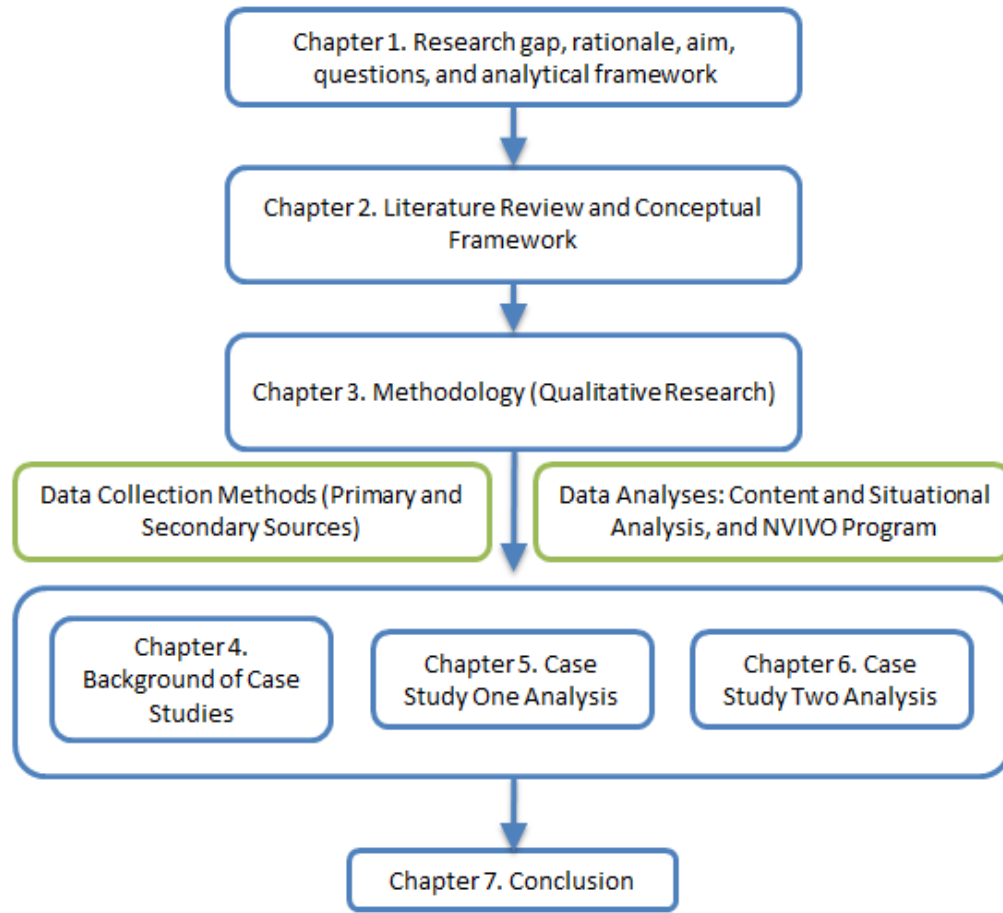


Figure 1.3 Thesis structure

Source: Author (2016)

Chapter 1. This chapter describes the research gap, rationale, assumptions underlying the research, aim, questions, and the concepts related to analytical framework, and presented the structure and process for conducting and concluding the thesis.

Chapter 2. The Literature Review examines the scholarly research to identify the driving factors motivating the multilateral donors of the two Case Studies to adopt environmental safeguards and climate resilience into their development aid projects. It also explores the relevant concepts of how mainstreaming CCA considerations are constrained and influenced by internal and external factors.

Chapter 3. The Research Design describes methodology and methods of the research. This chapter identifies a cross-case study methodology for the thesis in order to operationalise the conceptual research framework explained in Chapter 1. It then

describes the processes of data gathering and analysis using the Nvivo 10 program, employing a range of methods and data sources, and concludes with a reflection on the researcher's journey throughout the PhD thesis.

Chapter 4 describes the historical background, operational dynamics, and funding system of the two Case Studies. Chapters 5 and 6 present a discussion of the empirical findings and each case study analysis in accordance with the specific research questions and conceptual research framework presented in Chapter 1.

Chapter 7 presents the conclusion based on the empirical evidence of the two Case Studies. This Chapter synthesizes, discusses and concludes the entire thesis. It begins with a response to the research aim and research questions. It then emphasizes the significance of the research findings and their contribution to the development policy and academic literature. It then draws on lessons learned and policy recommendations for the emerging study field of CCA. The chapter then highlights the implications of the research for development practices, discusses the limitations of the research and provides suggestions for future research.

1.7. Summary

This chapter has explained the current knowledge gap in the thesis and challenges in donor aid and international development funds in the context of global climate change. Although substantial funds are donated in the form of international development aid, the impact of these funds is not always positive. Despite extensive research into the measurement of such impacts, little research has investigated the way that CCA measures are identified and managed at the project level. This chapter therefore seeks to address this issue followed by discussing the research gap created by paradigm shifts in the development aid.

This chapter also presented the research aim and the modification of Goldman's institutional change and Ostrom's institutional analysis for development for the research analysis. It has shown that accountability challenges surrounding the emerging CCA and the contemporary donor aid have played an important support and facilitation role for linking climate-resilient development, and these are contestable and require in-depth empirical evidence. However, the discussion presented above indicates that there is little

evidence on how to ensure that the integrated approach of maximizing climate-resilient road investments can work effectively. Debates about effective compliance with the rules and policy requirements regarding climate resilience funding conditionality are still dominated by issues related to Ostrom's five fundamental sets: contextual factors, action arena, interactive patterns, evaluative criteria, and process outcomes. These five fundamental sets are discussed in the Results chapters 4 to 6. The next chapter provides a review of the literature and an explanation of the conceptual foundations underlying the present research.

Chapter 2. Literature Review and Conceptual Foundation

Adaptation is ... a legitimate response to climate change; yet, there is little consensus within climate change and development community over what adaptation means; and how it should be operationalized (Ayers & Dodman, 2010, p. 161).

This chapter covers themes related to climate change adaptation (CCA) and climate resilience in the context of international development aid and road investments at the micro project level. It begins with a discussion of the historical approaches to multilateral aid portfolio and the management of climatic risks in international development aid, with particular reference to road infrastructure. Attention is drawn to the climate change (external) impacts on the project. The review also considers the drivers and challenges of institutional change in upholding actions for climate-resilient development practice. It concludes that mainstreaming CCA into donor-funded individual projects, especially for road infrastructure, has been insufficiently investigated.

2.1. Understating institutional change and analysis

As explained in Sections 1.4 and 1.5, the concepts related to institutional change (Goldman, 2005) and institutional analysis (Ostrom, 2011) are blended to be the principal research approach due to their conceptual compatibility. Their theoretical perspectives have been used in development policy and donor-sponsored physical infrastructure projects to explain how donors initiate and enforce policy compliance. Goldman (2005); and Mosse (2005) used drivers of institutional change to explore the successes, failures and gaps between policies and practices of donor aid for mega-infrastructure projects in developing countries. Goldman (2005) and Bebbington and Bury (2009) refer to the institutional change drivers emerge beyond the power of donor aid as the offset asymmetries of power relations. The literature review shows that the question of institutional change related to impact assessment is becoming increasingly popular, but remains under researched.

According to Goldman (2005), the theoretical concept of institutional change related to impact assessment (e.g. IEE/EIA and environmental change [aligned with climate vulnerability] impact assessment discussed further in Chapters 5 and 6) and institutional change within the multilateral donor leadership in support of integrating CCA

considerations into the ongoing or new development investments. IEE/EIA is important because it is one of the only ways in which large development projects can be scrutinised for their environmental performance – this is the case in Cambodia.

Ostrom, Nobel Prize winner in 2009, established the institutional analysis and development concept in the 1980s to analyse the common resource and community-based development policy that an institution can operate and change over a period of time (Polski & Ostrom, 1999). Over the last three decades the institutional analysis and development concept has been continually refined by Ostrom and other scholars (see Ostrom, Schroeder, & Wynne, 1993) to address public policy questions and development practices, including donor-sponsored infrastructure projects in distinct socio-political contexts. However, only few scholars, for instance Cuevas, Peterson, and Morrison (2014); Joshi, Ostrom, Shivakoti, and Lam (2000); and Yasuda (2015), have jointly operationalised the concepts of institutional analysis and institutional change in their respective studies in Asian development context, but not in an integrated context of donor-aided road investments in Cambodia. For example, Yasuda (2015) applied the concepts of institutional change and institutional analysis to investigate and analyse how development policies, rules, and norms, which are parallel to donor policy narrative and funding conditionality (Kähkönen et al., 2014), can influence the environmental activities of civil society networks on a controversial hydropower infrastructure project on the Mekong river. Cuevas, Peterson, Morrison, and Robinson (2015) used institutional transformation concepts to examine the process and success in mainstreaming CCA and disaster risk management into local land development planning in the Philippines.

As noted in Chapter 1 (i.e. Figure 1.2 of the analytical framework), this research design and analytical framework are guided by the principles of institutional change and institutional analysis. The concept of institutional change within the development aid context is coined by Goldman (2005), whereas the institutional analysis and development model is originated and tested by Ostrom (2011) and her academic colleagues. The term 'institution' is broadly defined as the structure of social order to organize individual and organizational behaviors and development activities at a specific scale (Ostrom, 2009). Institutions therefore describe behavior patterns targeted to enforce rules, guidelines and policy of formal organizations or institutions. The research refers to institutions as an entire system, including the capacity to learn and to act (Inderberg &

Eikeland, 2009), for example, through the design and implementation of individual road investment that the external donors financially and technically support. In this context, the research design is informed by the general institutional approach (see Lasco et al. 2009). Although institutional change theory was initially employed in the political and economic sciences (Ostrom, 2011; Tang, 2011), institutional change has been also applied to analyse development aid compliance supported by the external donors; see Goldman (2005) working in Southeast Asia.

Factors that shape the change of an institutional behavior might be influenced either by internal pressures (e.g. mission and competency of donors) and/or external pressures (e.g. the donor actions to address global climate change vulnerability). Both can lead to institutional change. An example of institutional change is ‘adding on’ adaptation requirement to the business-as-usual model. In this context, bringing CCA issues into project decision-making can require, or lead to, changes of focus of resource allocations, and business-as-usual development models for international development aid. Such changes are dependent on meanings inferred by the actors and institutional arrangements (Ostrom, 2011; Yasuda, 2015). Understanding these meanings requires multiple qualitative research methods; and not simple awareness surveys or statistical analysis.

The literature shows that theory development lags behind on-going sustainable and climate-resilient development practice (Persson & Klein, 2008). This research is modest in scope, inductive, and does not aim to challenge or test institutionalism or institutional change theory or its applications. I address how the drivers of institutional change—such as finance, awareness, adaptive capacity, and decision power—are constructed and reconstructed by the project implementers, beneficiaries, collaborators, and other stakeholders. Therefore, I systematically build understanding of a specific conceptualization induced from social phenomena and the research findings.

2.2. Understanding climate change adaptation

Adaptation has been used where biological or ecological principles are widely applied in the context of human-environment and human-development interactions. Although farmers, sectors and all individuals have a number of examples of their successful adaptations in our human society (Batterbury & Forsyth, 1999), with the expected risks and uncertainty of human-made climate change, a new or different form of adaptation is needed (Adger et al., 2009b).

Scholars such as Schipper and Burton (2009) have felt that the meaning of ‘adaptation’ to climate change is universally accepted. These scholars have commonly referred to the IPCC (2007a)’s 4th assessment report, which defines ‘adaptation’ as adjustments of a system to better respond to present and future climate vulnerabilities by moderating climate risks and/or exploiting beneficial opportunities. This definition views ‘adaptation’ as a specific system and its ability to adjust to the changing climate on its own.

After reviewing the definitions of ‘adaptation’ in the body of literature, I observe that adaptation is about anything that reduces the risks associated with vulnerability and impacts to climate change, over the short- and the long-term, for both the direct beneficiary of the adaptation and the wider society. Various key adaptation definitions and concepts demonstrate that there is lack of consent across various groups of stakeholders—who or what to adapt and why? When key adaptation concepts enter the wider circle of analytical work and sustainable development policy making, they need to be treated with more care and accuracy—adaptation to what and how to adapt? Furthermore, the literature shows that different climate change scholars, policy makers, and practitioners have even used ‘adaptation’ in a similar manner to other related terms such as vulnerability, resilience, and adaptive capacity (Levina & Tirpak, 2006; Schipper & Burton, 2009). In other words, while there is common understanding about ‘adaptation’, the interpretation and application of adaption varies from field to field. An example of how selected agencies and development actors still interpret and apply ‘adaptation’ in a way that suits their specific or particular individual agendas is summarized in Table 2.1.

Table 2.1. Adaptation definitions by different actors

Actors	Definition and/ or application	Remarks
United Development Programme (UNDP)	A process by which strategies to moderate, cope with and take advantages of the consequences of climatic events are enhanced, developed, and implemented (UNDP, 2015).	Focuses on opportunities to cope with and take advantage of the changing climate. Not clearly link to development or economic growth.
IPCC	Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2007a).	Be prepared to respond to and benefit from the effects of changing climate. Not clearly linked to development or economic growth.
Multilateral Development Banks (MDBs) including the World Bank and ADB	Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects. Adaptation can be carried out in response to (ex post) or in anticipation of (ex-ante) changes in climatic conditions (MDBs, 2013).	Same as the above
UNFCCC	Actions taken to help communities and ecosystems cope with changing climate conditions (IPCC, 2007a).	Focus on strategic actions or guideline to cope with the changing climate conditions.
Academics	A process, action or outcome in a system (ecosystem, household, community, group, sector, country) that helps the system to better cope with, manage or adjust to the change conditions, stresses, hazards, risks or opportunities associated with climate change (Ayers & Dodman, 2010).	A combination of process, system and actions to adjust with and benefit from the changing climate conditions. This fits best with my proposed research context.

Source: Compiled by the Author (2016)

All the above definitions use different terms to explain what adaptation is; and this can create different or inconsistent expectations in different circumstances. Additionally, one can see that a growing number of adaptation practitioners use the technical terms (closer to the definition from the UNFCCC secretariat website), while others such as policy makers and politicians use a broader definition and emphasize the institutional capacity of adaptation. The various interpretations of adaptation can have serious financial implications and can also influence development models, policy narratives or approach (Käkönen et al., 2014). Ultimately, my preference is to use the adaptation definition and concept for informing decision-making (how and what we can adapt?).

The present research aims to improve individual development projects to ensure sustainability and the inadvertent vulnerability to extreme climate stresses. Therefore, this research refers to climate change adaptation (CCA) as a matter of building climate resilience by reducing exposure to climate change risks (e.g. avoiding construction in

floodplains or planning ahead for extreme weather events) and increasing institutional adaptive capacity (e.g. through education, communication, warning information, and adaptive actions embedded in the goal of an individual project). That means improving the practical ability to cope with current and future climate risks in order to build a resilience system, or in order to promote a system of climate-resilient development practice, which is increasingly identified as a critical characteristic of road systems now and in the future.

For the purpose of my research focusing on mainstreaming adaptation in the global warming context, I follow the majority of scholars in adapting the IPCC (2007a) definition, which looks at adaptation as integrate part of development approach for building resilience to adverse impacts of climate change. When it comes to road infrastructures, numerous forms of adaptation are possible and this research adjusts the definition of ‘adaptation’ by focusing on human needs and actions in environmental management planning towards maximizing adaptation measures such as changes in bio- and techno-engineering design, and changes in the infrastructure codes and practices that reduce the impacts of climate risks and variability.

2.3. Linking climate change adaptation to development

Climate change adaptation (CCA) and development projects are linked because any adverse impacts of climate change pose a challenge to meeting the ultimate goal of development. In addition to being a development issue, climate change mitigation and adaptation can affect our capability for economic growth and poverty alleviation. At the moment, many development practitioners, policy makers, and climate scientists jointly acknowledge adaptation as a powerful choice to avoid and minimize climate risks or take advantage of its positive effects on a development-specific basis. Thus, adaptation to climate change helps protect the environment (Batterbury & Forsyth, 1999) and levels positive impacts on an individual development investment. For instance, an increase in rain intensity or probability of flooding requires road construction investors to take into account flooding concerns into their engineering design in order to protect and environmental costs from road damage and to assure sustainability of the road investments over time. However, adaptation may give more benefits to some agencies and some members of societies than others receive (Batterbury & Forsyth, 1999),

therefore we should be wary in ever claiming successful adaptation in the development context.

There is substantial evidence to prove that CCA and development are linked, and this has attracted attention at recent international negotiations and dialogues (Ayers, Kaur, & Anderson, 2011; Furlow, Smith, Anderson, Breed, & Padgham, 2011). However, the design and implementation of development investments have either not yet considered the anticipated risks of climate change, or climate vulnerability has only been addressed to a limited extent (Adger, Hug, Brown, Conway, & Hulme, 2009a; Lasco et al., 2009). An examination of the shifts in focus in climate change debates during the United Nations Framework Convention on Climate Change (UNFCCC) process (see Table 2.2) provides more insights into how linking CCA to development was initially left behind, and why the original understanding of CCA differs from how adaptation is currently perceived in global climate change policy.

Table 2.2 Historical thinking and linking adaptation to sustainable development in climate change debates

Period	Forum	Provoking Questions	Strategy/Paradigm
In 1980s	Advisory Group on Greenhouse Gases IPCC	What will the impacts be? How much adaptation to climate change are ecological and social systems capable of? How much can ability to adapt offset the need to mitigate?	Ecosystem adaptation
Early 1990s	IPCC Intergovernmental Negotiating Committee	Is climate change mitigation more important than adaptation for responding to climate change? Justifications that mitigation and adaptation are alternatives to responding to climate change	UNFCCC
Late 1990s	Research Body of UNFCCC Conferences of the Parties	How can policy support adaptation? Who is vulnerable to climate change and why? Climate change will occur—adaptation will be necessary. Close link between adaptation and development.	Vulnerability and impact assessments Adaptation policy

Early 2000s to 2007	United Nations Development Program/Global Environmental Facility World Bank and Donor Agencies Research Bodies IPCC Third Assessment Report	What constitutes adaptive capacity? How can adaptation be integrated into existing sustainable development plans? How can adaptation policy be designed?	Development policy programs and projects by multilateral and bilateral development agencies.
2007 to present	IPCC Fourth Assessment, United Nation Agencies, and the Multilateral-Development Banks	Why mainstream adaptation into development assistance? What is needed for integrating climate change adaptation into development investment, and why? How can adaptation be mainstreamed at policy, sector, and operational levels?	Climate-resilience policy

Source: Adapted from Miller et al cited in Schipper (2006, p. 89)

2.4. Multilateral development aid and road infrastructure

Cambodia has received considerable external assistance from international development agencies. The country's development has been dominated by donor aid, which has accumulated above 90 per cent of its annual national budget since 2002 (Käkönen et al., 2014; Sato, Shiga, Kobayashi, & Kondoh, 2011). By 2013, the country had received USD1.42 billion of development aid (C. Heng, 2014). From 1992 to 2012, Heng (2012) estimates that the country received USD5 billion in donor grants and loans through multilateral and bilateral institutions. The multilateral donors⁴ to Cambodia, and most multilateral aid agencies, focus their support in the hard (or material aid) sector, which includes rural and provincial road investments and other physical infrastructure projects.

According to the Cambodian Ministry of Environment (MOE, 2013a), Cambodia has experienced one of the highest rates of two-digit economic growth for the last decade. With a continued flow of international development aid, Cambodia is also making progress in tackling poverty (MOE, 2013a). Nevertheless, many aspects of the country's development remain precarious and vulnerable in the face of climate events such as seasonal and flash flooding, due to the country's limited institutional capacity (MOE,

⁴ Donors have different agendas; and some donors have considered environmental protection and lately climate change vulnerability and assessment in their development aid. Cambodia has received USD5 billion granted by the international development agencies since 1992, in different economic sectors of the country. A general observation: the major donors in Cambodia can be classified as multilateral donors and bilateral donors.

2009; UNDP, 2011). Consequently, Cambodia has been selected by the Cambodia Climate Change Alliance (CCCA) and the Pilot Programme for Climate Resilience (PPCR)⁵ to pilot climate-resilient development. The CCCA and PPCR are administered by multilateral donors such as the European Union, United Nations, the World Bank Group and ADB. The donor countries that push for these climate resilience demonstrations are, of course, some of those most responsible for causing the global warming problem (see European Commission, 2010; R. J. T. Klein & Möhner, 2011; Seballos & Kreft, 2011) that affects Cambodia's economic growth and poverty. Respectively, the CCCA and PPCR provided climate resilience funds to the two Case Studies that I investigated and from which I have discussed the empirical findings in Chapters 5 and 6. The institutional relationships between those involved are illustrated in Figure 2.1.

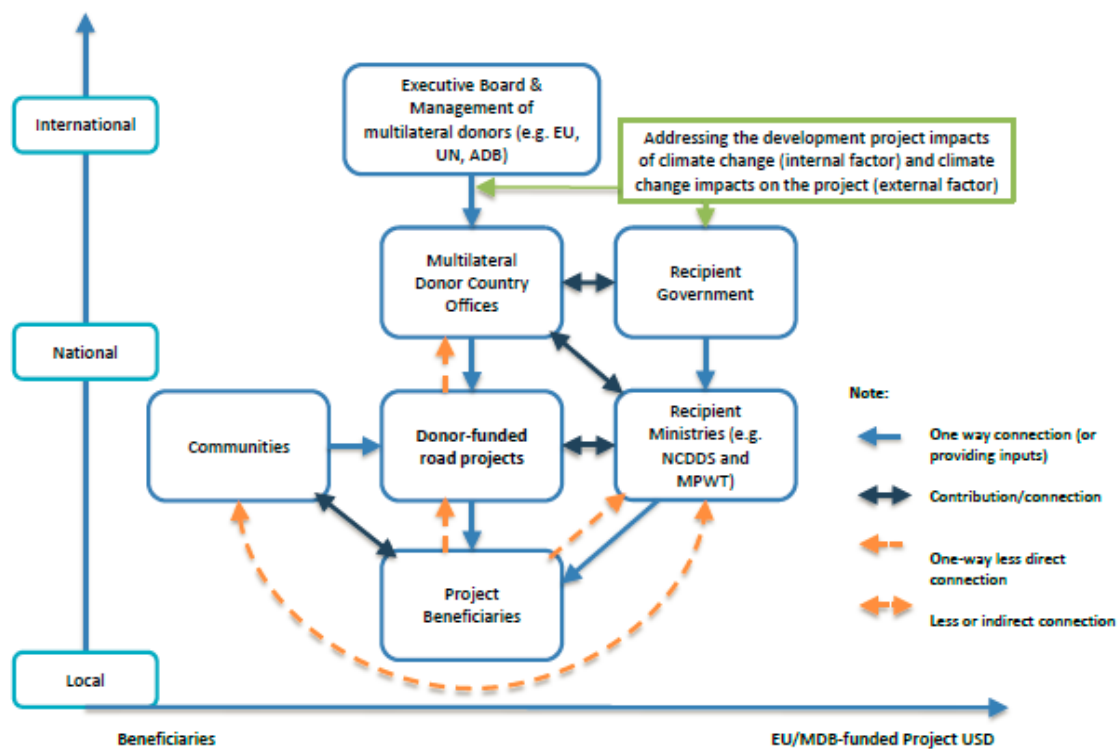


Figure 2.1. Mainstreaming climate change adaptation and institutional relationships

Source: Author (2016)

⁵ PPCR is one of the three sub-programs of the Strategic Climate Fund (SCF). The other two sub-programs of the Strategic Climate Fund are the Forest Investment Programme (FIP) and Scaling up Renewable Energy Programme (SREP) for low income countries. Further information is at www.worldbank.org/cif, accessed 6 June 2016.

Since the early 1980s, the United Nations Development Programme (UNDP) has resumed work in a limited capacity in Cambodia, contributing to emergency relief operations, and formally establishing its offices in Phnom Penh in 1994. UNDP is small in the extent of its technical assistance and development operations (UNDP, 2013) and has been implementing a five-year Country Programme Action Plan (2011-2015), which aims to enhance the government's ability to deliver public services to the population in an efficient, effective, equitable and accountable manner and to create an enabling environment for inclusive growth and sustainable development. Climate change, especially the aspect of adaptation, continues to be a key priority area, along with gender and disaster risk management in Cambodia (UNDP, 2012). However, CCA funds are available nearly a decade later after Cambodia National Adaptation Programme of Action was officially endorsed in 2006. UNDP administered the Cambodia Climate Change Alliance (CCCA) programme from 2011-2014⁶ (European Commission, 2010; UNDP, 2009a), which provided a climate resilience grant to fund Case Study One, discussed in Chapters 4, 5 and 6.

The United Nations Capital Development Fund (UNCDF) is a specialized fund within UNDP, established to exclusively support government efforts to decentralize planning and financing systems (Chay, 2006). UNCDF aims to build local government capacity and empower local communities to request services from their elected leaders. Together with UNDP and other development partners, UNCDF has been helping Cambodia meet its development challenges by supporting local governance programmes since the early 1990s (NCDDS, 2011, 2013b, 2014a; UNCDF, UNDP, & UNEP, 2010). Building on its former "Innovations for Decentralization and Local Development" (IDLD) project and as a part of the Global Programme of Local Climate Adaptive Living Facility (LoCAL). UNCDF has provided technical and financial support to the National Committee for Decentralization and Deconcentration Secretariat (NCDDS) to design and implement the Local Government and Climate Change (LGCC). LCGG is aimed to demonstrate the key

⁶ Cambodia Climate Change Alliance (CCCA) is a multi-donor initiative of a total of USD8.9 million (John & Try, 2012).

role that commune⁷ councils can play in fostering Cambodia's climate-resilient investment project planning and implementation (NCDDS, 2011, 2012a, 2013b).

The Asian Development Bank (ADB) resumed its major development aid to Cambodia in 1992, and re-established its Resident Mission in Phnom Penh in 1996. ADB is Cambodia's largest multilateral development partner. In recent years, efforts have focused on the development of physical infrastructure and the management of public sector reforms. As of 31 December 2014, Cambodia has received USD2.11 billion in ADB lending, grants, and technical assistance (ADB, 2015a). ADB has exclusively administered the climate-resilient Provincial Road 150B, which is co-funded by the PPCR (ADB, 2011b). Some social groups and scholars, for instance Boakye-Agyei (2011); Buntaine (2011); Ear (2007b); Goldman (2005); Kakegawa (2012); Riddell (2007); Rosien (2010); and Seballos and Kreft (2011), often criticize the loopholes or ignorance of multilateral donors in ensuring environmentally and socially sustainable development practice. Bilateral aid agencies, such as the Australian Agency for International Development (AusAID), in collaboration with multilateral donors, have also started injecting some development lending in infrastructure and other economic sectors, as well as replicating the multilateral donor investment model (ADB, 2015b; UNDP, 2009a). Among the bilateral aid agencies, China has become the largest foreign aid provider to Cambodia, on a 'no strings attached' basis. For example, Chinese aid has no condition on the recipient government to address any concerns regarding environmental safeguards or climate resilience (Brautigam, 2009; Burgos & Ear, 2010; Heng, 2012). Consequently, the development aid competition is not only among traditional donors, but now includes China as an alternative source of funding (Kakegawa, 2012). Financial statistics show that grants and loans provided to Cambodia by China from 1992 to June 2012 reached USD2.6 billion. (Kakegawa, 2012) argues that this competing funding source has evolved giving more challenges for the traditional donors to negotiate strict due diligence with their clientele, such as the government implementing agencies.

In 2014, the grand launch of the Chinese-led Asia Infrastructure Investment Bank (AIIB) with USD100 billion capital was regarded as a new rival to other global and regional

⁷ The word "commune" refers to the third-level of the sub-national administrative and development planning system in the Cambodian Organic Law 2008. The word "community" refers to a small group of people within a commune. There is no official administrative division for community in Cambodia.

multilateral donors. There are now concerns that China's new multilateral donor could worsen Cambodia's aid dependency if the foreign fund continues to be ineffectively managed (VoA, 2015). Many development experts and academics such as C. Heng (2014); and Kakegawa (2012) are concerned that China's "unconditional" aid has exacerbated pressure on Cambodia's natural resources, environment, and specifically may hinder the efforts to address adverse environmental and climate change impacts. Meanwhile, ADB's funding is reliant on the infrastructure it funds being constructed to a high standard. As of 2013 road and transport projects were one-third of ADB's total investments (ADB, 2013a).

The global southern and civil society organizations (see also Müller & Winkler, 2008; Tan, 2008) argue that despite the track record of environmental degradation and maladaptation resulting from some of their past development portfolios in developing countries, the climate resilience funds offer Multilateral donors a new and positive step towards correcting their support for unsustainable development and the possibility for maladaptation (Barnett, 2013; Seballos & Kreft, 2011). However, this argument has been unsubstantiated by academic research. While Multilateral donors and their recipient governments wish to embrace the mainstreaming CCA into their development portfolios, the needs of each developing nation such as Cambodia can be different, and thus the level of success depends on the efficiency, commitment, and capacity of the government implementing institution (Regi & Star, 2014).

The multilateral donors have played a leading role in development policy and project funding (i.e. in grants and lending). These Multilateral institutions are the largest providers of development aid in Cambodia, with a common aim to strengthen national and sub-national capacity to achieve human and sustainable development—including promoting good governance and the sound management of environmental and natural resources (ADB, 2015a; NCDDS, 2013b; UNDP, 2009a, 2009b, 2011, 2013).

Multilateral donors generally provide development funding with pre-conditions such as changes in institutional structure, environmental governance, strategy and policy formulation, and so on. A new wave of aid conditionality is the recent climate resilience funding conditions in the two road Case Studies in Chapter 4. While these conditions can serve as catalysts for institutional change and accountability (Goldman, 2005), they can

on the other hand slow down the process of receiving aid for development projects due to the lengthy application and approval process. Consequently, the project goal or situation may have changed before the funding disbursement. At the international level, donors may compete among themselves to receive free climate resilience grants such as the Green Climate Funds or the Pilot Programme for Climate Resilience fund, and be able to use the grants to climate-proof their own development investments (Ayers et al., 2011; CIF, 2011; Käkönen et al., 2014; Seballos & Kreft, 2011). On the positive side, these donors set aside their own agenda to agree on which sectors and which government implementing agencies in a particular developing country should receive their development aid (Seballos & Kreft, 2011). Some form of development aid has even focused more on the agendas already pre-set by the multilateral donors and the donor countries (Babb, 2009; Chay, 2006) without properly accounting for the realities or needs of the recipient country. Obviously, different donors have different hidden agendas (Ear, 2007b; Goldman, 2005; Riddell, 2007). Some donors have been criticized for their poor environmental safeguards compliance (Baird & Quastel, 2015; Boakye-Agyei, 2011; Goldman, 2005; Kakegawa, 2012); and more recently for poor management of climate change impacts in their development aid programs (Donner & Webber, 2014; Seballos & Kreft, 2011).

2.5. Climate change impacts on road infrastructure in Cambodia

Cambodia's climate is governed by the tropical monsoon, and characterized by two major seasons: from May to early October, when strong prevailing winds from the southwest bring heavy rains and high humidity; and from November to April, when winds and humidity are low. The country has experienced an increase in flood damage in recent decades (ADB, 2015b; Anshory-Yusuf & Francisco, 2009), resulting from heavy rains that fall locally and upstream in the Mekong Basin between May and October (see also MPWT, 2013a; UNDP, 2009a, 2012). Moreover, “[w]hile the available precipitation data do not show significant changes in average rainfall since 1960, climate models predict an increase in annual rainfall in the coming decades” (Dazè, Ravesloot, & TANGO International, 2013).

The Cambodia Climate Change Strategic Plan 2014-2023 aims to enable the government to participate in a global trajectory towards a climate-resilient economy (MOE, 2013a).

It identifies more frequent floods, more intense and prolonged droughts, increasing precipitation, and frequent shifts in rainfall patterns as having significant consequences for peoples' livelihoods and the road infrastructure (MOE, 2013a). The Climate Change Strategic Plan is a new step to mainstreaming climate change concerns into the sub-national development planning and infrastructure sector development planning and investment project financing. The Cambodia Climate Change Country Profiles project that Cambodia's annual temperature has increased by 0.8°C since 1960 and will experience an increasing annual rainfall in the wet season, but partially offset by a projected decrease in rainfall during the dry season (UNDP, 2011, 2012). The Ministry of Public Work and Transport (MPWT, 2013a, 2014a) reports that potential climate change risks and environmental degradation present new challenges for road infrastructure investment projects and road improvement across Cambodia.

The road network in Cambodia plays an important role in economic growth and is a principal mode of transport (ADB, 2014a; MPWT, 2013a). Over years of negligence, exacerbated by the effects of flooding, whole sections of many unpaved roads have been wholly or partially destroyed (ADB, 2014b). Some 6,641 km of provincial roads, 39,500 km of rural roads and thousands of commune road connections require regular improvements and maintenance in one form or another (ADB, 2014b). Cambodia's road infrastructure also suffers in dry conditions, when increased climate-induced heat and winds can increase dust levels and reduce visibility. These issues pose concern to the road infrastructure itself, as well as being a safety hazard for commuters and other road users.

The prolonged wet conditions and water erosion caused by flooding damages road embankments and slopes, especially with respect to low-lying or low plain roads. This is compounded by weak institutional capacity, fragmented accountability, and poor governance (ADB, 2014b) in the enforcement of national technical and engineering standards for road construction and improvements, which ineffectively safeguard environmental resources and take no account of climate change risks (ADB, 2015b; MOE, 2013b; MPWT, 2013a).

Cambodia's vast flood plain is one of the country's most prominent geographical features. This makes large portions of the country's road network naturally susceptible to annual flooding, particularly along the Tonle Sap and Mekong River watersheds (Wim Douven

et al., 2012). Recently, flooding has become excessive, resulting in damage to the already fragile road infrastructure, a major hardship to poor villagers and a hindrance to disaster relief, requiring costly damage repairs (Keller, 2002). From 1987 to 2007, floods affected the greatest number of people and road networks—and caused the greatest amount of damage—in the country’s history. There were extreme events such as the 2000/2001 flood, as well as Typhoon Ketsona in 2009, which hit Cambodia badly and caused infrastructure damage including USD25.50 million in road damages (MPWT, 2014a; World Bank, 2015). Worse, additional flooding in 2011 damaged much of the rural and provincial road infrastructure that had been rehabilitated over the previous ten years (Kim & Chem, 2014).

Road infrastructure suffers in dry and wet conditions. When it is dry, repair and building activities and vehicular traffic raise clouds of dust, whereas during the wet season potholes and thick muddy conditions obstruct transport movements, and traveling on a few kilometers of road can take over an hour (Chay, 2006). Worse, road infrastructure is vulnerable to climate change: increasing frequency of rain intensity and flood damage, and inadequate technical specifications that do not meet international design practice for road engineering (or structural) standards (ADB, 2015b; MPWT, 2014a). At least two trends in climate resilience funding conditionality have been initiated by different donors in road infrastructure investments in Cambodia. One is small scale and the other one is larger, as described in Chapter 4.

2.6. Entry points for mainstreaming climate change adaptation

‘Mainstreaming’ is a concept borrowed from previous development practices, for instance, mainstreaming gender or mainstreaming human rights and other emerging socio-economic concerns into development at the scales of policy and project decision-making (R. J. T. Klein, Eriksen, Næss, Hammill, Tanner, Robledo, & O'Brien, 2007). This ‘mainstreaming’ notion has been the focus of some debate by development scholars and practitioners (Boakye-Agyei, 2011), alongside their efforts to avoid and minimize carbon emissions to combat future climate change. Benson, Forbes, Korkeakoski, Latif, & Lham (2014) describe environment and climate mainstreaming as “the informed inclusion of relevant environmental and climate change concerns into the decisions of institutions” that drive the actions of development policy, programs and project implementation. Thus, the focus of environment and climate mainstreaming is to improve

development and peoples' lives and so that they can adapt to the risks of environmental degradation and a changing climate (Agrawal & Perrin, 2009; Benson et al., 2014).

Mainstreaming CCA into business-as-usual development model is regarded as one of the most challenging problems confronting our humanity. Mainstreaming CCA describes a process of identifying climate change risks and adaptation measures into the development decision. The process aims to ensure that development investments are not vulnerable to the uncertainty or potential impacts of climate change. In other words, mainstreaming CCA primarily explains a process of adjusting the design and implementation of development projects to address potential climate risks or integrating climate change concerns. The aim of mainstreaming CCA is to ensure that ongoing and future development investments are not at odds with the changing climate (Hug & Reid, 2009; Lasco et al., 2009)—through adjusting options to enhance climate resilience while achieving the development goal. The literature reports less rhetoric about the importance of mainstreaming CCA, but there is more rhetoric about the reality of understanding and ability to put into practice among stakeholders—particularly the funders, the implementers, civil society organisations, and those who are directly touched by the development project.

Development agencies and recipient governments cannot afford more time for inaction on mainstreaming CCA into ongoing and future development activities. In this regard, multilateral donors (Käkönen et al., 2014; Seballos & Kreft, 2011) and bilateral development agencies (Furlow et al., 2011; Persson & Klein, 2009) have increasingly acted on screening their ongoing development portfolios to identify adaptive management opportunities for mainstreaming CCA concerns into their development policies and investments. However, their screening methods and results for addressing CCA issues are under review. The emerging body of literature shows that CCA issues should be addressed not only at the higher level of national, sub-national and sectoral policy (Karthi, Bhandari, van Schaik, Cornland, & Kjelle'n, 2006), but that the issues should also be taken into account at the lowest or project-level of the development investments (Byer et al., 2009). The latter can directly affect or be affected by the changing climate. Figure 2.2 characterizes three different levels from policy to project to address CCA issues.

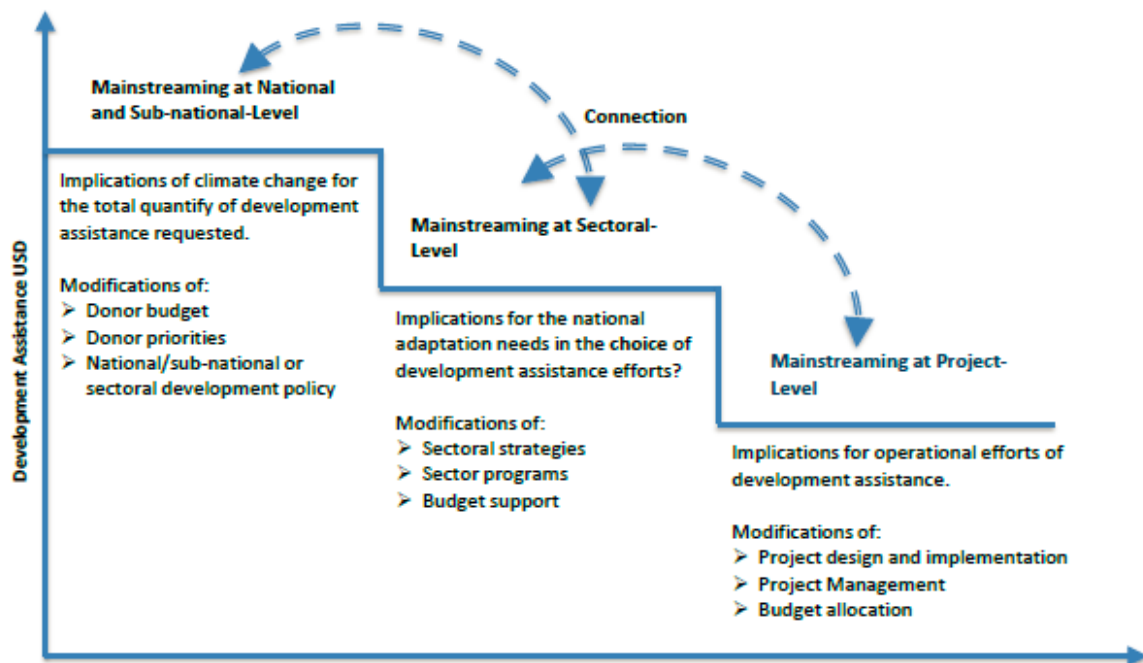


Figure 2.2 Mainstreaming climate change adaptation at different levels

Source: Adopted from Kartha et al. (2006)

Higher-level mainstreaming is about including CCA considerations into National and Sub-national development policy and planning. In order to mainstream at this level, governments need to modify national budgets and their priorities. Furthermore, potential adverse impacts resulting from climate change are incorporated into national policy decisions across different sectors, although this varies considerably with the human and physical geography of states and the particular vulnerabilities their populations are exposed to. One important element of such national policy development is the need for actions that enhance CCA to avoid and reduce maladaptation (Barnett, 2013; Barnett et al., 2010; Hug & Reid, 2009).

Medium-level mainstreaming refers to including CCA considerations into sectoral development policy. In this regard, there is a need to modify sectoral strategies and priorities to meet CCA needs. Furthermore, development planners, decision-makers, and managers should anticipate future climate impacts and variability in their sectoral development process (see Hug and Reid (2009, p. 316). Lower-level mainstreaming refers to the inclusion of CCA considerations into the design and management of

individual development projects and other actions by the state, the local state, or other actors (Karthi et al., 2006). Theoretically, IEE/EIA is an entry point for mainstreaming CCA at this lower-level because IEE/EIA is often mandatory, depending on the institutional context, even if it is weakly implemented in developing countries. Properly applied, it may be used to enforce at least minimum compliance with environmental standards and enhanced CCA. However, the whole basis of impact assessment methodology and its use in project formulation and management is weak in many developing nations, and indeed is absent in some cases, even though some best practice guidelines exist in other developing countries. This project-level mainstreaming is the central focus of this research. Other higher mainstreaming levels, although important, are less significant in the empirical work presented in Chapter 4.

2.7. Mainstreaming at the project-level

Mainstreaming CCA into an individual development project is a key response to short-term and medium-term climate change concerns. In this research, mainstreaming CCA into an operational investment basis describes a process of integrating it into the decision-making process, or adjusting the project design and activities to cope with the environmental (internal) and climatic (external) risks, so that the development investment will not be at odds with internal and external risks either now or in the future. However, when CCA is incorporated, the project proceeds like any other donor-aided business-as-usual project (Webber, 2015a). Therefore, mainstreaming CCA can enhance the success of development project efforts. In other words, mainstreaming CCA is a way of making more efficient and effective use of financial and human resources than separately implementing a standalone ‘adaptation project’ where the precise goal is to purely build resilience.

The literature shows that the discussion of mainstreaming CCA focuses more on national, sub-national, and sectoral development policy and planning, whereas the actual development funding and activities are implemented at the project-level. Mainstreaming CCA into a development project is a key response to short-term and medium-term climate change concerns. In this research, mainstreaming CCA into a project-specific basis describes a process of integrating adaptation into the project decision-making process or of adjusting the project design and activities to cope with the climate risks so that the project will not be at odds with climate risks both now and in future. Therefore,

mainstreaming CCA can enhance the success of development project efforts. In other words, 'mainstreaming CCA' is a way of making more efficient and effective use of financial and human resources than separately implementing an 'adaptation project' where the precise goal is to purely build resilience to a changing climate. However, the literature shows no standards for mainstreaming CCA into development projects at this moment. While the mainstreaming CCA methods and options continue to be debated by scholars, it can be noted that two different methods of mainstreaming CCA have been used in the project cycle.

The first method opts for a formal procedure of climate vulnerability assessment, or a related climate risk management approach outside the existing environmental impact assessment. This method of climate vulnerability assessment has been introduced in the new or present national and sub-national development policies and planning (OECD, 2009) and has been used particularly by non-governmental organizations such as Care International (2010) for small-scaled agriculture or community livelihood development projects. The second method employs the project-IEE/EIA as a vehicle to include climate risks and adaptation options into the project life cycle. In this case, adaptation is treated as one project-related issue which the IEE/EIA can address (Agrawala et al., 2012; Boakye-Agyei, 2011; Byer et al., 2009; Curtis et al., 2005; Sok et al., 2011).

Most scholars indicate a preference for the latter. However, neither method is straightforward nor easily accomplished. As a result, improving the explicit understanding of adaptation and empirical evidence of mainstreaming CCA in the broader development debate should be theoretically and practically undertaken. I do this by investigating the climate vulnerability assessment and the adaptation-integrated IEE/EIA under the present climate change strategies and environmental safeguard procedures of multilateral donors working in Cambodia. The following two sub-sections will discuss the characteristics of each mainstreaming method.

2.7.1. Climate vulnerability reduction assessment

Adaptation continues to be incorporated in climate vulnerability assessment or climate change impact assessment, which has become increasingly available in response to the requirement of parties to the United Nations Framework Convention on Climate Change (UNFCCC). However, most of the climate vulnerability assessment reports have analyzed

climate risks and adaptation responses very briefly, if at all (Tol, Fankhauser, & Smith, 1998). Vulnerability assessment is complementary and drawn from other impact assessment methods such as IEE/EIA and strategic impact assessment (Dany, Bowen, & Miller, 2015). It is largely structured for collecting and analyzing information to inform development strategy, policy, planning and projects to prevent and avoid threats from climate change impacts.

To address this, several development agencies have developed different mechanisms for screening their project portfolios for climate risks and for screening adaptation measures into the project-specific basis. Danish Development Assistance was one of the first bilateral agencies to initiate mainstreaming climate change consideration into its development assistance in the last decade (Trærup, 2010). Likewise, the OECD (2009) has outlined a framework for climate risks and adaptation assessment—used in much the same way as the climate vulnerability and assessment tool—for development assistance at three different levels: policy, plan, and project. This is especially important as Furlow et al. (2011) highlight the significance of incorporating climate change considerations into an individual development. In spite of this, there has been little discussion about how climate risks and adaptation assessment should be performed. In line with this, USAID is in the process of refining its Adaptation Guide Manual to explain what needs to be done at each step in the project cycle (Furlow et al., 2011). Care International (2010), in collaboration with the International Institute for Sustainable Development (IISD), has developed a step-by-step guide on mainstreaming CCA into the preparation, implementation, monitoring and evaluation of non-profit development projects. However, few scholars have reviewed this Adaptation Guide or its theoretical results. Table 2.3 summarizes the step-by-step issues to be considered for assessing climate risks and adaptation options.

Table 2.3: Climate vulnerability reduction assessment

Project Phase	Key issues in a climate risks and adaptation tool
Identification /Analysis	Screening past and current climate context (based on anecdotal information and/or meteorological records)
	Future changes to climate context due to climate change (primarily based on scientific projections and data)

Appraisal	Assessing climate risks and adaptation options Collecting suitable climate data Conducting the assessment of Livelihoods-climate linkages for different groups within the community Institutional and policy environment related to climate change (national, district and local level to fully capture the context) Underlying causes of risks to climate change
Detailed Design and implementation	Adaptation to climate change reflected in project objectives and expected results Climate-resilient development principles Developing local capacity on longer-term adaptation Addressing underlying causes of risks to climate change Project target groups Creating an enabling policy and institutional environment for adaptation at the local, district and national levels whenever feasible
Monitoring and Evaluation	Establishing appropriate partnerships to achieve expected results, particularly cross-sectoral ones Incorporating emergency preparedness measures

Source: Adapted from UNDP (2010); Care International (2010, pp. 22-23); and ADB (2015c)

First, in the project identification phase, the implementing agency (e.g. a multilateral donor) assesses whether the project is climate-sensitive or may be affected by climate change. To properly adapt to climate change, it is necessary to first understand the past and current local climate change variability and climate extreme events. The climate extreme events that impact on individual development projects will most likely be changes in temperature and rainfall patterns, including heavy rains, droughts, floods, and cyclones. In many areas, the impacts of climate change have been observed by scientists and by local communities. Analysis of their observations can provide more informed decision-making about CCA options. This will generally require a combination of scientific or meteorological records (MOE, 2009), along with local traditional knowledge (Batterbury, 2008).

Second, the project appraisal phase offers a more detailed assessment of climate change risks and adaptation options, which the implementing agency should be responsible for suitable climate data (Va, Bajracharya, Lebel, Regan, & Taplin, 2015). The assessment of climate risks identifies the vulnerable assets and the most significant impacts of climate change that will require adaptation. The assessment then defines and prioritizes adaptation options and measures that (i) are most important and feasible and (ii) do not have negative effects on other development projects (or sectors) now and in the future.

Third, the detailed design phase is an entry point for integrating the climate risks and adaptation options in a project cycle. For instance, modifying the design or size of the roadside's drainage or storm water collection system may be required due to a change in extreme rainfall events. Integrating adaptation into the project cycle may result in objectives and expected results that are slightly different from those that the project would otherwise strive for (CIF, 2011). The aim is not to turn every project into an adaptation project, but to ensure that the goal of the individual project is appropriate in the context of climate change (CIF, 2011; World Bank, 2012). When reviewing project objectives, the implementing agency should consider whether the design responds to climate-related challenges identified during the analysis stage (CIF, 2011; Seballos & Kreft, 2011). This may lead to building the institutional adaptive capacity of the implementing agency to plan and implement, for example, bioengineering, habitat reconstruction, or consultative management structures. Finally, a project monitoring and evaluation system assesses if the adaptation measures are working as planned and confirms whether the project meets adaptation objectives. In addition, the monitoring and evaluation system gives feedback on whether the project outcomes include environmental benefits or adverse impacts of climate change.

To assure quality of the assessment of climate risks and adaptation options, sufficient expertise in climate change impact assessment and devotion of adequate resources is required. Key indicators for implementing the adaptation options should be incorporated in the implementation and monitoring plan. The monitoring and evaluation system should be designed to facilitate learning and foster participation by project stakeholders in the design of the system, data collection and analysis. It should help build local ownership and institutional capacity and ensure that the system is grounded in reality. Theoretically,

adaptation should be proactively led locally and should not be isolated from the broader process of development activities (Mortimore, 1989).

Overall, there is viability in applying climate vulnerability assessment to enhance climate-resilient development at an individual project. More empirical evidence and further understanding is needed to account for actual practices and to compare-contrast with the employment of the existing IEE/EIA for integrating adaptation into an individual project. This is discussed in the next sub-section.

2.7.2. Adaptation-integrated IEE/EIA

The Multilateral donors' environmental safeguards, developed in the 1980s, were a significant advancement for sustainable development investments. Since then, multilateral donors have included environmental safeguards as part of their funding requirements that apply to borrowing and recipient countries. Adaptation, an emerging issue for environment and development, should not be considered in isolation from other environmental safeguard issues. For example, the World Bank and Asian Development Bank have looked into the potential of adding or modifying climate change mitigation and adaptation in their Environmental safeguards (ADB, 2005; World Bank, 2009). Incorporating adaptation or CCA in the existing IEE/EIA, a part of the safeguard procedure, was highlighted following the release of the IPCC's fourth assessment report in 2007. Subsequently, in 2009, the European Union introduced guidelines for integrating CCA into the IEE/EIA process (Agrawala et al., 2012). Since then, the nexus between adaptation and IEE/EIA theory has been a subject of intense discussion among the circle of climate change and environment experts. For overviews, see Kamau and Mwaura (2013); and Sok et al. (2011).

The approach of incorporating adaptation into the existing IEE/EIA or environmental safeguards is often referred to as a procedural change (Lasco et al., 2009). The implication of this procedural change is that climate change and environment safeguards advocates need to collaborate to maximize the potential synergies. In part, this is because it is often efficient to commence new projects using the existing IEE/EIA (Sok et al., 2011), a well-established environmental management decision-making tool used by multilateral donors in many (Agrawala et al., 2012).

On the one hand, scholars, for example Agrawala et al. (2012); Boakye-Agyei (2011); Persson and Klein (2008); Sok et al. (2011), argue that mainstreaming CCA appears to require more emphasis on procedural change than on institutional change. On the other hand, scholars such as Inderberg and Eikeland (2009) focus more on institutional transformation to support the paradox of mainstreaming CCA. A common challenge for institutional change is a critical complex process of power struggles and meeting time requirements to realize and implement the change, whereas procedural change (e.g. adding climate screening into the existing IEE/EIA process) can be implemented more rapidly.

Figure 2.3 2.3 explains the notion and process of adaptation-integrated IEE/EIA as part of the multilateral donors' safeguard requirements.

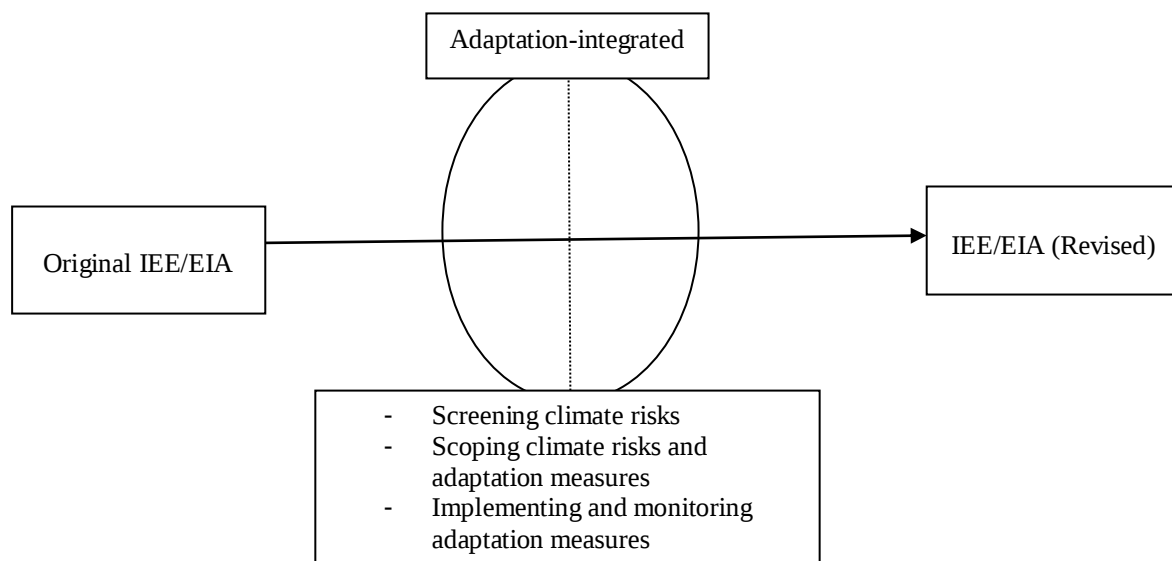


Figure 2.3 Adaptation-integrated IEE/EIA

Source: Author (2016)

On the other hand, there exists a critical limitation of existing IEE/EIA, which was originally designed to identify the impacts of a development project on the environment, but not to identify the impacts of climate change on the project (OECD, 2009). Environmentally benign activities are therefore not considered, even though they may be vulnerable to future, serious climate risks. An additional limitation is the ongoing effort to improve the existing IEE/EIA by strengthening the required skills and institutional

reforms, and therefore “adding adaptation” can be too much for implementation at this stage.

Coupling adaptation with the IEE/EIA process would require that the screening process of a donor-aided project be extended to include sensitivity to climate change, and to assess the project’s potential to lead to maladaptation. Another limitation concerns the fact that in many cases, environmental safeguard procedures are codified in legal obligations, thus making them difficult to modify to formally include adaptation. In this context, multilateral donors have unclear procedures ‘in place’ for including adaptation into their development operation policies. Without the legalized procedures put in place, the implementing agency may under- or over-invest in climate risk analysis and in exploring adaptation options (Independent Evaluation Group, 2011). Despite political will, other challenging factors include institutional values and capacity, power arrangements, and infrastructure resources to address current and future climate impacts.

Adaptation-integrated IEE/EIA can be a tool for not only addressing environmental concerns into a development project (see <http://www.adb.org/site/safeguards/main>) but also for avoiding and reducing risks of climate change which affect the project. Scholars such as Agrawala et al. (2012) and Sok et al., (2011) tend to support IEE/EIA practitioners who argue that we should never create another type of IEE/EIA specifically for climate change impacts or vulnerability assessment. In other words, as illustrated in Table 2.4, all steps (e.g. screening, scoping, and analyzing) of the project-IEE/EIA should be inclusively tasked to incorporate adaptation.

Table 2.4: Incorporating adaptation in IEE/EIA

Project Phase	EIA Step	Possibility for mainstreaming CCA ⁸
Identification	Screening environmental impacts	Screening climate change risks
		Does the project (investment level) justify considering climate change risks?
		Will the project be potentially sensitive to climate change? If so, what risks?
Appraisal	Scoping IEE/EIA	Scoping climate risks and adaptation options
		What variables and factors of climate change risks need to be assessed?

⁸ In this case, the climate data gathering and analysis can be undertaken as part of the environmental impact assessment process.

Literature Review and Conceptual Foundation

		What resources are available for the assessment? Who will conduct the assessment? Who will review and approve the assessment?
Detailed Design and implementation	Preparing IEE/EIA	Preparing climate risks and adaptation options assessment
	Public Consultation	What variables and factors of climate change does the project need to be assessed? What forms of public and stakeholder consultations could be done? Have climate change risks and adaptation options/measures been correctly identified and assessed? What resources have been allocated for adaptation options/measures?
Monitoring and Evaluation (M&E)	Implementation and monitoring EIA/IEE/EMP	Implementing and monitoring adaptation options/measures
		What resources are available for monitoring the implementation of adaptation measures? What indicators can be used to evaluate the implementation of adaptation options/measures?

Source: Adapted from Agrawala et al. (2012, p. 11); Boakye-Agyei (2011); and Sean Capstick (2014) and (Sok et al., 2011).

Little is known about how the design and management of a development project through the existing IEE/EIA is cost-effective to address adaptation issues. With respect to this, scholars such as Agrawala et al. (2012) question the effectiveness of including adaptation in the IEE/EIA process. That means the possibility of addressing adaptation issues through the IEE/EIA are aspirational rather than operational on the ground (Agrawala et al., 2012; Sok et al., 2011). In this regard, Boakye-Agyei (2011) states that multilateral donors are operating within the existent safeguards which unnecessarily address the challenges a changing climate presents to recipient governments, affected communities, and the global commons. There is little guidance to the recipient government from multilateral donors in addressing adaptation concerns into the development investments.

There has been little effort to undertake a holistic approach to integrate adaptation into donor-aided development aid (Furlow et al., 2011). A quicker roll-out of climate-resilient development projects is further hampered by the almost complete lack of institutional capacity to carry out the model of climate-resilient development practice.

In short, there is potential to employ IEE/EIA as a vehicle to enhance climate-resilient practice. However, the body of IEE/EIA literature has not specified where or how mainstreaming CCA can be implemented into individual projects. Furthermore, the extent to which the method of climate vulnerability reduction assessment overlaps with the method of Adaptation-integrated environmental assessment (e.g. IEE/EIA) is unclear. The present research aims to examine these mainstreaming CCA methods through a case study approach in Cambodia. It explores the empirical evidence since much more empirical work and systematic ways to account for the actual practice of adaptation responses, specifically at the project-level is worthwhile.

2.8. Challenges

As mentioned in the studies of Ayers et al. (2011); Boakye-Agyei (2011); Goldman (2005); and Webber (2015b), donors are concerned about the financial and reputational issues of projects that have failed. Hence, major constraints make it difficult to mainstream CCA into the development decisions faced by institutions. Mainstreaming CCA may adversely affect the business-as-usual development model because to 'add-on' climatic risks management costs may lead to frustration or skepticism due to poor institutions (Goldman, 2005), limited resources (Ayers & Huq, 2009; Ayers et al., 2011), inadequate infrastructure, and the uncertainty of climate change (Boakye-Agyei, 2011). Thus, mainstreaming climatic impacts may fail to reduce the amount of damage or risks of environmental change but, instead, waste the already scarce resources.

Scholars such as Dalal-Clayton and Bass (2009) and Agrawala and van Aalst (2008) caution that 'mainstreaming' may lead to increased, excessive workload for administrative and technical staff in the design and implementation of an individual project. Likewise, Lavell (2004, p. 73); and Schipper (2004, p. 199) argue that mainstreaming CCA is probably unnecessary because adequate development will automatically reduce the levels of relative or total risks posed by climate change. From the perspective of developing countries, financial barriers to mainstreaming occur across levels ranging from international to regional, community, or to individual project. It is still unclear where and how the mainstreaming costs will be funded in aid-dependent countries. Some developing countries and academics have voiced concerns about the trade-offs between environmental consequences and development, particularly if the two cannot be isolated (Yamin, 2005). On one hand, the concerns of developing countries are

that funds might be diverted into general development activities, needing at least a quantitative commitment of new and additional funds for environmental pollution reduction and climatic change mitigation committed by industrialized countries (Yamin, 2005). On the other hand, climatic impacts will pose a potential problem to developing countries who worry if the funds allocated specifically for climate change initiatives detract from the money that would be allocated for other non-climate change related, more urgent needs, such as food security, water supply, poverty, economic growth, and health and education services (Michaelowa & Michaelowa, 2007; Stephen, 2013). This is a driving factor for the need for climate finance to be ‘new and additional’ to traditional development aid (Donner & Webber, 2014). In short, climatic impacts are not isolated from development, but are connected to it. The next step is to overcome the suspicion of credible, empirical evidence regarding the resource saving from mainstreaming climatic resilience measures into the development project cycle.

Conversely, in recent years the notion of mainstreaming climatic impacts has continued among sustainable development advocates for donor-funded development policy and projects. Such a notion supports an integrated mainstream approach to ensure sustainability of development investments and to minimize sensitivity of the development investments to both current and future climate risks (R.J. Klein, Kartha, Persson, Watkiss, Ackerman, Downing, & Kjellen, 2008). With this support, the expected benefits of mainstreaming climatic impacts include avoiding policy conflicts, reducing climate change impacts, and ensuring long-term sustainability of investments (Agrawala, 2005) compared with financing standalone environmental protection or CCA projects.

With this in mind, mainstreaming is formally promoted in the IPCC’s fourth assessment report as a cost-efficient way to address climate risks at a multi-level process—from national, to sub-national and project levels (IPCC, 2007b). Mainstreaming was also promoted in the IPCC’s fifth assessment report. Consequently, since November 2008, Multilateral donors and bilateral governments have introduced the PPCR with the aim of implementing the approach of “adding-on” costs (in the form of grants and concessional

loans) (Seballos & Kreft, 2011) into development investments, thereby providing the financial incentives to achieve climate-resilient development practice⁹.

With the climate resilience funding conditionality, additional can be legitimately allocated to existing development investments funds (Seballos & Kreft, 2011) in an attempt to manage an area that remains exposed to climate risks and many other inter-related development risks (Batterbury, 2008). For instance, for long-lived infrastructure and cost-efficient purposes, the global PPCR and GCCA engage the recipient government to consider assessing vulnerability risks and adaptation options as early as possible in the decision-making process (Agrawala & van Aalst, 2008; Seballos & Kreft, 2011). However, there is currently no empirical data, nor clear analysis methods, to assess the actual benefits from mainstreaming climatic impacts into the donor-supported investments.

2.9. Summary

The literature has shown that academic research has minimally investigated the two pivotal and interrelated issues: 1) what multilateral donors have done to mainstream CCA into individual road investment and 2) how multilateral donors can promote climate-resilient development practice. Scholars such as Adger et al. (2009b); and Boakye-Agyei (2011) have shown that these issues have not been investigated sufficiently. The literature has proved that further studies on mainstreaming CCA into development context in general and into an individual project in specific are necessary.

⁹ See also www.worldbank.org/cif, accessed 29 March 2016.

Chapter 3. Research Design and Methodology

“Not all cases are equal. Some have great visibility and impact because of their real- ... consequence.” (Lebow, 2000, p. 594).

Through the research analysis outlines using the theoretical concepts of Goldman’s institutional change and Ostrom’s institutional analysis and development, this thesis examines the entry points for and perceptions of mainstreaming CCA into road investments, which technically and financially are assisted by multilateral donors and climate resilience funds in Cambodia. This research is influenced by Yin (1994, p. 3) in applying the ethnographic, multiple Case Study approach to investigate and explain the studied phenomena: institutional change, accountability and challenges for climate-resilient development practice.

This chapter begins with perspective discussion of the theoretical orientation of my methodology. It follows by justifying why case study methodology is ideal for exploring and evaluating the studied phenomena in the social world of aid and international development at the project-level. It then discusses how various techniques of primary and secondary data collection methods were used. The qualitative and ethnographic interviews were conducted with regard to how CCA is practically integrated into the two Case Studies. Content analyses were employed to identify categories and themes or patterns emerging from the empirical data and literature review. The last section is a summary of this chapter.

3.1. Theoretical and methodological perspective

From an ontological perspective, the research views reality as a construct of the social world. This is a continuous process, as meanings are created when people comprehend themselves in their world in order to make sense of their environment (Denzin & Lincoln, 2008). The subjectivity in the research findings is a tool to explore realities, which are constructed from insights in the data generated from the participants involved in the selected Case Studies and are discovered through multiple subjective accounts. I adopted relativist ontology to produce reconstructed understandings of the social world. From an epistemological perspective, the research uses constructivism because I view reality in the social world as a continuous process and the meanings of the reality are created when

people apprehend themselves in their world to make sense of the environment (Denzin & Lincoln, 2008).

Following from these perspectives, the enhancement of climate-resilient investments were analysed, following a qualitative constructive research paradigm. The research is inductive in nature with empirical research guiding concrete to abstract categories (Neuman & Kreuger, 2003; Sarantakos, 1998). Research data were socially and empirically constructed and interpreted. I interrelated the data from different participants in order to construct a picture of the social world (Denzin & Lincoln, 2008). With this epistemological position, I employed a variety of research methods and techniques to collect and analyse a variety of empirical data. This empirical data informs how social phenomena were analysed in relation to how potential climatic impacts have been empirically managed in two road improvements: one funded under the Programme Based Climate Resilience (PBCR) funding criteria; and the other financed under the Pilot Programme for Climate Resilience (PPCR) funding criteria. Overall, they both concern the provision of additional funds to make road improvements climate resilient (see Chapters 4 for further details).

From an epistemological perspective, the research uses constructivism because I view reality in the social world as a continuous process and the meanings of the reality are created when people apprehend themselves in their world to make sense of their environment (Denzin & Lincoln, 2008). By applying constructivism, the research is inductive in nature and derived from the specific to the general, and from concrete to the abstract (Neuman & Kreuger, 2003; Sarantakos, 1998). Therefore, the research data was socially and empirically constructed and interpreted. I interrelated the data from different participants in order to construct a picture of the social world (see Denzin & Lincoln 2008). Thus, this research sought to refer to the data for constructing and re-constructing the social phenomena it uncovered: the process of how CCA issues have been empirically integrated and managed into the two Case Studies of donor-financed road improvement projects. An outline of the research design is given in Figure 3.1.

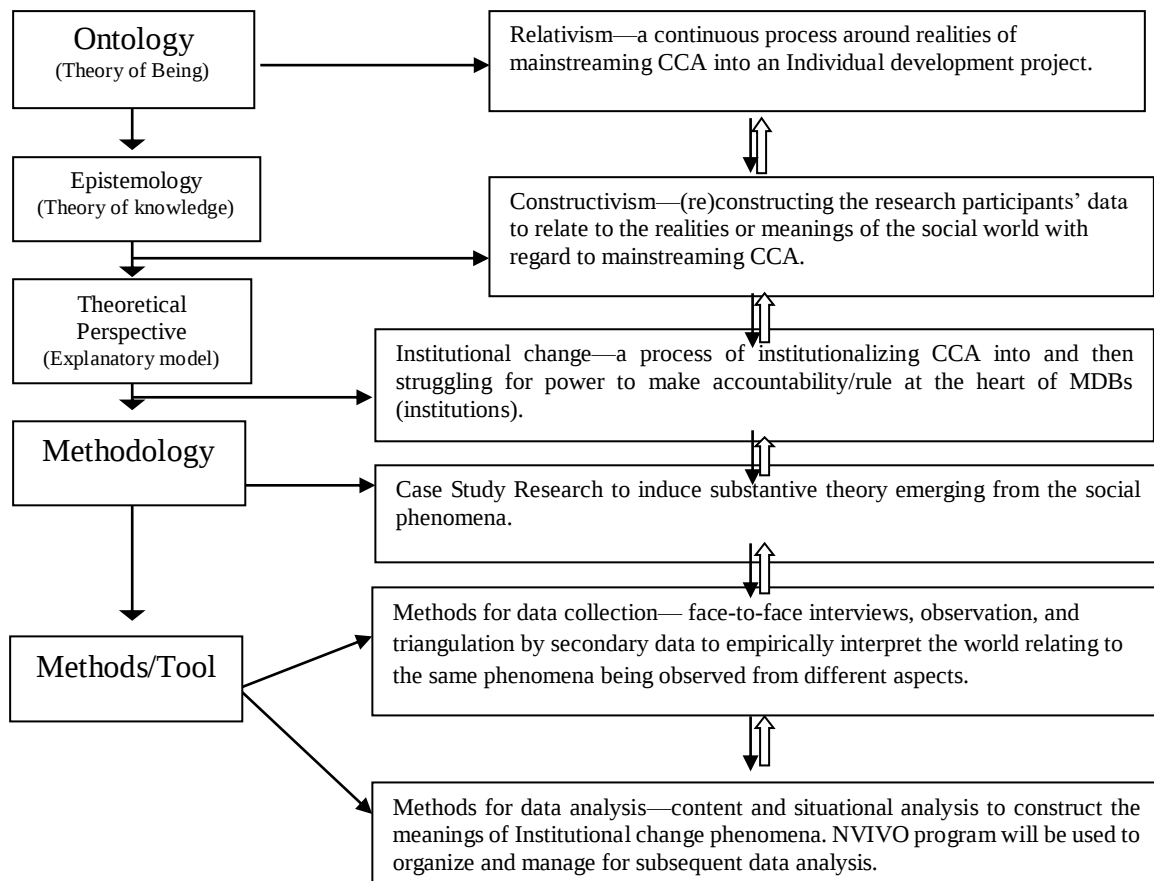


Figure 3.1 The Methodological Research Process

Source: Adapted from (Crotty, 1998)

Babbie (2008, p. 299) refers to the strengths of constructivism for uncovering things that are not apparent. Hence, multiple means were used to show how realities are constructed and re-constructed through human perceptions (Denzin & Lincoln, 2008). The participants' varying views are due to their different backgrounds and social status. They differed in their view of empirical processes and their understanding in addressing how climate change (an external factor) affects the road projects. The Case Study methodology and methods for data collection, management and analysis are discussed in the following sections.

3.2. Case study methodology

Yin (2009) asserts that a case study is one of research methodologies used to explore and explain a contemporary phenomenon within its real-life context, especially when the context boundaries (e.g. methods and procedure of mainstreaming adaptation) are ambiguous. Nevertheless, the common understanding of case study research

methodology varies among scholars (Creswell, 2007; Creswell, Hanson, Plano, & Morales, 2007; Lincoln, Lynham, & Guba, 2011; Merriam, 1998; Stake, 1995; Yin, 2009). For instance, some researchers consider Case Studies as a bounded system, not a methodology, while others treat them as part of a research strategy or a research process (see Creswell et al. (2007); Lincoln et al. (2011)). I acknowledge the debate about using Case Studies as a methodology and strategy. However, engaging in this debate is beyond the scope of this dissertation. Thus, given the different understanding of Case Studies, I endorse the position of Yin (2009) and Creswell et al. (2007) who treat Case Studies as a coherent methodology of qualitative enquiry itself, in which researchers study multiple cases in an allocated timeframe, by using different information sources for detailed and in-depth data-gathering.

The thesis focuses on not only the implications of early sustainable and climate-resilient investment paradigm shift, but also examines the institutional challenges and accountability relating to this paradigm. A case study allows researchers to study the phenomenon in question in its particular context (Stake, 1995; Yin, 2009). In my own Case Studies, I had no control over the behavior of research participants or actual events, and no ability to manipulate them (Yin, 2009, p. 8). Additionally, I focused on the recent donors' initiatives for sustainable and climate-resilient investment in Cambodia. Hence, a case study methodology was appropriate.

Levy (2008) classifies rationales for case study research into three types: idiographic Case Studies which describe, explain or interpret a case and fall within either theory-guided or inductive cases; hypothesis generating and testing Case Studies, which refer to theory-informing and confirming case study research; and plausibility probe Case Studies, which probe a case which is situated between hypothesis testing and generation. Based on Levy's (2008) classifications, the current research design used a combination of theory-guided and an inductive case study. I have drawn the institutional change analysis introduced by Goldman (2005); and Ostrom (2011) to guide the study, but not to test any specific theories. The empirical findings contribute to generating new or emerging hypotheses in the field of sustainable development and CCA studies, rather than testing existing hypotheses associated with theoretical concept of institutional change and development.

3.3. Case study selection

The selection of Case Studies was drawn from the road infrastructure investments, which are prioritized in Cambodian Government's rectangular strategies and donors' country assistance strategies. I chose two of the first generation cases that piloted the climate-resilient road infrastructure. The first Case Study is the Local Governments and Climate Change implemented by NCDDS and funded by international development donors (i.e. European Union and UNCDF) (see NCDDS, 2011, 2013b). The second Case Study is the Provincial Road Improvement Programme (PRIP) implemented by MPWT and funded by multilateral institutions (i.e. ADB and Pilot Programme for Climate Resilience (PPCR))¹⁰ (ADB, 2011b; CIF, 2011). These two Case Studies were selected to address my principal research question for several reasons.

First, Cambodia's road infrastructure has been, in recent years, increasingly damaged by climate extremes or weather-related extreme events which are likely to worsen in the future (ADB, 2011a, 2014b; M. B. Regmi & Hanaoka, 2011). Moreover, road projects usually gain primary attention with regards to how they adversely impact our environment (their internal factor) and how they can be adversely affected by climate change (the external factor) and vice versa. There are a few models of donor-assisted infrastructure projects that are designed to adapt to climate extreme events and weather-related disasters. Therefore, the road infrastructure investments provide a more conducive entry point for managing CCA at the project-level. As developing countries such as Cambodia often lack budgets and adaptive capacity, projects financed by donors can open opportunities to cope with climatic problems. This context matches well with the aims and conceptual framework of my research.

Second, the two Case Studies are in the first round of demonstrating road improvement investments in Cambodia that formally require the (new) adaptation integration by the donor Executive Board and the head of recipient governments in 2011. They illustrate the donors' growing CCA agenda, in the first round of climate-resilient projects. Several other climate-resilient infrastructure projects being implemented during my fieldwork were either at an early preparation phase or implemented by NGOs—compared to the

¹⁰ The first PPCR is from 2009-2012, which targeted to prepare for the PPCR Phase 2 and identified Bank-financed projects that can be used to trial greater climate-proofing practice. The proposed projects must meet the "rush to disperse funding before the expiry dates of PPCR investment funding.

wealth of studies on NGOs. Nonetheless, the nexus of donors and government agencies around funding and operational compliance is still limited.

Third, the two Case Studies have similar characteristics though funded by different donors in different locations. They provide some unique characteristics for comparison in terms of mainstreaming processes, governance and power relations, and the challenges in their policy and institutional adjustments.

Fourth, there are academic studies of multilateral donors' previous performance for development aid and investments that have high environmental-risks, such as hydropower dam projects in Lao PDR (Baird & Quastel, 2015; Goldman, 2005) and highway and bridge construction projects in Southern Asia (Bangladesh Bridge Authority, 2010), which civil society organisations involved and pressured the multilateral donors to follow their policy of due diligence right from an early stage (Caufield, 1996; Clark, Fox, & Treacle, 2003; Connell, 2015; Gutner, 2002; Kakegawa, 2012; Wade, 1997). These offer some comparisons of relevance to road projects. Monitoring their commitment to international standards should be an internal normal practice regardless of the different climate change risks or external pressures.

Finally, I am familiar with the road infrastructure projects and institutional arrangements between the multilateral donors and the government implementing institutions from my previous job as an Environmental Specialist at the World Bank Cambodia Office. ADB and the World Bank have co-funded road and other infrastructure development projects by these implementing institutions. So, I knew the locations and conditions there. In my role with the World Bank I conducted studies in these areas with the implementing institutions, and met several key informants, experts, and government officials. Instead of combining the two selected case study projects into a single-case study, I considered each of the two projects separately. The different locations of the road investments (see Chapter 1) also allowed me to study each individual case separately.

3.4. Research coordination schema

Specific methods to collect and analyse both the primary data and the secondary data against each of the four research sub-questions are:

Subsidiary question 1. What is the content of the environmental assessment safeguards and Programme Based Climate Resilience (PBCR) for obligating the donors and the government implementing institutions to address climate change adaptation issues? How does this content affect climate risks and adaptation options in the actual project operation?

Document (content) analysis—I conducted an archive review of donors’ and government’s current climate change strategies, safeguards policy statement, project-based environmental reports, and other related documents including project documents, progress reports, and evaluation reports. Sources of the documents include websites, publications of consultants and civil society organizations, newspapers and materials from research institutes. I reviewed joint statements, communications and memos of donors and their executive boards to explore the climate change adaptation measures, which are addressed in their climate change and safeguards policies. The goal was to examine how their climate change and safeguards policies have prioritized or regarded adaptation options as the most urgent issues.

Subsidiary question 2. How do donors assure that the government implementing institutions are mainstreaming climate change adaptation into the project decision-making?

Analysis of the project documents—I conducted situational and content analysis of the case study project documents: project proposals, contract agreements, project implementation plan, monitoring plan, and progress reports. These documents are available in English and Khmer in websites and/or public information centers of the donors (e.g. European Union, UNCDF, UNDP, and ADB) and implementing institutions (e.g. NCDD and MPWT). I also conducted ‘participant observations’ through which I participated as an observer in the selected project activities such as workshops, meetings, etc... This is an important component for case study method and ethnography study.

Face to face interviews—I conducted semi-structured interviews with participants such as government implementing staff, donor task team members (including climate change specialists and environmental safeguard specialists), consultants, and civil society organizations.

Visits to the case study project sites—I conducted field trips with the two donor support missions and undertook on-site visits on my own to observe the project activities at the local level.

Subsidiary question 3. What are the institutional challenges in mainstreaming climate change adaptation into the decision-making at the nexus between the recipient government and donors in relation to technology, resource dependence, decision-making power, adaptive capacity, and institutional values?

Document (content) analysis—I conducted content analysis of policy and institutional change literature and explore the process and drivers that donors facilitate and foster the recipient government to buy in the exercise of climate change adaptation mainstream. I examined not only the institutional arrangements between the donors and the government implementing institutions, but also the investment decision-making process. I reviewed reports prepared by internal and independent evaluation groups.

Face to face interviews—I conducted semi-structured interviews with government implementing staff, donor task team members (including climate change specialists and environmental safeguard specialists), academics, development partners, private sector, consultants, and civil society organizations.

Subsidiary question 4. What are the challenges and implications (responses and perceived benefits) at the local level resulting from the exercise of mainstreaming climate change adaptation issues into a development project?

Document (content) analysis—I reviewed reports prepared by internal and independent evaluation groups. I conducted content analysis of the project documents on how community people and local authorities were engaged in the project documents such as Project Data Sheet, Project Manual Administration, and Report and Recommendation of the President to the Board of Directors.

Face to face interviews. I conducted semi-structured interviews with government implementing staff, donor task team members, consultants, and civil society organizations. I conducted focus group discussions with the project beneficiaries to

investigate their perceived benefits and attitudes towards the additional requirement of enforcing climate change adaptation.

3.5. Data collection

The methods for data collection include face-to-face interviews and direct observations. The interviews were semi-structured and in small focus groups. Direct observations were carried out during the visits to the investment project sites and during the interviews, focusing on behaviors of participants and their utterances. The goal was to be unobtrusive. Content analysis examined the archives on climate change strategies and environmental safeguards for donors and the government implementing institutions. The research was interdisciplinary because CCA involves multiple aspects such as engineering technology, finance and adaptive capacity as well as the choice of institutional change and decision-making values and priorities.

3.5.1. Gaining access

My position as a Cambodian researcher conducting fieldwork in my home country provided me with geographical closeness, flexibility and language and cultural awareness. I could easily access the investment project sites back and forth and adjust to the availability of my informants. I could go back to them for further confirmation or information during and after the fieldwork period. I benefited from a long period of fieldwork and participation in the donor support missions and their meetings and conversations held at the project sites. Joining the donor support missions provided me with a unique opportunity to develop stable relationships and mutual understanding in terms of issues around their project progress, issues, challenges, and opportunities as well as my research. In this way, my informants gave me open opportunities to access and acquire information. Culture and language was not a problem because I speak not only the same language but also refer to the same cultural setting with my informants. The benefit of being in the same culture and using the same language have been noted in qualitative case study research (Yin & Davis, 2007). I could conduct interviewing and collecting information in a more or less neutral setting. I felt at ease and comfortable in conducting either individual or group interviews as I could communicate with my informants easily.

Spontaneous and probing questions were often adapted to my open-ended, semi-structured questions, with particular reference to the research aim and the research subsidiary questions. The purpose of each interview was to collect as much information from the interviews according to their responsibilities, expertise and knowledge covering the research purpose and questions. Over the course of my fieldwork, I collected substantial primary documents relevant to the case study projects. The application of multiple qualitative methods provides me with guiding principles to construct the research results and identify theories that can be built on or deepened from my research. Furthermore, with the data collected by the multiple qualitative methods, I reduced the unintentional bias of data collection and the inappropriate interpretation and induction of the participant data.

3.5.2. Sampling method

I interviewed a wide range of semi-structured interview participants. The participants are governments, donors, consulting firms, free-lancers, local authority representatives and villagers in focus group discussion at the project sites. They have a wide range of technical, operational, and management positions. The participants were initially selected with a purposive sampling through my professional and personal contacts from my previous job in Cambodia before I came to the University of Melbourne. Some individual contacts were consulted based on publicly available information (e.g. list of attendees in the various climate change adaptation workshops in the country, case study project documents, and donor websites and publications). Once the interview was initiated, snowball sampling was used to identify other participants.

I approached the participants through various forms including telephone call or e-mail to request an interview and make an appointment. I began by interviewing the participants I know through my professional contacts. I approached the participants seeking their consent to conduct interviews. The interviews usually took place at their offices or in designated venues. Casual conversations with participants were conducted after the formal interviews or in different occasions (such as at conference, workshops, or social gathering event or café) to expose to other information that are not revealed in the formal interviews.

3.5.3. Primary data collection

My data collection was conducted with ethnographic intent. I accompanied the project implementers, particularly in the first Case Study, in their field support missions and meetings at the project site. I could not do so for the second Case Study due to its delayed implementation during my fieldwork. I also absorbed as much as possible of what was happening around the Case Studies. One of my research techniques to triangulate the information was to spend much time for lunch gatherings at workshops arranged by people who directly implement or engage in the two case projects.

From August to December 2013, I conducted my initial fieldwork in the capital city Phnom Penh and Kompong Chhnang for the Case Study of Provincial Road 150B and Takeo for the Case Study of Borey Chulsar Commune Road. I also conducted participatory observations to other project sites in Battambang, Pursat, and Svay Rieng provinces where the same donors are piloting other climate resilient infrastructure practices in order to gain a better insight of the results that I found in the two Case Studies. I conducted observations to other climate-resilient project sites in order to better understand *‘how and to what extent climate change adaptation is empirically integrated and managed into donors-financed infrastructure development project’*. With a snowball sampling technique, I interviewed a total of 103 participants (see Appendix C): 70 semi-structured participants at national and sub-national levels and 33 focus group discussions participants. Examples of my face-to-face interviews and participatory observation during my data collection in the project sites are provided in Figure 3.2.





Left: Face to face interview and focus group discussion

Right: Participatory observations during fieldwork.

Figure 3.2 Field interviews and participatory observations

Source: Author (2013)

Based on the open-ended question semi-structured interview template, I adapted spontaneous and probing questions with particular reference to my research purpose and specific objectives. The purpose of each interview was to collect as much information as possible from the interviews according to their work responsibilities, expertise and knowledge. I digitally tape-recorded the interviews with the participant's prior consent for full transcripts after the wrap up of my fieldwork. I took notes of important points during each interview. For a couple of participants who expressed their uneasiness with tape-recording, I proceeded with the interviews without it, but I took notes during the interviews and wrote them up from memory immediately afterwards. The transcripts and notes are useful in generating ideas and reviews for my data analysis.

To assure the systematic and reliable collection of the research data, I conducted each interview based on the interview ethical criteria and templates (see Appendix A) that I developed and prior-tested with potential participants. When conducting interviews, I sought to meet with various stakeholders including technical, operational and management staff to triangulate the data and maximize variation in observations. For their anonymity and confidentiality, their names are not listed and they are referred to as participant 1st and 103rd (see Appendix C). The composition of my participants were a range of stakeholders including implementing institution, donor, private sector director, manager, specialist, technical officer, local authorities, and villagers. My intention was to explore a wider range of factors in delivering the 'pilot' climate-resilient infrastructure

projects from different angles. Additionally, during the fieldwork, I tried to grasp what things worked and what were the constraints, as well as the contributing and limiting factors to overcoming constraints along the way in the project delivery and decision-making process.

My data collection was conducted in two periods. The first period was planned field research for five months in 2013. The second was for four weeks in 2014 to meet with the newly recruited CCA and engineering firms whose role was to support the government implementing institutions in addressing climatic risks through mainstreaming. The second trip aimed to conduct follow-up interviews with some early interviewees whose first interview did not provide sufficient information. The second trip was also used to confirm my initial findings and to collect missing information that I noted during the transcription.

The empirical data presented in this chapter are drawn from my field research and were supplemented by information from direct observations and casual conversations. These conversations were held to not only gain further insights into the processes, governance and challenges in CCA mainstreaming, but also to clarify doubts and to collect information outside the formal interviews. Lastly, information came from documents relevant to the case study project(s), and project documents, reports, publications, and media articles. I also reviewed relevant documents related to CCA policy and road infrastructure investments in Cambodia. The data allow the application of a conceptual framework, in the theatrical context of a development project life cycle. Moreover, the case study methodology is well-suited for this study when I used three principle sources of information.

First, I gathered information in the primary project documents available in the websites of Cambodian government ministries such as NCDD, MPWT, MEF and MOE in Phnom Penh and of the websites of international development donors such as UNCDF, UNDP, Swedish Embassy, ADB, and World Bank who finance or administer the PBCR funds in Cambodia.

Second, I collected information from individual semi-structured interviews, focus group discussions and informal conversations with numerous actors including the funders, the

designers, implementers, and beneficiaries (details are provided in Appendixes B and C). Where possible, informal conversations were conducted repeatedly with the participants and their narratives were verified by means of a thematic and contextual analysis comprising of official documents and websites. Although I also informally conversed with households in nearby villages, I do not specifically refer to these informal conversations in my thesis because the project management requested me not to converse with nearby villagers who could have had their expectations raised about possible projects benefits. Themes that were discussed included knowledge about climate change and vulnerability, impacts on infrastructure and livelihoods, entry points for CCA and their perceived implications of spending resources for CCA at project-level. I digitally tape-recorded the interviews with the participant's prior consent for full transcripts after the wrap up of my fieldwork. I took notes of important points during each interview. Names of my interviewees or information that might reveal their identifications are not disclosed to ensure their confidentiality according to research ethics.

Third, I gathered information through my direct observations and casual conversations on the LGCC project sites. I also conducted casual conversations with villagers and local authorities to clarify doubts and collect information that I could not get or found hard to collect in the setting of formal interviews.

I was lucky to be permitted to join several LGCC support missions in not only Borey Chulsar commune, but also other project sites in Takeo and Battambang provinces. I was allowed to watch as the donor staff interacted with local implementing officers including commune council members and villagers. I was allowed to sit in public meetings (gatherings) where the donors and government implementing officers inform and discuss with villagers of the LGCC objectives and reactions from those villagers. I met and interviewed with local implementing officers, consultants, and project participants associated with both case study projects. Furthermore, I was aided by the new ADB disclosure policy implemented since 2010. This new policy permitted me to access to project documents and reports that were restricted in the past. Accessing these ADB documents allowed me to gain better insight into what the donor staff's own concerns and strategies put forward and also provide valuable milestones for project activities and changes. However, my requests to access the bidding specifications and civil work progress reports were not granted. I felt the implementing staff were sensitive due to the

long delays and early implementation problems with the project, which is in contrast to LGCC project which is universally assessed as a smooth success.

My primary goal of conducting interviews was to ‘study up’ as Goldman (2005) and ethnographic researchers do in the development world. I digitally tape-recorded the interviews with the participant’s prior consent for full transcripts. I also took notes of important points during each interview. For a couple of participants who expressed their uneasiness with the tape-recording, I proceeded with the interviews without the recording, but taking notes during the interviews and wrote the interview details from my memory immediately after the interviews. The transcripts and notes are useful in generating ideas and reviews for my data analysis to assure the systematic and reliable collection of the research data. I conducted each interview based on the interview protocol in Table 3.1 and the interview guides (see Appendix B) that I developed and pilot-tested with two to three potential participants.

Table 3.1: The Interview protocol

Stage	List of Description	Objective
Before Interview	Provided brief background on the research project and what kind of questions would be asked, so that the participants could understand the nature of the questions. Presented a plain language statement and consent form to the participants.	To prepare for brief research information and principles for ethical data collection.
During Interview	Provided brief background information on the research project. Re-ensured confidentiality and re-confirm permission to record and transcript the interview Listened to the key informant throughout interview and take notes. Requested permission to follow up issues by telephone/face to face/e-mail later.	To briefly explain the research project To obtain the confidence and consent of the key informants
After Interview	Wrote letter of thanks to the participant Wrote up contextual interview notes. Completed fact sheet information and enter into database. Transcribed the recorded interview (see above this takes a huge amount of time) Entered factual content information from the interviews into database (participants, place, dates and events). Entered the transcript and notes into NVivo 10 program	To analyse and discuss the research findings

Source: Adapted from Momtaz (2012, p. 54)

I used multiple qualitative research methods such as face-to-face interviews and participatory visits to the two road sites for data collection. The application of qualitative research methods allowed me to see the problem from different aspects.

3.5.4. Secondary data collection

Secondary data relating to the preparation and implementation of the two Case Studies projects was gathered through Web of Science and Google Scholar searches and media articles. I also gathered related national and sectoral climate change strategies, and legislation and procedures on environmental impact assessment. Many climate change and project completion documents were available online in the donor and government websites. In addition, I collected an abundance of reports prepared by consultants, technical assistants and civil society organisations. Not surprisingly, such reports are

mostly produced by foreigners in English or the language of the agency, and a part of the local readership is excluded. The secondary data was reviewed and followed by the face-to-face interviews. This approach enables me to obtain the overall picture of the *historical and current* situation of how environmental and adaptation issues are addressed within the donor agencies. The secondary data generated useful information about the events relevant to the case study. The reports, media articles, publications and information on websites were used for triangulation, after the primary data was collected. Many of these documents are referred to for triangulation and analysis throughout this thesis.

The content analysis of the secondary data lies in its role in methodological and data triangulation and the immense value of documents in the case study research. The content analysis provided a behind-the-scenes to look at things that are not directly observable. Table 3.2 describes the objectives of secondary data analysis according to the key research areas.

Table 3.2 Collection of the secondary data

Key research area	Types of public documents	Objectives
CCA statements [in the climate strategies and environmental assessment safeguards] that guide the recipient government to integrate CCA considerations into the project-decision-making	Multilateral Development Bank Climate Change Strategies and Development	To analyze the coverage and quality of measures to address climate change impacts at the corporate strategy level and project-level
	Environmental Assessment Safeguards and Procedure	
	Development Operation Manual	To analyze whether CCA is incorporated in the project
	Guidelines of other donors for mainstreaming CCA into development aid	To investigate the extent coverage and clarify of CCA requirements
	Case Study Project documents	
	Legal contract and other legal papers	
Collaboration and Institutional challenges raised at the nexus between Multilateral Development Banks and Recipient Government	Guideline of other donors for mainstreaming CCA into development aids	
	Strategic Program for Climate Resilience Proposal	To explore the decision-making process
	NAPA, EIA guidelines, and environmental legislations	To investigate actors power-relation at policy and operation levels
	Strategic Program for Climate Resilience Proposal	To analyze challenges of institutional change and accountability
	Country Assistance Strategy	

Key research area	Types of public documents	Objectives
	Multilateral Development Bank Climate Change Strategies and Development Climate Investment Fund Guidelines	
Local responses and perceived benefits towards integrating CCA into a development project	Case Study Project documents Strategic Program for Climate Resilience Proposal Guidelines of other donors for mainstreaming CCA into development aid	To analyze the design and implementation of CCA measures recommended by the project To investigate the reactions (e.g. attitudes or feedback) of the sub-national and local people

Source: Author (2016)

3.6. Data management and analysis

In strict methodological terms, this research is not an explanatory, but an *exploratory* study and content analysis (Webber, 2008). I used past studies of road investment projects and policies to inform my lines of questioning and how I searched for information. I collected material in Khmer and English, and then translated my transcripts to English. The problem with transcribing Khmer into English is that there is the chance for some errors in the translating of the original meaning (Marshall & Rossman, 2014). To reduce this risk, I made multiple readings and verifications to ensure accuracy. The end result is descriptions and understandings of the PBCR approach introduced by the donors and government ministries in Cambodia. The study's interpretations were based on the qualitative content analysis of the empirical data and an evaluation of the experience in the pilot mainstreaming of adaptation considerations into infrastructure investment design and management at the project-level. A qualitative content analysis entails “subjective interpretation of the content of text data using the systematic classification process of coding and identifying themes or patterns” (Hsieh & Shannon, 2005, p. 1278). The intention was also to reveal factors behind external observable behavior of institutional change (Goldman, 2005; Ostrom, 2011). With this intention in mind, I went to the infrastructure investment project sites and spent considerable time with the donors, implementers, and beneficiaries at the grass-root level during my field research.

Data analysis was conducted on two levels. The first step, the higher level of coding covered the following key themes (or headings): mainstreaming entry points; the power

nexus; accountability; and institutional constraints. This was carried out when I was making a descriptive analysis and started using Nvivo to code. The second step, the lower level was assigned to sub-themes. This was performed when writing up the Case Studies. Throughout the thesis, my empirical data analysis was done through content and situational analysis. In other words, I analysed transcripts of my interviews, focus group discussions and observation notes in detail.

The interview transcripts listed above and secondary data were imported into NVivo 10 software, a software programme for qualitative data management and analysis. The NVivo 10 software is used in qualitative research to systematically handle data (Bazeley, 2007). Wickham and Woods (2005) explain that the NVivo programme allows coding and categorizing of narrative text such as interviews and filed notes.

After importing the data, I read through the transcripts and started making notes of the major categories emerging. Then, I coded by reading through the transcripts and field notes again, and by making memos to describe the content of the interview transcripts and fieldwork notes. At this step, patterns reflecting answers to the research questions emerged from the data (Glaser & Strauss, 1967). The NVivo 10 software made it easy to allocate each piece of the transcripts under an appropriate category and sub-heading. At the stage that all of the categories were filed together, I started writing up my field findings and analysis. However, as this was my first experience of using NVivo for research, and to overcome difficulties using the software, it was sometimes necessary to read and code my data when I needed to read interview results more carefully and in greater detail. I continued to consult with the transcripts throughout the analysis and writing process in order to maintain the original meanings and contexts. A process of analyzing my data by using the NVivo 10 software is provided in Figure 3.3.

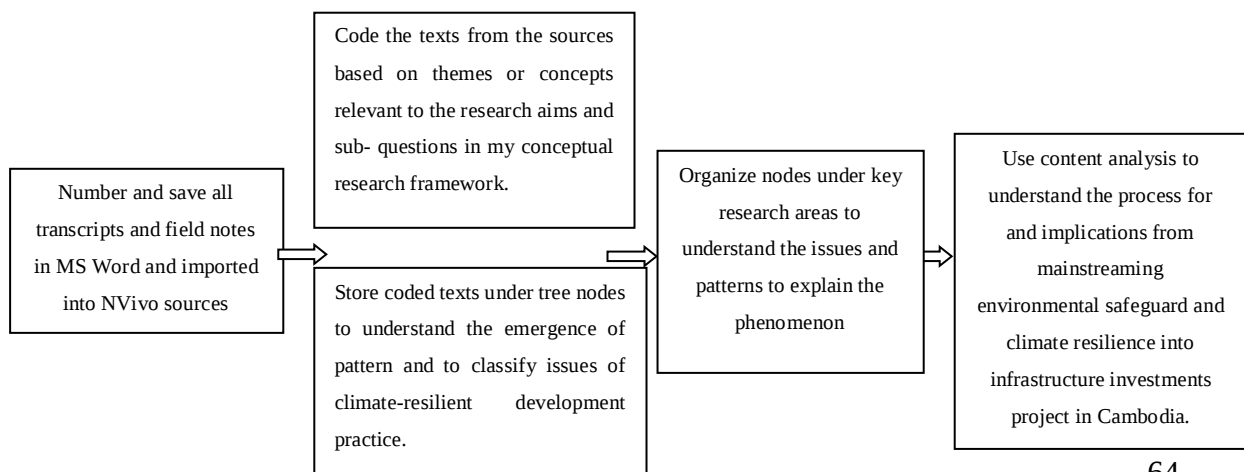


Figure 3.3 The process of data analysis

Source: Adapted by the Author from Momtaz (2012, p. 70); and QSR International (2012)

I then auto-coded my data from all interviews using each subsidiary question in my conceptual framework as heading (See auto-coding and coding in Bazeley, 2007; Bazeley & Jackson, 2013; QSR International, 2012). The auto-coding process helped guide the analysis direction. I grouped and then coded nodes and sub-nodes in accordance with themes and concepts emerged from the interviews and identified in the literature in Chapter 2. My research aim and interview questions served as an objective guide to for me to extract responses/answers that fell into specific coding themes and sub-themes, according to the linkages between them. For example, the interview transcripts and the literature show emerging themes including mainstreaming entry points (Bass, Annandale, Binh, Dong, Nam, Oanh, Parsons, Phuc, & Trieu, 2010; Inderberg & Eikeland, 2009), financial resources (Ayers et al., 2011; European Commission, 2010; Seballos & Kreft, 2011; UNDP, 2009a) and institutional capability (Fünfgeld, 2010; Measham, Preston, Smith, Brooke, Gorddard, Withycombe, & Morrison, 2011; Sietz et al., 2011; Sietz et al., 2008; Uittenbroek, Janssen-Jansen, & Runhaar, 2012).

A qualitative multiple case study analysis builds abstractions within each case study (Merriam, 1998). I tried the argument of Yin (1994, p. 112) “to build a general explanation that fits with each of the individual cases, even though the cases vary in their details”. Miles and Huberman (1994) claim that multiple case synthesis is tricky and demands a careful study of the complex configurations of processes of individual cases. Merriam (1998) concludes that ultimately, the multiple case analysis differs little from the in-depth analysis of a single qualitative case study. Hence, the analysis treated the two Case Studies are separate and independent as detailed in the next four chapters.

3.7. Summary

To summarise, this research adapted a case study research methodology with qualitative content analysis (Yin, 1994, 2009) to understand and explore the performance and institutional challenges in managing CCA in donor-funded road infrastructure projects. Face to face interviews were used, with field observations and informal conversations to

gather empirical evidence from each Case Study. A triangulation approach was also employed to ensure data reliability. Other media and project documents were also used to triangulate to understand institutional performance, challenges and implications.

Chapter 4. **Background Case Studies**

Cambodia is an interesting case study...since it has been the host of several climate change projects and processes (Käkönen et al., 2014, p. 360).

This chapter reviews the background or contextual factors such as the attributes, biophysical conditions, operational dynamics, funding systems, and action arena of the two Case Studies. Case Study One investigates climate-proofing Borey Chulsar Commune Road investment in Takeo province. Case Study Two examines climate-proofing Provincial Road 150B investment in Kompong Chhnang province. Borey Chulsar Commune Road investment is a small scale, rural, bottom-up project. In contrast, Provincial Road 150B investment is large scale, urban and top-down. The two Case Studies were selected because both projects were in an advanced stage of implementation progress at the time of the fieldwork.

The first section of this chapter discusses the historical background of the two road investment and analyses the content, criteria, and process of climate resilience funding to make the road investments resilient to climate change impacts. The second section examines their milestones and conditionality of the top-up climate resilience funding for the project decision-making process. The third section examines the action arena to which climate change issues are addressed in line with environmental regulations.

4.1. Contextual factors of Borey Chulsar Commune Road

Borey Chulsar Commune Road is frequently affected by flooding events and was chosen as a subproject of the Local Governments and Climate Change (LGCC) initiative, which aims to make the existing commune-based road investment project resilient to climate-related extreme events. Box 4.1 explains the background of LGCC approach in Cambodia. Cambodia became one of the first countries to pilot the LGCC approach because it was most vulnerable to climate change impacts in the region due to its weak adaptive capacity and economic dependency on rural livelihoods. The LGCC model aims to neither override, nor define, the design standards for the commune council's own infrastructure investment projects (MOE, 2012; NCDDS, 2011). In other words, the LGCC approach does not seek to replace the existing development process of any existing commune investment project procedure. See more information in Box 4.1.

Box 4.1 Local Government and Climate Change (LGCC)

What is LGCC?

The LGCC was initiated by the UNCDF to demonstrate the role of sub-national administration, specifically at the commune level, in fostering practical ways to mainstream climate change adaptation into the commune investment project planning and budgeting system (Initiative, 2011; NCDDS, 2013d; UNCDF, 2010). It is funded by the European Union and receives technical assistance from the United Nations Capital Development Fund (UNCDF). The initiative is implemented by the National Committee for Sub-National Democratic Development Secretariat (NCDDS) of the Ministry of Interior.

The LGCC's adaptation mainstreaming approach is neither to override, nor define, the design standards for the commune council's own infrastructure investment projects (MOE, 2012; NCDDS, 2011). In other words, the LGCC approach does not seek to replace the existing development process of any existing commune investment project procedure.

Key activities and funding milestones

Activities conducted since the inception of LGCC in 2011 have included a consultative planning process with the provincial, district and community levels (NCDDS, 2013c, 2014a; Richter, 2014, p. 25). The consultation process targeted all relevant stakeholders, especially local actors, briefing them on the mainstreaming climate change adaptation guidance. The LGCC activities also include a feasibility study on adapting the design of infrastructure investment projects to ensure they are climate-resilient; conducting training on climate change concepts and vulnerability reduction assessment (VRA) tool; and conducting climate change adaptation and service activities. The results of these various activities have been fed into a technical package for local communities and sub-national administrations to make their proposed commune investment projects (CIPs) resilient to external risks.

LGCC provides support for mainstreaming climate change adaptation in service delivery and physical infrastructure investments. With its climate resilience funding conditions, each commune-based climate-resilient project should be co-financed by its annual commune investment funds—usually two third or 70% expense is covered by the commune fund and one-third or 30% comes from donor aid. LGCC's original timeframe for completion of the Borey Chulsar commune road project was from December 2011 to December 2012. However, the completion date was later extended to December 2013 due to that the wet season, which necessitated that the contractor delay completion of the civil work. For this project, LGCC received a total grant of USD30,000: USD250,000 grant from the Cambodia Climate Change Alliance (CCCA) Trust Fund and USD50,000 from UNCDF core resources (NCDDS, 2012b).

Source: Compiled by the Author (2016)

4.1.1. Funding milestones and key activities

Borey Chulsar Commune Road improvement is co-financed by the commune annual budget (i.e. 70% of the USD26,205 total cost) and the donors' performance-based climate resilience top-up grant (the remaining 30%), provided through the European-funded Cambodia Climate Change Alliance Programme in Table 4.1.

Table 4.1 Climate proofing of Borey Chulsar Commune Road 2011-2013

	Information
--	-------------

Local	Borey Chulsar commune, Takeo province
Type of project	Laterite road construction (1130 metre) with one twin culvert
Type of climate proofing	Reducing climate change (e.g. flood) risks
Budget without climate proofing	N/A
Budget including climate proofing	USD26,205 (70% from commune budget)

Source: NCDDS (2013a, p. 5)

According to the framework of Cambodia's decentralization reform guidelines, the CCA issues are to be systematically addressed by all levels of the sub-national administrations across Cambodia to ensure that disaster and climatic risks to development are reduced (NCDDS, 2013c). To demonstrate these strategies, Borey Chulsar Commune Road was piloted with a design to exhibit a practical way to mainstream CCA into an individual commune investment project planning and budgeting in the future.

During the period of fieldwork for the present study, conducted in late 2013, a number of similar experiments were also being facilitated in the design phase in other Asia-Pacific countries, including Bhutan, Lao PDR, Bangladesh, Nepal and the Solomon Islands (See also NCDDS, 2013c and NCDF website). At the same time, Cambodia's National Committee for Decentralization and Deconcentration Secretariat (NCDDS) accepted other donor-funded community based adaptation programmes. Two examples are the 'Cambodia Community Based Adaptation Programme 2010-2015' and 'Promoting Climate Resilience in Agriculture and Water Resources Management for Rural Livelihood 2013-2015'. Both programmes are funded through UNDP GEF small grants, which are similar to LGCC in their aim and approach (see more details in UNDP, 2009a, 2013). From 2001 to 2013, LGCC approach was piloted in three communes in three different districts in Takeo province (NCDDS, 2011, 2013c). Due to the high demand for basic infrastructure across most Cambodian communes, LGCC invests mainly in funding climate-resilient infrastructure such as the rehabilitation and improvement of commune roads, dikes, canals, water gates and the community ponds.

Climate-proofing Borey Chulsar Commune Road enabled local communities to freely commute for social services during the annual flood season. There has been no significant criticism of the LGCC approach, apart from a complaint about the delayed financial flow from the National Treasury to the commune development account (NCDDS, 2014a). The Borey Chulsar community-based road investment approach has been praised by multiple

donors (e.g. UNCDF and the European Union) for its active involvement of key stakeholders, particularly the commune council and community citizens, which has created a sense of local ownership of the projects (NCDDS, 2013b, 2013c, 2014a). Figure 4.1 shows conditions of the climate-proofing achievement for Borey Chulsar Commune Road and on-site discussion between commune councilors and donors in 2013.



Left: No flood damage in wet season after building climate-resilient road in 2013

Right: Donors, visitors, and commune councilors discussed climate resilience

Figure 4.1 Climate-resilient investment and lessons-learn sharing in Borey Chulsar

Source: Author (2013) and NCDDS (2014a)

During the period of fieldwork for the present study, it was noted that there were no complaints from any of the research participants concerning either the effectiveness of performance-based climate resilience (PBCR) funding criteria or of the climate-resilience demonstrations. However, it is possible that this was due to politeness and respect for the donors and project implementing staff, given that outcomes could not be delivered in a short period of time.

4.1.2. Performance-based climate resilience funding

A Climate resilience top-up grant¹¹ was allocated for the additional costs of making Borey Chulsar Commune Road resilient to climate change. However, it is unclear how the 25% to 30% additional costs were calculated by the commune councilors. The climate resilience top-up grant is channeled through existing sub-national fiscal transfer systems rather than parallel or ad hoc structures¹². However, scholars such as Eng (2014); and Ostrom (2009) argue that the government's rigid development planning system can cause delay, for example, the transfer to climate resilience funds from the national treasury to sub-national or commune council account. The performance-based climate resilience funding is “large enough to have an impact but small enough to be fiscally sustainable and scalable” (NCDDS, 2012a).

In order to receive the performance-based climate resilience grant, Borey Chulsar Commune Road needed to be seen as facing a high risk of climate change impacts. To achieve this, it was unnecessarily classified as a ‘high priority’ project. In other words, in the hope of securing the grant, the commune councilors of Borey Chulsar decided to raise the road surface higher. Thanks to the climate resilience top-up grant, Borey Chulsar commune would receive an additional 30% of the investment cost (NCDDS, 2012a, 2013c), which meant that Borey Chula commune would paid only the remaining 70% from its annual commune investment fund (see Figure 4.2).

¹¹ LGCC established a competitive grant mechanism to provide full or partial funding for climate responsive measures identified within the commune investment project, based on a set of criteria that was adapted for each commune. The selection of each commune investment project proposal is done with the participation of the NCDDS at a central level. Only a few proposals are selected in this competitive process – aiming to retain only the best CCA actions. The selection is made in a participatory way, involving all the represented communes. Each commune has its representatives – who make a presentation in front of everyone using PowerPoints, local maps and anecdotal evidence.

¹² <http://www.local-uncdf.org/performance-based-grants-for-climate-resilience.html>, accessed 16 March 2016

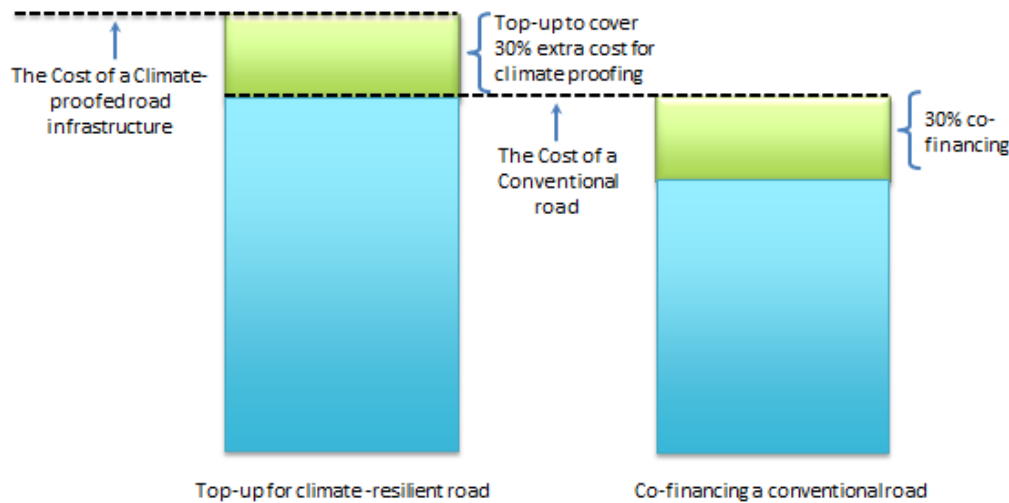


Figure 4.2 Illustration to differentiate top-up and co-financing a commune road investment project

Source: Assessment Report of LGCC Project (NCDDS, 2014a)

With the chance of securing the climate resilience top-up grant, the commune council chose for the first time to make this road investment a half-meter higher than all the other roads in the commune area. The aim was to completely avoid flooding in the monsoon season. A justification made by a commune councilor and Participant 12 was:

“Kids could not go to school, women could not go to health centers, and villagers could not even sell their products to the market, so everything was ruined... during flood. Every wet season, local people worried whether the flash flooding would destroy the road even more”.

Nonetheless, although arguments such as this have been a common justification for the continued investment into rural road rebuilding and development in Cambodia, whether the road permits more affordable transportation of domestic goods or provides villagers with an increased access to market opportunities and services is debatable. While the level-up of the road surface could create a temporary refuge for people during flood events, it would also mean that households living along both sides of the road must raise their houses by half a meter in height. This was the negative impact of climate-proofing this road.

In order to secure the climate resilience top-up grant, a screening process was applied to identify whether an individual commune investment project was worthy of funding (NCDDS, 2012a; Richter, 2014; Va, 2015). The prioritization and selection of each commune investment project was based on criteria for the performance-based climate resilience (see also NCDDS, 2011; NCDDS, 2013b).

Accordingly, the main guiding principle was to protect this commune road investment against weather-related impacts over its lifespan. As Borey Chulsar Commune Road investment project was selected via its annual district integrated workshop, the Borey Chulsar commune council was mandated by the performance-based climate resilience criteria to integrate climate-resilient measures into the road investment decision-making process (NCDDS, 2012a).

Therefore, promoting mainstreaming CCA into Borey Chulsar Commune Road investment became a way of making more efficient and effective use of financial and human resources, rather than separately implementing an ‘adaptation project’. This is important, as noted by one donor advisor, Participant 1, because:

“Mainstreaming climate change into this particular road project is a way of making more efficient and effective use of financial, technical, and human resources than separately implementing a standalone-adaptation project where the precise goal would only be to build resilience to a changing climate”.

As argued by (Goldman, 2005), the performance-based climate resilience criteria pre-determined mainstreaming CCA into a project-specific basis as a process of integrating CCA into the project decision-making process, or adjusting the project design to cope with climate risks such as flooding and other extreme weather events. As a result, Borey Chulsar Commune Road was less likely to be new or at odds with climate change risks, which could have occurred this wet season or in the future.

In short, the performance-based climate resilience grants are additional funding to either make outputs of existing infrastructure projects more resilient to climate change, or provide expenditure for new projects that directly help a community to increase its adaptive capacity. At the very least, the climate resilience top-up grant provides a scheme

under which the community-based adaptation fund can be improved or increased. Without the performance-based climate resilience funding, the impacts of climate change can be undermined or, in some cases, reverse the efforts for enhancing the sustainable commune investment projects (Va, 2015).

4.1.3. Geographical and biophysical¹³ conditions

Borey Chulsar Commune Road is situated in the Lower Mekong Delta in Borey Chulsar commune, Borey Chulsar district, Takeo province, which borders with An Giang province of Viet Nam. See the map of Borey Chulsar Commune Road in Figure 4.3.



Figure 4.3. Map of climate-resilient road in Borey Chulsar commune

Source: @ Cartography, Chandra Jayasuriya, *The University of Melbourne and NCDDDS* (2013a, p. viii)

¹³ The geographical and biophysical characteristics are a key variable as they affect the institutional arrangements and actors' behaviors (Yasuda, 2015) from the common property (i.e. road) development perspective.

This road links Borey Chulsar commune to the National Road 4 and Takeo provincial town. Takeo province was mapped as one of the 17 provinces in Cambodia vulnerable to climate change impacts, especially seasonal floods (Anshory-Yusuf & Francisco, 2009). According to (Commune Database Online, 2014), which was verified by a village chief, Participant 16 said:

“The [Borey Chulsar commune] road was rehabilitated in 2009, but was then destroyed by flood damage in the same year. Based on the results from the VRA conducted in 2011, the population in Borey Chulsar faced several adverse impacts of climate change such as flash floods from storm surges and high rain intensity over the last decade. Due to poor road infrastructure and seasonal floods, most villagers are often isolated in the wet season.”

Takeo province is about 87 kilometres distance from Phnom Penh and is crossed by the Mekong River. Borey Chulsar commune has a population of 735 families (3,706 persons) (Commune Database Online, 2014; NCCDS, 2013). Most of the people living in the commune are fishermen whose livelihoods rely on reliable access from the river to their homes via the Borey Chulsar Commune Road.

4.1.4. Actors and implementation arrangements

Borey Chulsar Commune Road investment involved multi-level actors. UNCDF and the government (i.e. National Committee for Sub-National Democratic Development Secretariat) liaised with relevant line ministries, and in particular with the Ministry of Environment and the National Climate Change Committee, following a normal project management structure. Day-to-day management is implemented by a National Project Coordinator (or climate change planning and coordinator advisor) appointed by the National Committee for the Sub-National Democratic Development Secretariat. This National Project Coordinator provides day-to-day technical support to the pilot projects at sub-national level and was responsible for operational coordination with donors at national level since the inception of LGCC in 2011 until its closure in December 2013. UNCDF’s National Technical consultant was hired to support LGCC implementation and to provide additional support through its monitoring process. As illustrated in Figure 4.4, the European Union, through the CCCA, provides NCCDS with the USD250,000 and UNCDF allocates USD50,000 for the LGCC implementation.

Influenced by Ostrom's principles on institutional analysis and development, Figure 4.4 describes the institutional setting, logistics, and multi-level governance among the key actors including the management arrangement from the top, national level down to the commune level (NCDDS, 2011, 2014a).

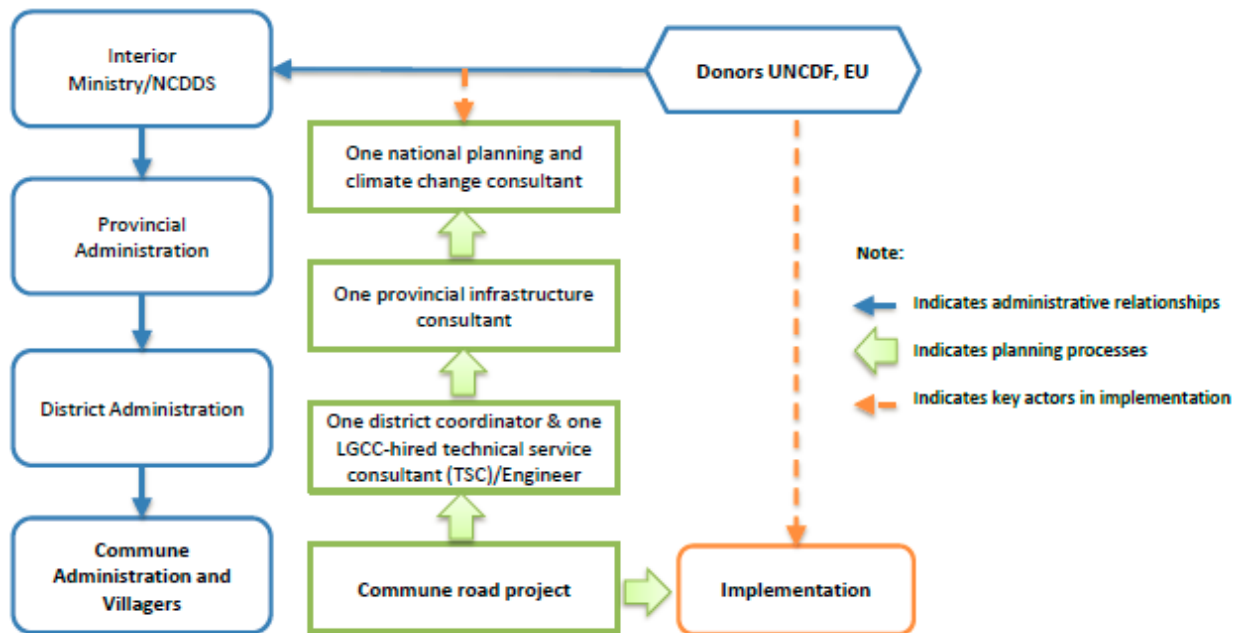


Figure 4.4. Commune investment project and its multi-level governance structure
 Source: Adapted from and Pak (2010); Va (Forthcoming)

With the regular support of UNCDF and NCDDS, Borey Chulsar Commune Road demonstrated various commune-based activities related to disaster risks and climate change awareness. As a result, there was a campaign and training on mainstreaming CCA in Borey Chulsar (NCDDS, 2011, 2014a). Borey Chulsar Commune Road is a pioneer commune investment project building a climate-resilient, higher and stronger road that can withstand external stresses such as the incidence of flash flood imposed by climate change impacts. The ultimate goal is to demonstrate the role of sub-national administration in fostering climate change resilience and to identify practical ways to mainstream the climate-resilient measures into the sub-national planning and finance systems (MOE, 2012, 2013a). After the failure of climate change mitigation efforts, multilateral donors increasingly “recognized that neglecting of the climatic vulnerability at local level can induce maladaptation in its long-term outcomes” (Ayers & Abeysinghe, 2013, p. 502).

The mandate of UNCDF is to strengthen and reform local governance systems in developing countries, such as Cambodia, which need to consider multiple goals and policy objectives that include the role of local political representation, infrastructure and service delivery functions (NCDDS, 2011; UNCDF et al., 2010). Its role is to support various sub-national administrations for LGCC implementation. UNCDF works with NCDDS and the local institutions to improve their capacity in planning, public expenditure management, procurement and delivery management, as well as other areas related to the application of local development capital and resources. A new and growing area is the role of local governance in CCA. This can include a regulatory role (such as in building standards and regulations, early warning systems and disaster risk reduction), an expenditure role (such as in climate proofing public infrastructure and re-routing roads), and a revenue role including creating financial incentives for climate sensitive activities (UNCDF et al., 2010). UNCDF has recruited one national consultant and one part-time international advisor to provide hands-on technical support to NCDDS and sub-national administration.

At the national level, the National Committee for Sub-National Democratic Development Secretariat (NCDDS) of the Ministry of Interior (MoI) is responsible for designing the LGCC approach with, and reporting to, the donors (i.e. UNCDF and EUROPEAN UNION) on overall project operation and financial management and reporting. The sub-national level is divided into provinces, which are divided into districts, each district into communes, and each commune into villages. Each commune can consist of as few as three or as many as 30 villages depending on population, whereas villages can consist of 46 to a few thousand villagers (Commune Database Online, 2014). At the sub-national level, at the request of Borey Chulsar commune council, the provincial infrastructure advisor and district coordination advisor provide administrative support and supervision guidance. However, other commune investment projects which are unsupported by LGCC, do not receive the same amount or level of support. LGCC has also hired one locally trained engineer or technical service consultant (TSC) to support the district and commune authorities in studying, designing and monitoring an individual commune investment projects to be resilient to climate change impacts. The capacity of the commune council also depends on their access to quality services from the technical service consultant and construction contractor (or the contracted service providers).

Borey Chulsar commune was one of the recipients and implementers of the LGCC's climate resilience top-up grant for commune road investment project in 2013. In addition to receiving technical support from UNCDF consultants and NCDSS consultant, NCDDS—at the request of Borey Chulsar commune council—also tasked the provincial infrastructure advisor and district coordination advisor in Takeo Province with providing administrative support and supervision guidance. So, it is evident that LGCC took steps to ensure the completion and success of this pilot climate-resilient road. Under normal circumstances, other commune road investment projects do not receive the same amount or level of support. Throughout the period of fieldwork it was observed that the Borey Chulsar commune council benefited from the advice of the technical service consultant (TSC) and various national administrative inputs, however it was impossible to collect evidence for this, especially from the provincial government.

The Borey Chulsar Commune Council is authorized to supervise the technical supervision consultant and contractor. Due to its weak technical capacity and limited experience in working with donors, Borey Chulsar commune was dependent on the national and subnational administrations for its technical and administrative decisions.

The Commune Councils and villagers are responsible for the procurement of road infrastructure and services, in line with the Commune/Sangkat Fund Project Implementation Manual and as referred to in specific provisions indicated in NCDDS' engineering standards for commune road projects. It is expected that operation and maintenance will be arranged through the establishment of a commune-based road maintenance group and incorporation in the annual Commune Development Plans and Commune Investment Plans (CDP/CIP) (World Bank, 2016). However, in practice, the commune-based maintenance group is non-functional since ownership is weak and villagers appear to relay maintenance to the government or commune council.

The process of commune-based development and investment planning in Cambodia is a combination of 'bottom-up' and 'top-down' processes, in which provincial administration responds to sub-national level policies. According to Va (2015), the existing commune development planning process consists of five-year development plans and three-year rolling and annual investment plans, wherein the five-year development plans are used to inform the three-year rolling and annual investment plans. The

development of commune investment projects is made in alignment with the commune development plans as well as the national development plan of the Ministry of Interior.

To facilitate the implementation, the Ministry of Interior has created a ten-year development plan, split into three phases of three- to four-year implementation plans, which are then called three-year implementation plans (Va, 2015). The three-year implementation plans aim to strengthen the capacity of sub-national government officials in development planning and budgeting (Richter, 2014). The NCDDS facilitates the implementation of the three-year implementation plans and LGCC approach (2011-2013) (see also Va, 2015). The commune development plans and commune investment projects (CDP/CIPs) are the lower level basis for the provincial three-year rolling plans. The commune development plans are central for the alignment and harmonization of commune investment projects (CIPs). Within the planning processes, an integration of climate change concerns can be made directly during the development of commune development plans. A district integration workshop is usually organized in order to combine all of the commune development plans into a district development plan; referred to as a district priority actions matrix.

Commune Councils prepare plans in response to their grassroots needs. These two processes are reconciled through district integration workshops, at which Commune Councils, civil society organizations and provincial agencies meet to coordinate (Va, 2015). The District Integration Workshops are facilitated by the Provincial Rural Development Council, chaired by the provincial governor – an arrangement which, with the external support of UNCDF and NCDDS consultants, appears to work well. Additional technical support is provided through the Takeo Provincial Office and an independent District Advisor, paid by UNDP or a particular donor-backed programme (Eng, 2014; Va, 2015). The implication is that major activities from planning to implementation are still undertaken by or with consultants.

4.2. Contextual factors of Provincial Road 150B investment

Case Study Two is Provincial Road 150B investment, which is part of the Provincial Roads Improvement Programme (PRIP, 2011-2015), co-funded by the Government of Cambodia, Asian Development Bank (ADB), and Climate Investment Fund's Pilot

Programme for Climate Resilience (PPCR)¹⁴ in order to support the design and planning for climate resilience and disaster risk management. Box 4.2 explains the background of Provincial Road 150B and the funding conditionality of Pilot Programme for Climate Resilience (PPCR) in Cambodia.

Box 4.2 Provincial Road 150B (PRIP, 2011-2015)

What is PRIP?

Begun in late 2011, the Provincial Road 150B is a sub-project of Provincial Roads Improvement Project (PRIP). PRIP's primary objective is to rehabilitate 157 km of flood-vulnerable roads in four provinces to a climate-resilient condition. Doing so will provide year-round access to markets, jobs, and social services in agricultural areas, thereby enhancing the quality of life for the population of those provinces. The project, which is the result of a partnership between the Government of Cambodia, ADB, and CIF, has received \$17 million in PPCR investment funding and will be completed in 2017. Beneficiaries include the rural poor, and primarily women and children in the four targeted provinces. Better accessibility will improve rural health and education attainment, as well as offer more economic opportunity to local populations.

Key Components and Funding Milestones

PRIP was designed to promote a climate-resilient, paved condition to provide a safe and cost-effective road network. Hence, climate resilience assessments and emergency management planning will be undertaken to mainstream climate change concerns into future infrastructure planning. PRIP was designed to contribute to a key output of Improving Climate-resilient Infrastructure with the support of the Strategic Programme for Climate Resilience in Cambodia. The activities under this output include piloting approaches to strengthen civil works design and planning, as well as to reduce risks of damage resulting from climate change impacts through implementing ecosystem-based adaptation measures and emergency management responses. Through such activities, the planning capacity for climate-resilient infrastructure by the executing agency—the Ministry of Public Works and Transport (MPWT), and provincial organizations will be enhanced.

Source: ADB (2011b)

¹⁴ Recognizing Cambodia's high vulnerability to climate change risks, due to its high dependence of the economy on climate-sensitive sectors and low adaptive capacity, the PPCR sub-committee selected Cambodia from among the nine most climate-vulnerable developing countries for piloting the PPCR approach (CIF, 2009a). According to the PPCR guidelines, its process is led by the Cambodian government in collaboration with ADB, the World Bank and IFC. The process comprises two phases (ADB, 2013c). The first phase - PPCR 2009-2011 (USD1.5 million grant) - aimed at putting in place a framework to manage climate risks and prepare for PPCR Phase II. The PPCR Phase II 2013-2015 (extended to 2019) (\$55 million in grant and a \$36 million loan) encompasses adaptation investments (MOE, 2013b) including USD17 million is allocated to PRIP. The World Bank and IFC withdrew their engagement after Phase II was approved in 2011. According to the research participants, PPCR and PPCR Phase II are designed to support Cambodia to mainstream climate change adaptation into its national and sub-national development planning, policy and projects. This requires a particular implementing agency to demonstrate that climate risks are assessed and integrated into the project life cycle. PPCR and PPCR Phase II experienced long delays and were only at an early implementation stage during fieldwork in 2013.

During fieldwork, the implementation of Provincial Road 150B investment experienced lengthy delays (more than two years). In November 2013, the recruitment of project implementation consultants was completed and the consulting team was on board. However, its civil works were not expected to commence until the first quarter of 2015. There was not sufficient evidence to determine whether the delays occurred because of engineering requirements (for example, changing sub-grade materials or surface elevation to ensure climate-resilience) in areas where major flooding had become increasingly common. According to Youker (2015)—a retiree of a global Multilateral Development Bank and an international project management consultant—delays in the Bank’s projects, such as PRIP, were due to difficult interactions between donors and the recipients, as well as issues with bureaucratic procedural systems such as a lengthy procurement, land acquisition, and the approval process. Although Provincial Road 150B improvement began in May 2012—the major causes of delayed civil works were prolonged procurement delays in 2013 and a resettlement compensation delay in 2014. Eventually, however, civil works commenced in early 2015, more than two years late, compounded by the wet season (MPWT, 2014c).

4.2.1. Funding milestones

The Ministry of Public Works and Transport (MPTW) received a loan in various currencies equivalent to USD52 million from ADB's Special Fund resources. ADB financed 21.57% of the total cost to cover the expenses of civil works, equipment, related consulting services, project management, interest charges, and contingency. In contrast, the Pilot Programme for Climate Resilience (PPCR) financed 65.99% for the expenses of civil works and related consulting services, the service charge, contingency and equipment purchases (ADB, 2011b). The PPCR Sub-Committee approved an allocation of USD17 million (7 mission PPCR grant resources and USD10.0 million in PPCR credits) for the Provincial Roads Improvement Programme, which included Climate Proofing Provincial Road 150B. However, civil society organizations and the Cambodian Ministry of Environment have viewed the PPCR credits, received as part of the climate resilience [investment] fund, as problematic (Käkönen et al., 2014; Seballos & Kreft, 2011) provided that developing countries such as Cambodia are the victims rather than the creators of climate change (IPCC, 2014). Climate change scholars such as Käkönen et al. (2014); and Seballos and Kreft (2011); Va (2015) have questioned the actors or authorities who would be accountable for the climate proofing credits or loan included in

the PPCR fund. The Government of Cambodia contributed in in-kind, local taxes, duties, land acquisition and resettlement costs amounting to USD10.10 million or 12.44%. Details of the breakdown budgets are shown in Table 4.2.

Table 4.2. Breakdown financial costs (per kilometre) of Provincial Road 150B

Road Number	Length (km)	Financial Cost (USD)	Financing: ADB vs. PPCR
150B east	25.6	1,567,259	68% vs. 15.8% of total expenditure. The rest was covered by the public funding
150B west	25.5	5,641,870	

Source: Compiled by the author from KCI (2011, pp. 50, 237)

The proposed repayment period for the ADB loan was 32 years, including a grace period of 8 years, with an interest charge of 1.00% per annum during the grace period and 1.50% per annum thereafter, along with other terms and conditions set forth in the draft loan agreement (ADB, 2011b)¹⁵. The interest during construction was financed by the ADB loan. The proceeds of the loan were made available by the Royal Government of Cambodia to the MPWT through budgetary allocations. In total, the cost of financing civil works, equipment, related consulting services, project management, and contingencies amounts to the equivalent of USD52 million.

4.2.2. Key activities

The proposed activities of building resilience to Provincial Road 150B investment are key contributors to the improvement of climate-resilient development efforts in Cambodia. The activities include piloting approaches to strengthen civil works design and planning, as well as to reduce the risks of damage resulting from climate change impacts, through the implementation of several low risk options and no-regrets resilience measures. These include piloting water capture and storage systems, planting appropriate species to restore ecosystem functions, and developing emergency management systems (ADB, 2011b)¹⁶. Through such measures, the planning capacity for climate-resilient

¹⁵ The total PPCR support is \$91 million (\$55 million in grant and \$36 million in credit). In addition to the Royal Government of Cambodia agreed to contribute nearly \$50 million as counterpart financing (MOE, 2013b).

¹⁶ To better prepare future climate change vulnerability, the support activities focus on (i) improving planning and understanding of climate change; (ii) implementing measures to better manage seasonal water distribution through water capture and storage; (iii) restoring ecosystem functions for flood and drought management; and (iv) piloting emergency management systems (ADB, 2011b).

roads by the Ministry and provincial Departments of Public Works and Transport was enhanced.

Climate-proofing Provincial Road 150B was aligned with the Cambodian Government's development strategy. On 31 January 2006, Cambodian Premier Hun Sen revealed in a speech that a developing country such as Cambodia had tremendous need of road improvements and construction. However, he noted that limited funds made it difficult to improve any entire road at once at the highest standards, but that such improvement would need to be undertaken within the limit of funds available (Wim Douven & Buurman, 2013).

While data and information on global and regional climate change impacts are improving, it is still a challenge to inform the design of engineered structures with precision. This is especially the case in Cambodia, where the lack of available climate change impact assessments and data adds to this uncertainty.

The proposed adaptation strategy, therefore, includes a combination of engineering, non-engineering, and planning activities to manage the changes observed and predicted in the project area. The engineering changes (modifications) have been mainstreamed in the project design itself (through Output 1 of the PRIP) in order to integrate climate risks and adaptation into core development planning activities. Based on the report of Korean Consultants International (KCI) Firm (2011), these include elevation of the road in areas where major flooding is becoming increasingly common, and changing the selection of sub-grade materials to withstand higher moisture content. Furthermore, Provincial Road 150B must also be paved with hand-laid concrete rather than raising levels, according to the project document (KCI, 2011). This means that the road may be inaccessible for short periods during extreme flood events, nevertheless, will be intact once the flood recedes.

Flooding has been a persistent problem for Provincial Road 150B, which was therefore prioritized by the government for climate-resilient demonstration in terms of provincial and rural road access. Flooding caused damage to Provincial Road 150B and its associated embankments and pavements by overtopping, reducing the natural bearing capacity. Provincial Road 150B investment comprises two segments: the east and the west, as summarized in Table 4.3.

Table 4.3. Lengthen of Provincial Road 150B

Road	From	To	Length (km)	Width (m)
150B East of Kampong Chhnang province	National Road 5	Market in Ta Ches Village	5.8	8
150B West of Kampong Chhnang province	National Road 5	Tuek Phos Village	25.60	8

Source: Compiled from KCI (2011, p. 5); and KCI (2015)

The east segment of Provincial Road 150B, with a length 5.40 km, starts in Kampong Chhnang province at Taches market, in a fishing village on the shore of Tonle Sap. This segment traverses flood plains before meeting with National Road 5 to the west. The road is located along the river bank, serves quite a large village community both to the north and south of the road, and provides access to National Road 5 for services and larger markets. Examples of conditions of Provincial Road 150B are in Figure 4.5.



Left: Provincial Road 150B condition before climate-resilient practice.

Right: A villager showing the previous flooding level,

Figure 4.5 Conditions of Provincial Road 150B before climate-resilient investment

Source: Author (2013)

The existing roadway is 4 m wide and sits on a high embankment (up to 3m above the original ground level) with steep side-slopes. It has a gravel-wearing course which for the most part is passable, however within the village the road is in very poor condition. Generally, the land either side of the road is under rice cultivation (MPWT, 2011b). This segment of the road is important for the local communities since it provides access to services and livelihood activities. It therefore requires widening within construction limits and paving (SBST) to provide safe all-weather access for two-directional traffic (KCI, 2011).

The west segment of Provincial Road 150B extends 26.50 km from the western National Road Number 5 to the junction with National Road 53 at Tuek Phos. It crosses extensive floodplains, mainly under rice cultivation, and connects with numerous local access roads (MPWT, 2011a). There are negative impacts on the nearby corridors if the road surface is elevated too high. Currently, the existing roadway sits on a low embankment and has a 4m wide gravel wearing course. As it is presently too narrow for the safe passage of two-way traffic, the west segment was re-designed for widening within construction limits (MPWT, 2011b).

4.2.3. Geographical and biophysical conditions

Provincial Road 150B stretches from Tek Phos village to Ta Ches village (see Figure 4.6). It is situated around eighty kilometres from Phnom Penh capital city and is realigned from the west to the east to bypass the village of Anangkae and terminate at the village of Ta Ches at the ferry crossing.



Figure 4.6 Locational Sketch of Provincial Road 150B funded by the regional ADB fund and PPCR investment Fund

Source: @ Cartography, Chandra Jayasuriya, The University of Melbourne and ADB (2011b)

Provincial Road 150B investment aimed to provide reliable all-year access to markets and social services from the National Road 5 and terminates at the ferry crossing Point of Tonle Sap River in Ta Ches Village (MPWT, 2014c). To achieve this, the existing gravel road was upgraded to SBST (single bituminous surface treatment) road, 8.00 metres in width with a 6.00 metre carriageway and 1.00 metre shoulder on both sides (KCI, 2015). There are now steep gradients down to the side roads in the village. This section of the road is located approximately 4.50 kilometres from the boundary of the outer zone, known as the Transition zone of the Reserve, which is a floodplain of the Tonle Sap Biosphere Reserve and liable to flood (KCI, 2011). However, a feasibility study funded by ADB confirmed no impacts from the civil work of Provincial Road 150B investment on the Reserve (KCI, 2011).

According to the Project Document submitted by MPWT to the ADB Board of Director (ADB, 2011b), the width of Provincial Road 150B was originally only 4 metres, which was inadequate for the needs of MPWT's service provision. Hence, widening of the road was an essential step towards providing suitable transport infrastructure to support Cambodia's development in this region. The increase to 8 metres was to provide a safe travelling way for two lane traffic (KCI 2011).

Provincial Road 150B west was realigned to the east to bypass Anangkae village and terminate at the ferry crossing point of the river in Ta Ches village. At the Ta Ches market where local residents trade their fishing products and commodities, the road length was adjusted without widening, to provide paving within the town. Provincial Road 150B was realigned in the east of Alangkae village to ensure the community would not be isolated.

The Project Document proposed the widening of cross-drainage structures to match the 8 meter road width (KCI, 2011) and to ensure the condition of Provincial Road 150B is consistent with the increased movement of local and through traffic (KCI, 2011). The SBST civil work of this Provincial Road 150B improvement was completed in late 2015 (KCI, 2015), after more than two years of delay caused by the complex procurement and bureaucratic system.

4.2.4. Actors and implementation arrangements

According to Ostrom (2009), the arrangement of actors, a single individual or an institution, is relevant for analysing what positions exist in the construction of infrastructure, and the set of actions influenced by the climate resilience funding conditionality or PPCR pilot investment. Under the PPCR approach, key actors engaged in development investments are required to increase their awareness of the risks of global climate change and the process of incorporating climate change solutions into their development activities (CIF, 2011).

ADB and the World Bank in Cambodia have been actively involved in the PPCR implementation, in close consultation with various donor agencies in Cambodia. Since the PPCR design and implementation was in the recipient country, it is critical that the government implementing agency (i.e. MPWT) accesses adequate and prompt guidance from the ADB task team and its resident mission office (ADB, 2013b). ADB's Resident

“Mission Policy adopted in 2000” focused on the financial and administrative support at the resident mission (Kakegawa, 2012, p. 325). The ADB task team was responsible for assessing the government’s capacity to address climate change risks and impacts on Provincial Road 150B investment, identifying capacity building needs and integrating the necessary capacity building actions into its design (ADB, 2013b).

Despite ADB being committed to building resilience to its road projects and country-based support (ADB, 2011b), its Resident Mission in Cambodia did not have a climate change adaptation specialist to monitor the climate-resilient practice and provide technical advice to the government (ADB, 2011b). However, ADB hired an interim foreign consultant to ensure the government integrated a clause of climate change impacts and mitigation measures in bidding documents and contractor contract. The consultant also conducted due diligence, review and supervision regarding compliance with ADB’s project requirements during implementation (ADB, 2013b). As confirmed by Kakegawa (2012), and supported by empirical data gained from interviews with the consultants in this Case Study Two, the title ‘Consultant’ makes it difficult to independently negotiate and work with the ADB team leader and government senior officials deem it important to have ‘respect’ from the consultants. Another disadvantage of being a Consultant is ineligibility for independent field travel or the receipt of updated environment and climate change information from ADB Headquarters.

The project management unit (PMU) 3 of the General Department of Public Works at the Ministry of Public Works and Transport (MPWT) is the implementing institution. The project management unit 3 and the MPWT play the most significant roles as they have the primary responsibility of fulfilling the borrower’s responsibilities including climate resilience requirements. They are responsible for engaging consulting services and awarding contractor contracts to actually deliver the best environmental safeguard and climate-resilient practice. In the case of Provincial Road 150B, they hired and supervised civil engineers and construction companies to implement the roadwork on the ground. The civil works contract for the road followed International Competitive Bidding as the mode of procurement. The next stage of the project then focused on an in-depth analysis of the requirements to improve Provincial Road 150B. Adaptation activities included an awareness campaign and hands-on training on adaptation measures to be mainstreamed in road design and implementation process (Hughes & Un, 2011; MPWT, 2014c).

The PPCR investment funding to Provincial Road 150B was overseen by the Ministry of Economy and Finance, whereas technical assistance was provided by ADB. The memorandum of the PPCR investment funding highlights the vulnerability risk reduction approach from the beginning and is for demonstrating climate-resilient practice (Regmi & Bhandari, 2013). Whilst the Departments of Environmental Impact Assessment and Climate Change at the Ministry of Environment (MOE) are the key implementing agencies in collaboration with the Ministry of Public Works and Transport, there are challenges for managing the environmental, disaster, or climate change hazards, given that technical and management staff of the Ministry of Environment need capacity development. Multilateral donors “have assisted the Ministry of Environment to build capacities” however this has proven to be inadequate (Kakegawa, 2012, p. 343).

4.3. Summary

This chapter has described the background; climate resilience funding criteria, operational dynamics, and the rationale for demonstrating specifically climate-resilient road investment in order to align with the Cambodian Government’s current development strategies. The two Case Studies are situated in floodplains, which are prone to climate-related extreme events. Both Case Studies were selected due to their advanced stage in implementation, and shared a common aim to raise awareness and institutional capacity in addressing climate change risks at the operational level. The chapter explained why implementation delays occurred in each Case Study and highlighted some of the complexities of multi-level governance structure discussed in Ostrom’s 2009 institutional analysis concept. It also identified the positive steps undertaken by donors in supporting the government’s use of existing budgeting, design and implementation systems for the respective development projects, rather than overriding or replacing them. This chapter offers an understanding of the CCA mainstreaming from ADB operational perspective. Knowledge of the implementation practices of the donor aid policy is crucial in order to understand the links between policy and practice in accounting for environmental protection and climate-resilient measures.

The next two chapters will present the results of interviews and investigations into the actual practice of road investment design and management for each Case Study.

Chapter 5. **Climate Resilience of Borey Chulsar Commune Road**

“Climate change highly localized impacts and needs local-level adaptation, but many local governments are... passive” (UNCDF et al., 2010, p. 10).

This chapter seeks to address the research questions of why and how climate resilience funding has been integrated into the commune road investment project in Borey Chulsar. The chapter presents the empirical findings on the climate resilience funding conditionality, vulnerability reduction assessment, and challenges of integrating climate change concerns into local road development in Borey Chulsar commune (Case Study One). The chapter begins with a review of the Commune/Sangkat Project Implementation Manual’s environmental safeguard policy and the performance-based climate resilience funding criteria for the Borey Chulsar Commune Road. Second, the chapter examines mainstreaming CCA in the project cycle to screening, assessing, analyzing, and prioritizing climate risks and adaptation measures for integrating into the road development project. Finally, the chapter analyses accountability challenges raised at the nexus of power between the donors and the government.

5.1. Borey Chulsar Commune Road and climate resilience

Borey Chulsar Commune Road is located within a low-lying floodplain of the Mekong River. In the past, the Borey Chulsar commune council has repeatedly used its annual budget to repair this road because it plays an important infrastructure role for the community’s residents and nearby villagers to access social services such as health care and income sources. Each year it is impacted by climate-related events in the form of rainfall intensity and runoff from the Mekong River (NCDDS, 2013a). The road is inundated during the wet season (Anshory-Yusuf & Francisco, 2009), with the entire road flooded from July to November. All road and other physical infrastructure properties are affected during this period. As a result of the serious weather-related disasters it encounters on an annual basis, Borey Chulsar Commune Road has been rated as highly vulnerable to flood and rain intensity (NCDDS, 2011, 2013b).

As a result, the commune’s annual budget has repeatedly been used for maintenance of the road, and repair of the flood damage. To respond to this problem, the Borey Chulsar commune councillors prioritized building resilience into the commune road to save costs

and the time spent on travelling during the wet season (Borey Chulsar Commune Chief, 2013). Consequently, in an annual district integration workshop¹⁷ in Takeo province in 2011, a decision was made by Borey Chulsar commune chief and community representative to use its commune investment fund and the donor's climate resilience top-up grant to climate-proof the road (Va, 2015). The historical account presented in Table 5.1 shows the frequency with which Borey Chulsar Commune Road has been damaged by seasonal floods in rainy periods from 2009 to 2015.

Table 5.1 Account of flood damage and road rehabilitation

Year	Description
Before 2009	Borey Chulsar Commune Road was rehabilitated almost annually due to flood damage. No "Project Safeguards Screening" and environmental analysis (IEE) report were prepared.
2009	Borey Chulsar Commune Road rebuilding was funded by the World Bank-funded Rural Investment and Local Governance Project (World Bank, 2011). Climate change risks such as torrential rain and flash flooding were not integrated in the decision-making process. As a result, the road was damaged in the following seasonal flood. An environmental analysis/EMP was prepared and monitored by the government and the World Bank task team.
2011	The road was still damaged by the continued waterlogging and flood damage in the wet season. The commune council used its annual commune budget for repairs. No environmental analysis/EMP was prepared (Commune Database Online, 2014). Borey Chulsar Commune Road was selected for the donor's climate resilience top-up grant (30% of the total cost).
2013	Improvement of this commune road was co-funded by the annual commune development fund and the donors' climate resilience fund (NCDDS, 2012a, 2014a). No evidence of environmental analysis/EMP was conducted. Borey Chulsar Commune Road was elevated by half a meter to avoid the potential flood damage.
2014-15	The road was not damaged during the flood seasons.

Source: Compiled by the Author (2016)

Before 2009 Borey Chulsar Commune Road was rehabilitated almost annually due to flood damage. In each case, no 'Project Safeguards Screening or environmental analysis report' or no 'climate change impact screening or climate vulnerability reduction assessment' was prepared before or during this road rehabilitation activities. The Borey Chulsar Commune is situated in the flood terrain or catchment area of the Mekong River and has been listed in the NCDDS' Environment Watch-List. The Environment Watch-

¹⁷ District climate change adaptation Strategy Establishment: Using the VRA report, the Districts produced a climate change adaptation strategy. For most districts, this was the first time that climate change had been considered in local planning processes. The process has helped to raise climate change issues in commune development plans and commune investment projects (CDPs/CIPs).

List provides the names of communes and describes the types of investment projects that require an environmental analysis or environmental management plan for the civil work. According to the procedure of the NCDDS' 2009 Environment Watch-List Communes, environmental screening and environmental analysis reports were required prior to the commencement of any civil work of road investment project located in any known Environment Watch-List Communes.

In 2009, the rehabilitation of Borey Chulsar Commune Road was financed by the World Bank-funded Rural Investment and Local Governance Project (RILGP) (World Bank, 2011). However, climate change impacts such as rain intensity or torrential rain were not integrated into the initial decision-making process and, as a result, seasonal flood damage continued to occur. In accordance with the World Bank retroactive-financing conditionality (World Bank, 2003, 2011), Borey Chulsar Commune Road was identified by its commune council and NCDDS as having potential adverse impacts on fisheries. Therefore, in 2009 the NCDDS assigned its Safeguards Working Group to advise the commune chief on the process for undertaking “the environmental analysis and planning for environmental management” (NCDDS, 2009a, p. 17).

In 2011, the availability of a donor's climate resilience top-up grant, provided by the LGCC, finally enabled the Borey Chulsar commune to rehabilitate the road to improve its flood resilience (Borey Chulsar Commune Chief, 2013). The rehabilitation was co-financed by the Borey Chulsar commune budget (70%) and a climate resilience top-up grant provided by the LGCC (30%). Technically, the co-funding from the climate resilience top-up grant was for raising and strengthening the road so that it could withstand waterlogging and other flood damage (Borey Chulsar Commune Chief, 2013). The design and procurement of the road repair was completed in 2012. Although the road rehabilitation was scheduled to finish in the same year, it was postponed in the wet period from May to November 2012. Eventually, all civil works were completed in 2013, nearly one year later than the original schedule.

Borey Chulsar Commune Road proposal was granted the climate resilience top-up grant because it provided substantial benefits to communities, facilitating more efficient local livelihoods and reducing maintenance costs. The selection of the top-up grant was based

on four main criteria, shown in Table 5.2, which support the commune development and investment planning framework.

Table 5.2 Criteria for assessing and prioritizing climate resilience top-up grant

Criteria	Yes/No
Commune investment project is in climate or disaster-prone area	Yes
The project can be completed in one year aligned with the annual commune investment project cycle	Yes
The project can provide highest benefits to the villagers	Yes
The project will use budget effectively and efficiently aligned with the annual commune investment project procedure	Yes

Source: Adapted from Va (2015)

In terms of procedure, Borey Chulsar Commune Road was first selected as one of the high priority projects of the commune for the grant based on the commune-based VRA. It was then officially endorsed as a high development priority project for the Borey Chulsar Commune by an annual district integration workshop¹⁸ organized in Takeo province in 2011 (NCDDS, 2013a, 2013b). The final step was to prioritize the project over those from other communes within the district by using the selection criteria (in Table 5.2). In other words, Borey Chulsar Commune Road was selected for climate resilience top-up grant (NCDDS, 2013a, 2013b) which resulted in raising and strengthening the road to withstand waterlogging and flood damage induced by climate change (Borey Chulsar Commune Chief, 2013). The road was originally identified, prioritized and selected for climate-resilient improvement on the basis of local needs, its importance to the local community, and the expected impact of road improvement. The project took into account the results of the commune-based VRA analysis and was implemented in accordance with the commune development framework. The donor representatives and a provincial coordinator claimed the civil work had followed all procedures in the Manual. According to one project coordinator in Takeo Province, participant 21:

¹⁸ District climate change adaptation Strategy Establishment: Using the VRA report, the Districts produced a climate change adaptation strategy. For most districts, this was the first time that climate change had been considered in local planning processes. The process has helped to raise climate change issues in commune development plan and commune investment projects.

“... the environmental analysis (similar to IEE report) would have been submitted to the national safeguards advisory team for clearance in order to meet the Environmental safeguards Procedure”.

There is no evidence that the project-safeguards screening or any initial environmental examination to minimize negative impacts were conducted prior to the repair of the Borey Chulsar Commune Road. The progress reports that I accessed made no discussion of environmental analysis, and provided no evidence that any form of analysis had been prepared or conducted. The Commune Database Online (2014) also provided no evidence of an environmental analysis report. This evidence upholds the views of Mosse (2004, p. 639) who argues that:

“[development] policy which legitimizes and mobilizes political support — in reality make it rather unimplementable within its chosen institutions. But although development practice is driven by... the culture of organizations rather than policy”,

However, it seemed that no environmental impact assessment had been required by either UNCDF or the climate change performance based grants. If such as study had been a condition of the grant, or required by the donor in accordance with international sustainable development standards, it would have been undertaken by the Borey Chulsar commune office with the support of NCDDS’ safeguard working group and/or Takeo provincial technical committee.

In 2013, thanks to the concept of climate-resilient development funding initiated by UNCDF advisors, the road was elevated by half a meter. As a result, in 2014 and 2015 the seasonal flood damage of previous years was avoided (NCDDS, 2013a). However, while the Borey Chulsar Commune was able to avoid the road damage caused by wet season floods, the damage to other nearby roads became more serious. This occurred because corridor impacts had been overlooked due to the small scale of the road infrastructure investment. This demonstrates the negative aspect of climate-resilient practice or perhaps indicates the failure of adaptation funding.

5.2. Evaluative criteria and analysis of climate-resilient practice

This sub-section aims to examine the entry points for mainstreaming climate change adaptation (CCA) into an individual commune investment project through either the existing IEE/EIA or any emerging tool of climate change impacts assessment. The empirical data showed that Borey Chulsar Commune Road investment project has used VRA as an entry point to address climatic impacts. While, IEE/EIA tool can be used to assess climate change impacts and responses, only the VRA was applied in this case. Thus, I use this VRA approach and its results as the evaluative criteria in making Borey Chulsar Commune Road to be resilient to climate change. My analysis thus refers to the VRA process (e.g. step-by-step) and environmental analysis undertaken by Borey Chulsar Commune for assessing potential climate change risks and adaptation options.

As stated in the inter-ministerial Prakas of Ministry of Interior and Ministry of Planning No 2423 PRK, dated July 03, 2007 on the preparation of commune development plans and commune investment projects (CDP and CIP), each commune council should prepare a commune investment project every year (NCDDS, 2009b). As a result, the road investment followed the commune investment project cycle and occurs over a two-year period¹⁹. The dates vary from project to project and according to the timing of district planning and budgeting. This research uses the five steps of this project cycle (Figure 5.1) against the evaluative criteria proposed by Ostrom (2011) to explore the process and challenges in mainstreaming CCA into the Borey Chulsar Commune Road.

¹⁹ <http://www.local-uncdf.org/performance-based-grants-for-climate-resilience.html>, accessed 16 March 2016.

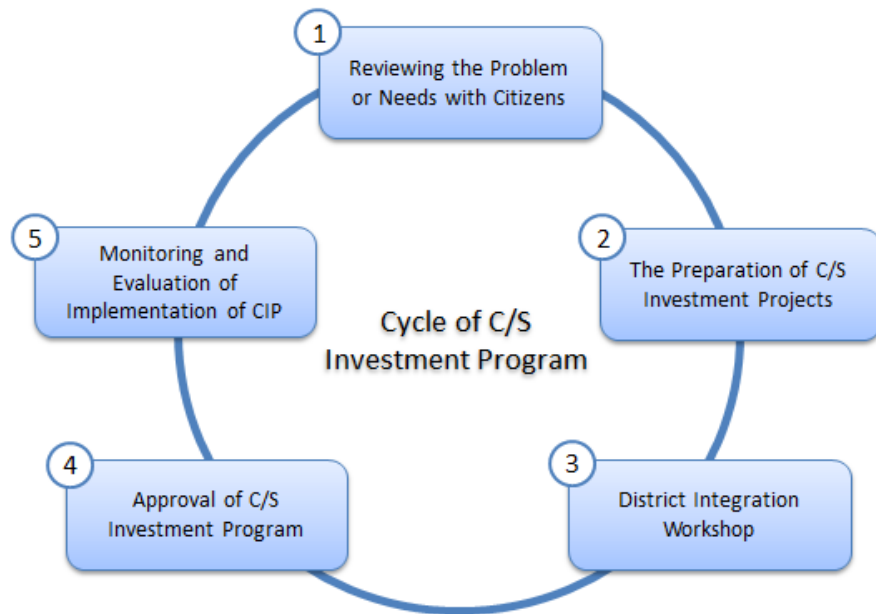


Figure 5.1 Commune investment project cycle

Source: Guideline on Commune/Sangkat (C/S) Investment Project (NCDDS, 2009b)

5.2.1. Review commune investment project needs

This first step aims to focus on the early idea or intention of integrating CCA concerns into of the commune investment project cycle (e.g. Borey Chulsar road design phases). At this early phase, the Borey Chulsar commune councilors were tasked to identify the development problem, the location of the problem, the cause of the problem, as well as the needs, constraints, and solutions in order to prepare the annual commune investment projects (NCDDS, 2009a). At this step, Borey Chulsar commune started with a commune-based Vulnerability Reduction Assessment (VRA). UNDP (2015, p. 6) defines VRA as “a perception-based tool that can be used to develop a vulnerability baseline and be used to monitor and evaluate the success to community-based adaptation activities”. Originally, the VRA exercise was undertaken to evaluate and update an existing commune development plan (CDP) in Borey Chulsar. This allowed local residents to participate in order to input and to understand their own adaptation needs. A limitation of this commune-based VRA was the focus on perceptions with little or no scientific backup at the bottom level. This was verified by one government official, Participant 60, who stated:

“How can we use perception as a baseline? We found that a lot more info is needed in order to do a meaningful assessment of climate change risks and mitigation measures”.

The VRA exercise focused on gathering and analyzing trends of historical climate change and extremes over time. Based on the VRA analysis, potential climate change impacts (i.e. future vulnerabilities) were also predicted. Local knowledge about climate or disaster extreme events was gathered and analysed in order to inform the commune development plan, thus local climate change concerns were included. This leads to a more climate resilient development that will meet local needs. Provincial and district officials who received training on VRA from NCDDDS or the national staff, would be the key focal points to support the Borey Chulsar commune in conducting and preparing the VRA results, as well as the updated commune development plan. The results were taken on board, reviewed and presented at a participative district integration workshop in Step 3 of the cycle.

5.2.2. Prepare commune investment project and entry points

Step 2 of the commune investment project cycle aims to prepare the priority commune investment projects and budget allocations that will be presented in order to mobilize support resources during an annual district integration workshop. My analysis at this step is also to examine the entry point for mainstreaming climate change adaptation through either the existing IEE/EIA method or the VRA method.

VRA as a mainstreaming entry point

I examined the vulnerability reduction assessment (VRA) and how it is designed to be used. According to UNDP (2015), the assessment tool was initially developed to evaluate and update commune development plans, enabling the community to participate and provide input into their own adaptation needs. The VRA exercise focuses on community views on the risks of climate change; therefore, traditional knowledge is analysed to provide a fresh viewpoint of community priority needs in the context of a changing climate. In other words, the VRA can be treated as a tool for promoting a climate-resilient decision-making process (Dany, Bowen, & Miller, 2015) and as a foundation for participatory climate vulnerability and risk assessment, focusing on the community's

perceptions and potential capacity to adapt. An advisor who was working for the donor institutions, Participant 3, provided the following perspective:

“VRA process—through LGCC’s Climate Resilience top-up grant—gives community members a direct influence in project design and the corresponding adaptation strategies and activities. Engagement with the project beneficiaries through VRA also empowers communities to have a say in the project design and management, and to take ownership and control of project activities at the grassroots”.

However, this perspective seems to misunderstand the original concept of VRA, which is not to analyse project vulnerability, but to gain a community-based (or commune-based) consultative analysis of climate change-related development risks and mitigation measures (UNDP, 2015). The VRA is essential for commune level development planning and commune investment projects. The process is simple and sufficiently flexible to fit any particular local context. In the Borey Chulsar Road development project, donors - through LGCC - assisted the commune council in applying a VRA as a first step to identifying potential climate change impacts and adaption options. However, the answers to VRA exercise should be triangulated with scientists as well as climate change experts because:

“When you asked ‘what is vulnerability to climate change?’ to villagers, government staff, donors, and other stakeholders they give you different answers. The same is probably true for those who engage with LGCC project decision-making on how to reduce vulnerability in rural communities in Cambodia”, (Participant 21).

Based on UNDP Practitioner’s Handbook for Implementing the Vulnerability Reduction Assessment (UNDP, 2015), the aim of the VRA is to brainstorm ideas for commune adaptation options, using trends of historical climate changes, particularly climatic extremes. While the value and utility of the VRA is well recognized by (UNDP, 2009a, 2009b), several issues emerged from the interactions with the community.

Firstly, the mobilization of community participation in the VRA exercise was challenging because many local people were busy labouring, and those who had the time were reluctant to participate due to exasperation caused by numerous local meetings. It is also possible that participant responses were biased, either by other VRA activities being conducted by LGCC, or by other CCA activities commonly undertaken through commune councils and LGCC staff.

Secondly, once the VRA exercise was completed, community participants had raised expectations which were either not met or were only partially met, given the limited resources allocated by donors and the government to each commune council. As a result, the community interest and participation tended to diminish over time. Ongoing awareness building through VRA in Borey Chulsar commune may lead to more and to better climate responsive measures in the next generation of commune investment projects. However, it is uncertain whether these actions will be prioritized in the absence of financial incentives such as a new grant mechanism.

According to the project documents of LGCC and UNDP Global Environmental Facility (UNDP, 2009a), VRA is promoted by various development institutions as a tool to empower community members to systematically collect community knowledge and experience, analyse problems, and suggest their own context-specific measures about climate change. However, no down-scale climate change projection was conducted to support the villagers' perceptions on climate change risks. The empirical data shows no site-specific or project-specific assessment has ever been produced for any commune investment project as described in that VRA document. This is the weakness in using commune-based VRA for commune investment projects (see also NCDDS, 2014b; NGO Forum, 2013; UNDP, 2015).

With the support of NCDDS and UNCDF national advisors, VRA training was offered to members of provincial and district governments (NCDDS, 2014a; Va, 2015). One government consultant, Participant 20 claimed that:

“The VRA trainings are for sub-national facilitators to enable them to facilitate the VRA process with the commune councils and villagers in Borey Chulsar”.

According to UNDP (2015), the VRA discussions analysed trends in changing climate, looking from the past to present time, then identified the needs and response options. Va (2015, p. 10) explains that:

“We [the VRA facilitators] asked them to document climate extremes, such as floods and droughts in 1960s, 1970s, 1980s, 2000s, and 2010s. We [the VRA facilitators] then asked them [the participant villagers], according to the trends of past climate extremes, what climate conditions by 2020 do you anticipate?”

Based on the climate change vulnerability literature, the VRA method can be similar to the vulnerability assessment method being used for the existing and new national and sub-national development policies and planning in many European countries (OECD, 2009). The main difference is that the VRA is less scientific because it depends on traditional knowledge and is less comprehensive in terms of scientific evidence. The VRA method opts for a formal procedure of assessing climate change vulnerability and adaptation options at the grass root or community level. The VRA has been used particularly for UNDP-GEF small grant programmes (UNDP, 2009a, 2009b) for small-scaled community livelihood development projects in developing countries. The VRA has been utilized to help the project implementers and villagers understand the implications of climate change to development and livelihoods. Similar to other community-based climate resilience initiatives in Cambodia or the aid-dependent countries in Asia and Africa, Borey Chulsar commune council applies the VRA as an ideal to meet the donors' funding requirements.

However, environmental practitioners whom I interviewed indicated their preference for using existing and more familiar impact assessment tools for considering climate vulnerability and adaptation measures. They suggested employing project-based IEE/EIA as a vehicle to include climate risks and adaptation options into the project life cycle. This is significant because, in this case, adaptation is treated as single project-related issue, which the project-IEE/EIA can address (Agrawala et al., 2012; Boakye-Agyei, 2011; Byer, Colombo, Sabelli, & Ches, 2011; Byer et al., 2009; Capstick, Kelly, Barrett, & Penailillo; Curtis et al., 2005; Sok et al., 2011). However, neither the VRA nor the IEE/EIA methods are straightforward or easily accomplished.

IEE/EIA as an entry point

In theory, CCA considerations can be addressed through the environmental analysis exercise (Agrawala et al., 2012; Bell, Collins, Ells, de Romily, Rossiter, & Young, 2002; Byer et al., 2009; Curtis et al., 2005; Sok et al., 2011; South Pacific Regional Environment Programme & World Bank, 2010; Xiangbai, 2013; Yi & Hacking, 2011). However, whether this perception has been translated into practice is something that needs empirical investigation. In accordance with the Commune/Sangkat Fund for Project Implementation Manual, at the stage of ‘project-environmental safeguards screening’ is mandated. The project-environmental safeguards screening aimed to assist Borey Chulsar commune council to determine if it was necessary to prepare the environmental analysis. In spite of this, it was apparent that either the technical service consultant or the provincial committee had failed to assist the commune council in completing the ‘project safeguard screening’. Although I was informed that the environmental screening document had allegedly been lost in the archive, I could not retrieve written documentation or any form of report during my fieldwork to support this assertion. Indeed, access to the Commune Database Online (2014) indicated that no environmental analysis study had been conducted for this road project.

Due to the road’s geographical location in the Mekong floodplains, Borey Chulsar Commune Road investment should have adhered to the environmental safeguard policy and prepared an environmental analysis report identifying the road civil works’ potential impacts on the environment (e.g. impact on the fish breeding ground, the effect of land and vegetation clearance, and the likelihood of erosion and sedimentation of water bodies, dust and waste generation). The provincial technical committee, or the technical support consultant who was hired to conduct the feasibility study, should have assisted the commune council in preparing the environmental analysis.

5.2.3. Selection and appraisal of commune investment project

Step 3 of the commune investment project cycle is an ‘integration workshop’ at district level. It aims to combine communes’ investment projects into a district development plan. The workshop also facilitates the alignment of the development priorities of different stakeholders: Provincial Line Departments, NGOs, and civil society with district and commune investment plans (NCDDS, 2009a). The implication is that the commune development plans are central for local development; so other stakeholders’ development

priorities should be supportive. In so doing, it allows commune councils to mobilize resources from the stakeholders to support commune investment plans. This can result in more harmonious and effective use of the resources for addressing local needs. As per procedure of the district integration workshop, the commune council presented a list of proposed priority projects to workshop participants (i.e. representatives of line departments, civil society and donors) for funding consideration. This is because the government commune development fund is substantially insufficient to cover each commune investment project.

At this step, a district integration workshop is organized to provide each Commune Council (i.e. the Borey Chulsar commune councilors) with opportunities to present their priority requirements in accordance with the needs of the people within their commune. A proposed commune investment project is undertaken at the annual ‘District Integration Workshop’ in which commune development plans and commune investment projects are prioritized and “consolidated into a district plan, monitoring the commune bidding process, supporting the communes in project implementation and providing training” (Eng, 2014, p. 144). The purpose of the workshop is for participatory voting, through which the workshop participants (e.g. commune councilors and village representatives) choose and prioritize the project(s), considered necessary and urgent for adaptation to climate change and which serve the common interest of the people in their respective communes.

During the annual ‘District Integration Workshop’, the village chiefs raised questions on the level of finances available. In response, they were told that there were many criteria to fulfil, based on a set of minimum conditions put in place by UNCDF. For example, all commune investment projects must be already integrated in the Borey Chulsar commune investment projects and commune investment projects must have addressed the most vulnerable and provide benefits to the most vulnerable projects (see Figure 5.2).

គម្រោង (Project Name)	ថវិកា (Budget)	LGCC
① ជំរុញការសាងសង់ផ្លូវក្នុងភូមិ	5,849,500	27,300,000 (6825#)
② ជំរុញការសាងសង់ផ្លូវក្នុងភូមិ	10,550,000	30,000,000 (7500#)
③ ការសាងសង់ផ្លូវក្នុងភូមិ	3,000,000 (3000#)	
④ ជំរុញការសាងសង់ផ្លូវក្នុងភូមិ	40,880,310	12,264,00 (3666#)
⑤ ជំរុញការសាងសង់ផ្លូវក្នុងភូមិ	100,000,000	4619.40

Handwritten notes on the right side of the table include:

- CF 66000
- 1- ជំរុញការសាងសង់ផ្លូវក្នុងភូមិ
- 2- ជំរុញការសាងសង់ផ្លូវក្នុងភូមិ
- 3- ជំរុញការសាងសង់ផ្លូវក្នុងភូមិ

Figure 5.2 A sample result of an annual district integration in Khmer

Source: NCDDs' workshop report on prioritized projects under LGCC II, 2014

The set of conditions also considered the quantity of beneficiaries and, finally, it was necessary that the selected project was aligned with the district climate change strategy. At the end of the meeting, the Borey Chulsar commune council and representative raised their voice in approval of this road investment. Then they collectively voted for the most urgent projects. Such democratic processes are fairly new in this region but they are something that the local leaders have come to appreciate. One commune councilor, Participant 12, said that she found the process very good for women to benefit from because:

"... during the vulnerability assessment, many women at village level had the opportunity to bring their concerns forward. Climate change affects a lot of women so I think this process has been very good for us."

At the end of the district integration workshop, the Borey Chulsar commune was selected based on these criteria for a total amount of USD13,102 of climate resilience top-up grant. Unusually, the Borey Chulsar commune development plan (CDP) was already made in 2013 with the support of UNCDF before its commune climate change strategic plan was developed.²⁰

²⁰ <http://www.local-uncdf.org/regime-changes.html>, accessed 16 March 2016.

Borey Chulsar Commune Road Investment project was developed and prioritized by the commune council officials. The prioritization was based on the findings of vulnerability reduction assessment and meetings with District authority. For the case of Borey Chulsar commune road improvement, the Borey Chulsar commune could start to develop its proposals for its commune priority investment project(s) in 2013. It is a participative process that helps to consolidate the findings of the VRA, bringing villagers and officials together to determine their specific issues and ways to respond to the problems.

5.2.4. Implementation and monitoring

During the implementation and monitoring, the VRA results are used for the Technical Standards. I verified that a technical service consultant, who is also known as a local engineer, had been recruited for quality control of the infrastructure development that was co-funded by the climate top-up grant. My memory from my interview with a local engineer is that during the road design stage, he worked closely with the commune councilors and he visited the project site a few times to better understand the biophysical conditions, both by observation and by speaking with local people. This, for example, identified the sections of the road where there were strong flows of water during rains, highlighting the need to construct a water culvert so as to avoid flood damage to the road during the coming wet season.

During the implementation stage, he often visited the construction site for quality assurance because the contractor sometimes provided the road with less quality than had been agreed in the contract – e.g. the contract might use a smaller steel structure. When the road was completed, he and his colleagues again visited with the locally available quality checking equipment to verify the quality of the road works against the engineering standards specified in the contract. The contractor would not receive the final payment from Borey Chula commune council until the final monitoring had been confirmed. Furthermore, UNCDF assigned one of its Technical Advisors to monitor the Technical Service Contractor's quality of technical study. As claimed by participant 20, another Technical Service Contractor explained:

“[the] International Technical Advisor talked to the village chief and commune chief about what information I had collected and to whom I had spoken. He wanted to check whether my work was acceptable. He provided ideas and

recommendations to design in a way as to address flash flooding. He enquired at length about the project study and culvert standard”.

During my fieldwork, I interview him and took part in the quality control monitoring of other commune road projects in the same commune. When asked how Borey Chulsar road differed from other non-climate-resilient roads, participant 20 responded:

“Climate-resilient measures are reflected in the M&E framework of the CDP. However, it was not clear whether the commune was aware of or was attentive the M&E given they focused so much on the physical progress”.

Borey Chulsar road has incorporated the climate risks and adaptation measures of the commune-based VRA in the year 2012. Instead of investing in quantifying road improvement as was usually the case prior to 2012, Borey Chulsar focused on climate resilience quality, which means the technical support consultant had to ensure that the road design (e.g. elevation and structure) coped with the weather extreme events such as torrential rain and flash floods caused by rain intensity in the catchment area. Information about past flooding records and hydrology was collected by the technical support consultant and then integrated into the road design decision-making. As a result, a meter of road surface was evaluated and one box culvert was added to the road design.

Interviews with UNCDF and NCDDDS staff revealed that the representatives of the provincial team in Takeo, the NCDDDS and UNCDF regularly conducted on-site monitoring.²¹ My conversations with many of them confirmed that the on-site monitoring was conducted in order to check the progress of the project, to identify and manage existing challenges, especially quality control of the project, to ensure that the projects were high-quality and responsive to climate change. In meetings with the district and commune councilors, UNCDF’s country representative clarified the purpose of reviewing the implementation of the project, stating:

²¹See also <http://www.ncdd.gov.kh/km/media-center/13-latest-news/1196-lgccii-project-monitoring-at-takeo-province>, accessed 18 March 2016.

“This is not an inspection to find error, but it is a common implementation of the project, which requires regular inspection to study the progress and challenges to work together to resolve”, (Participant 1).

From the government staff's perceptive, they are concerned that the monitoring and evaluation results are treated as a basis for the decision of whether donor aid should or should not continue.

5.3. Discussion

Climatic impacts can affect the lifespan and the traditional economic standards of an individual road project. However, as noted by Capstick et al. (2014), interactions between a road project and the relevant climatic factors (e.g. hydrology and surface water) should be identified as a part of risk management under the Technical Manuals for Infrastructure Design and Standards (NCDDS, 2009a). The Technical Manual excludes a range of opportunities for “avoiding flood damage to roads and addressing climate change impacts of roads during construction” (Wim Douven & Buurman, 2013, p. 163).

In theory, severity of climate change risks can be met with better design standards and forward planning. The language used is similar to that found in the 30% top-up grant management of the road investment project in Borey Chulsar commune. It means better engineering and more expense, which was partially met by the fund. However, the actual understanding and provision of the road design and implementation resulting from this knowledge remains to be seen, specifically in aid dependent countries such as Cambodia where the adaptive capacity is low but external resource dependency is high (MOE, 2012). When asked about engineering and technical standards that are climate-resilient for road infrastructure, many participants in this study referred to the need to meet engineering standards and international best practices. This was discouraging. For example, one Technical Service Contractor hired by the sub-national government, participant 23 commented:

“Actually ... used the same engineering multipliers. The difference is mainly on strict supervision on the contractor' work. We must strictly require the contractor to follow the technical standards. We have to put conditions that if the contractor does not follow our requirements, we would not accept the work quality. If you

continued to do more, you would waste your time and your resources because I would not approve. I would not issue your work progress approval.”

As noted by Kakegawa (2012), the contractor is entrusted with compliance with technical standards which theoretically incorporate mitigation measures for the negative climatic risks. However, depending on the mitigation measures, contractors can proceed with the project construction without supervision during the actual civil work, at a time when the contractor and the employer are focused on physical progress to meet deadlines. If the contractor is aware of the current standards, there is probably motivation to ensure compliance on the ground. Unfortunately it is often the case that profit-making contractors have little or no knowledge about climate change issues. It is difficult to ensure international standard compliance since no intensive training or special sessions are currently available to make them aware of CCA measures. Participant 23 further stated:

“The difference is that we strictly followed the technical standards and multipliers which we did not fully practice for normal commune investment project. Because the commune promised for a long road project during his election campaign, the engineer did not include multipliers for the normal commune investment project”.

Although the engineers were required to follow the Commune/Sangkat Infrastructure Design Manual and Commune/Sangkat Fund for Project Implementation Manual, the normal commune investment project had proceeded without the proper engineering design of previous commune road projects. When I asked about this, participant 23 noted that:

“That is why I said things are dependent on the commune chief and the engineer (i.e. technical service consultant). My road improvement projects could not follow what the commune chief promised in his politics. In some areas the engineers could do so to follow what the commune chief wants. But my projects could follow their patterns. I had to do things differently. So, it [the work quality] depends on the commune chief and engineer. The LGCC wanted sustainability, I had to follow all the technical standards, and I could not lower/manipulate the standards.”

Road investment projects have long been criticized for considering too few alternatives, and for basing design, implementation and management decision-making solely on technical (engineering best practice) and economic grounds. Road building is certainly a profession dominated by technical experts and engineers; although that does not mean that climate change considerations will be ignored. In this case, because the donors and LGCC wanted sustainability (expressed as climate proofing), the work had to follow all technical standards and there was no possibility of manipulating the standards. This significant difference to normal roadbuilding was attributable to the availability of additional funding:

“Normally the commune road project cannot afford or does not want to add culvert due to cost involvement. But for LGCC’s special case in Borey Chulsar, we were told not to worry about budget”, (Participant 23).

Of course, it is better to build a higher (possibly stronger) road than simply investing in the improvement of the existing engineering standards. Furthermore, as changing water levels can cause an increase in road erosion, considerations have to be broadened to consider more climate-aware designs or new road locations and routes in future. In this case study, one of the local engineers who was hired as a consultant, Participant 24 explains:

“If the technical specifications are entirely followed, much climate resilience will be done. ...Actually, compliance was enforced although the climate resilience top up and the hands-on supervision support of an assigned International Technical Advisor. The International Technical Advisor recommended adjusting the technical design (e.g. add another one meter culvert into their road design) to flow the flash flood water.”

This is in line with the donors and LGCC whose aims are to “strengthen technical support for climate-resilient development by contracting a technical support consultant using a model already piloted in other communes” (NCDDS, 2014a). Moreover, mainstreaming CCA assists the government in reinforcing its existing technical specifications for road design and implementation regardless of the limited annual commune investment budget. A number of government officials and engineers I interviewed affirmed that LGCC’s

climate resilience top-up grant helped ensure that the Commune/Sangkat Fund Project Implementation Manual and technical specifications were followed and enforced.

In short, to be aligned with Ostrom's institutional analysis concept (2009), the project-level adaptation mainstreaming was constrained by a rigid institutional structure, insufficient scientific information, and limited knowledge of hard and soft adaptation among the implementing staff and communities. My fieldwork indicates that mainstreaming CCA into the Borey Chulsar Commune Road investment project faced at least three challenging factors: technical, institutional and financial capacities. These factors are not broadly discussed in Ostrom's framework (2009), and are only debated to a limited extent by Goldman (2005). Details of each challenge are discussed as in the following sections.

5.3.1. Technical capacity

Availability and credibility of information

Availability of information about the national and sub-national climate change strategies of the relevant ministries, including the Ministry of Environment, can be easily retrieved from the government websites. Printed copies of this information are not widely disseminated to the public. In spite of this, the commune councils continue to rely on printed documents as their medium of communication and usually do not access the Internet for day-to-day work. As a result, many commune councils do not know about the climate change strategies and have become unaware of the emerging CCA requirements. In fact, they rely on external consultants (both national and international) to assist them. A similar phenomenon occurs with other cross-cutting issues such as gender and social equality, in which external expertise is critical if the government or Borey Chulsar Commune office is to move forward and to meet aid pre-conditions.

Donors and NCDDDS noted a lack of relevant information about the nature of the climate change risks to which the commune investment project must adapt. This, they believed, was a key barrier to adapting to climate change. This concern was captured by an international consultant, Participant 3:

“I guess there are some gaps in the knowledge – there are some issues that I’m not exactly aware of. We do talk about more flood issues like that but we’re not really sure why...”

In order to address the knowledge gaps and disconnection between climate resilience and the road infrastructure projects, the awareness and capability of the general public, as well as key stakeholders, must be improved so as to enable better understanding of climate change uncertainties. Increased awareness and capability would enable an integrative, adaptive form of planning to enhance adaptive capacity and resilience through better coordination and partnerships. To overcome critiques of fragmented donor aid coordination (Ear, 2007b; Hughes, 2009; Käkönen et al., 2014), the current partnership of the European Union and UNCDF to support LGCC is a good example of inter-agency collaboration. Here, the engagement and coordination of all donor stakeholders for mainstreaming CCA, especially at the sub-national level is critical (Uy & Shaw, 2010). However, the literature predominantly shows that the aim of effective aid coordination has not been achieved since multilateral and bilateral donors—for instance, donors of the Cambodian climate resilience initiatives: PPCR and CCCA (Käkönen et al., 2014)—continue to operate with their own agendas and models of financing.

The current information regarding disaster risks and climate change risks for CIPs is not particularly credible, given that the mainstreaming CCA efforts have only recently been piloted and tested. Furthermore, the National Committee for Decentralization and Deconcentration Secretariat has not endorsed any official policy and the Manual for mainstreaming adaption into the commune investment development and project planning. The fact that the proposals and pilot activities were prepared in English for donors’ comments was not particularly useful for users such as the commune councilors, as it minimally raised their awareness and understanding of the climate-resilient development policies and strategies.

Public awareness

Public awareness about climate change in general and climate resilient development in particular, is still very limited in rural Cambodia. According to the 2011 climate change awareness survey run by BBC World Service Trust’s Research (MOE, 2011), less than 36% of Cambodians have heard about climate-related events. While it is critical to

recognize the differences in villagers' public awareness and commune councils' abilities, understanding climate resilience and responding to it in practice is largely dependent on the way the issue is framed and what knowledge is valued, produced and diffused through discourse and practice. As such, a key process to mainstreaming CCA into the commune investment project planning process is to improve public awareness and information dissemination about climate change risks. In this respect, increased intensity in rain and flash flood events were noted as potential concerns by the research participants (1, 3, and 10) in Borey Chulsar commune.

When asked to identify the challenging factors for mainstreaming CCA into the project cycles, participant 2 (who works for the multilateral donor) argued that:

“CCA is new for us, for NCDDDS and for the communes. There are constraints in financial flow at the provincial department of finance to district account as this is a new system in Cambodia. Furthermore, district government staffs are not familiar with their role in working with the communes to deliver the project as there are no guidelines for them yet. Technical support consultants have limited understanding of climate change adaptation”.

Public awareness levels and the consequent act of mainstreaming CCA can be hindered by post-conflict institutions, which are dependent on external assistance due to their insufficient technical capacity and financial constraints (Huq & Ayers, 2008). These constraints are a recognized issue for local sub-national institutions, affecting their ability to adapt to climate change through local (by-the-commune) investment project planning.

VRA issues

Although VRA is applied by LGCC and Borey Chulsar commune council as a tool for raising public awareness of climate change vulnerability, the public awareness approach is rather ad-hoc. It is unclear whether the VRA outcome can help address priority issues and the needs of each commune at the level of investment projects, given that it does not specifically assess any site or project. Borey Chulsar Commune Road project has brought institutional opportunities to the commune councils with the aim of building their understanding and improving their capacity to engage donors and other relevant government bodies that can assist them in both successfully designing and managing the

pilot climate-resilient road infrastructure. It is obvious that awareness and participation of the sub-national stakeholders, ranging from identifying the site to integrating the VRA results, is one of many factors that can enhance CCA at the commune level.

Borey Chulsar Commune Road has essentially focused on the importance of a hands-on capacity development to Borey Chulsar commune councilors. Making Borey Chulsar Commune Road climate resilient is a powerful demonstration of what can be achieved. It assists not only the Borey Chulsar commune councilors, but also people in other communities, to understand and use the VRA as a tool to identify climate change vulnerabilities, prioritize local adaptation measures, and integrate them in their respective commune investments projects (NCDDS, 2014a).

Good decision-making for resilience requires information and knowledge including, but not limited to, climate information and likely future impacts. However, to act on this information, commune councils must have “knowledge of appropriate strategies and technologies, as well as access to the resources they need to implement them” (Dazè et al., 2013, p. 21).

The VRA was the main tool that helped build the commune council’s awareness and capacity for adaptation planning and mainstreaming. As is logically expected, due to their longer experience with the project and exposure to adaptation mainstreaming concept and processes, the sub-national government officials in Takeo Province were more distinctly informed and confident about adaptation mainstreaming (NCDDS, 2014a). According to participant 20,

“The very fact that Borey Chulsar Commune Road is the first of its kind in terms of mainstreaming climate change adaptation into the commune investment using existing sub-national planning and budgeting system. This accentuates its capacity development value in the ongoing contexts of Cambodia’s efforts to deal with climate change concerns and strengthen good governance.”

In addition to the awareness building through VRA exercises, the process of participatory evaluation and selection of commune investment projects for performance-based climate resilience grants also served as valuable awareness-building and capacity development

processes. They stimulated discussion among the stakeholders at various sub-national levels, prompting them to think about issues of climate change, adaptation needs, and the rationale of integrating CCA in the project decision-making process for commune investment projects (CIPs). These processes have contributed to better awareness among sub-national and commune staff about the challenges posed by the consequences of climate change, how those challenges should be addressed, and the role of the local governments in helping local communities to adapt to climate change.

“NCDDS provided us recommendations on how to address challenges effectively and on time. I used to call NCDDS for advice—when I carried out their recommendations I could effectively address the specific challenge that I faced. The provincial coordinator always raised challenges that I face in meeting in order to address them on time through the meeting. We discuss the gaps and areas need improvement in provincial meetings. We have provincial and district advisors who have good understanding of CR and can support us on time”, (One participant raised at the district meeting which I participated in October 2013).

Likewise, there is an increasing understanding at the commune level about the need for learning about climate change challenges and their corresponding solutions.

However awareness and capacity will require more persistent capacity development than that permitted by the LGCC project’s timeframe, as changes in attitude, behaviour and practices generally take time (NCDDS, 2014a). It was encouraging to note that LGCC was designed to integrate CCA in existing planning and project implementation procedures at the sub-national levels. This creates hands-on learning conditions for commune councils as well as the sub-national administration to look at development investments from the lens of climate change, and learn how to integrate CCA into the planning and implementation of an individual commune investment project. A case in point here is the integration of CCA in the Commune/Sangkat Fund Project Implementation Manual, which guides the sub-national governments in the implementation of infrastructure projects (Va, 2015).

5.3.2. Institutional capacity

Aspiration and authority

Aspiration and authority of the commune council to implement climate resilience need to be improved given that they are very dependent on the provincial and national consultant or advisors to assist them in preparing and reviewing climate resilience requirements, even at the screening stage. Furthermore, there are no set-aside resources or incentives for the commune council to promote the climate-resilient development practice in the absence of external aid. The authority and autonomy of the commune council outlined in the Cambodian Organic Law (Eng, 2014) has not yet been achieved. In reality, Borey Chulsar still has no full authority to exercise its decision-making power. It has been argued that the commune councilors hold only a basic level of education, many of them having only completed primary school (Borey Chulsar Commune Chief, 2013). Therefore, they are not in a position to put into effect their own commune development and investment planning without continued support and supervision from NCDSS and external consultants. While the largest proportion of the commune budget is spent on infrastructure investments, the commune councilors do not receive any basic training about infrastructure standards and have little or no understanding of basic infrastructure specifications. Therefore, they rely on the contractors and donor-hired technical service consultant, or sometimes the appointed provincial engineer who may be passive or may have colluded with the contractor due to the low salary they receive.

As a result of the World Bank-financed Rural Investment and Local Governance Project, which reimbursed an individual Commune investment project that met the eligibility criteria of safeguard compliance, there was evidence of integrating environmental safeguards in the Manual. This Manual has been used by the commune councils as policy guidance for formulating and managing commune investment projects nationwide, regardless of financial sources (See NCDD's 10 year plan).

Leadership and commitment

Although the leadership and commitment of commune councilors for climate resilient practices may be emotionally strong it can be constrained by their financial and technical capabilities. For example, in Borey Chulsar Commune Road investment, besides accessing the performance-based climate resilience grants (30% of their expenses), the

commune council relied on technical input from UNCDF advisors and consultants (e.g. an engineer and advisor paid by LGCC) in order to assist them from the first to the final stage of the project cycle. The performance-based climate resilience funding criteria force/require the NCDDS to mainstream climate change into its sub-national development planning and budgeting systems (MOE, 2012). While climate resilience funding criteria are aligned with the royal Government of Cambodia's decentralization and deconcentration policy, the funding conditionality has, with or without choice, mandated the Borey Chulsar commune authority to accept climate-resilient practice. However, the literature indicates that the leadership and commitment of NCDDS, as well as the Borey Chulsar commune authority, can be gradually eroded when they are no longer able to access this kind of external financial and technical support (for example, see Hughes, 2009).

The government's priority is to push forward its mandate to enhance de-concentration and decentralization. This prioritization is aligned with the Borey Chulsar Commune Road improvement approach, as well as UNCDF's long-term agenda, in providing support and capacity building to the government in order to demonstrate and then compile the lessons learned. The road project gave the subnational administrations a taste of the empowerment achievable through decentralization, making them accountable for promoting the mainstreaming CCA into the commune investment-project and planning portfolio. However, at this stage, it is premature to attempt to evaluate the extent to which climate resilience in commune investment projects would be able to address climate change concerns in reality. This is because the current climate-resilient practices are largely implemented by external consultants who are paid by LGCC and UNCDF. While knowledge and capacity transfer have been arranged, there is no guarantee that the low-paid government staff would be willing to learn and take on new or additional CCA responsibilities in the future. So, it is still questionable if the subnational government officials are accountable for their role in the current environment or only when they receive extra incentives. In other words, they are only measurably accountable to CCA when there are financial incentives in place. However, financial incentives are not a part of the efforts for mainstreaming CCA into the subnational development system and the agenda of commune investment projects.

Institutional blueprint

Institutional blueprint is another outstanding constraint. There is no evidence of any single ‘blueprint’ institutional arrangements for effectively mainstreaming CCA at a project-level. Development projects frequently neglect institutional capacity building at the local level (Agrawala et al., 2012). The LGCC approach is to delegate financial management and decision-making to the commune councilors. This happened in Borey Chulsar, where there was close consultation with various local actors. Consequently, one positive factor was the inclusive bottom-up approach to mainstreaming CCA. The empirical data indicates that a main contributing factor to climate resilience is the use of the existing commune investment planning and budgeting system. In this case, Borey Chulsar commune council is empowered to decide how to couple their annual commune budget with climate resilience funding. Participant 21, who coordinates the climate resilience funding activities between Borey Chulsar officials and UNCDF staff, explained that:

“I also facilitated other tasks in the national Commune/Sangkat Project Implementation Manual. I do not have right to make decision, but I can facilitate commune chiefs and commune councils have decision-making power with regards to climate resilience.”

However, the policy framework in which commune councils operate is largely imposed by a higher national level of governance, including a range of national and sub-national development planning policies. Indeed, in many cases there are communes, including Borey Chulsar, which have no constitutional standing of their own. Rather, they are merely designated recipients for a higher power structure, termed ‘deconcentrated’ rather than ‘decentralized’ governance (Batterbury and Fernando, 2006). There are competing pressures to decentralize control of climate resilience funding and responsible decision-making to the commune council too hastily. However, this is actually a trajectory of institutional change that leads to the adjustment of knowledge and attitudes (Batterbury and Fernando, 2006; Goldman, 2005) towards more equitable, sustainable and climate-resilient development practice.

The key planning mechanism for Takeo’s three year rolling Provincial Development Plan was prepared by NCDD-S and the provincial team, with minimum consultation or input

from the commune councils, for example when identifying infrastructure projects. When asked how the CCA could be implemented differently without donors, most participants indicated that they expected ongoing external support.

Systematic approach for building resilience

The lack of a systematic approach for building resilience to commune road investment projects is the result of a lack of donor aid coordination along with weak government capacity to mobilize aid resources.

The National Committee for Decentralization and Deconcentration Secretariat (NCDDS) has coordinated and implemented a number of different pilot programmes with a common goal of mainstreaming CCA into commune investment projects in an inclusive manner (NCDDS, 2013a; UNDP, 2013). Apparently, none of these donor-assisted CCA programmes have yet reached a systematic stage of full and consistent interaction and integration of CCA. The proclamation of ‘sustainable development’ should be achieved at different levels of governance regardless of a changing climate (see MOE, 2013a; Royal Government of Cambodia, 2003), however this means little in the everyday operation by government, without external technical and financial assistance.

The importance of prioritizing and decision-making for mainstreaming CCA is influenced by financial incentives (i.e. the LGCC’s climate resilience funding criteria). However, accommodating such priorities poses significant challenges since there are competing development needs of commune councils spread across environmental, socio-cultural, political and economic differences. The decentralization process affords commune councils louder voices and greater input to their needs prioritization. Due to the competing interests and resources associated with priorities pre-determined by donors and other stakeholders, it cannot be assumed that institutional challenges alone significantly enable commune action for climate-resilient infrastructure efforts. Empirically, it has taken NCDDS, the sub-national administration, and its multi-donors almost a decade to embed IEE/EIA (i.e. mitigation of environmental impacts) into its commune development planning and practice (NCDDS, 2012a; World Bank, 2011). Hence, it is not surprising that movement towards mainstreaming CCA has been slower than expected.

It was evident from the research participants that mainstreaming CCA represents only one area of urgent priorities amongst other competing interests for planning and managing commune investment projects (e.g. environment, gender, human rights, and poverty). This may account for reluctance to embrace an issue that may not necessarily reflect outright skepticism but, rather, feelings that commune councils have more immediate issues with which to contend. As noted by Rai, Huq, and Huq (2014), these competing priorities arise from many sources, including the different perspectives and areas of operation among commune council staff and elected politicians.

“We’re involved in everything from basic health care to road design and the request for more funding just comes in nowhere or uncertainty when it comes to climate resilience...”, (Participant 52, a village chief in Borey Chulsar).

The importance of mainstreaming CCA is also influenced by how the climate change vulnerability is framed. For example, to the extent that addressing climate change vulnerability is viewed as an issue of a financial benefit or a public development, it may have greater resonance within sub-national administrations and donors. Most research participants reported climate change as being seen largely as a governance issue alongside such topics as poor enforcement, nepotism or patriot clientelism. For example, one service technical consultant, participant 24 commented:

“... road engineers ... have a better idea of what’s going on with climate change and have a big idea of what climate change issues are to be addressed by enforcing the existing engineering standards.”

This comment stands in contrast with the broader view that CCA and climate resilience is in fact an important issue for development project planning and management. However, it also suggests that in some cases, knowledge and responsibility for tracking and responding to climate change vulnerability is not evenly distributed across sub-national administration officers and even among LGCC implementing staff. In the case study commune council staff stated that climate change risks were conceptualized as a road engineering issue. For this reason, dealing with the issue was assigned to the infrastructure practitioners, along with and included in the traditional engineering field survey. Exceptions to this tendency were found among the LGCC consultants (Va, 2015)

who, in many cases, mentioned rain intensity and flash floods when discussing the benefits of investing into CCA.

5.3.3. Financial capacity

Availability of funds

Fund availability is the greatest challenge for the Borey Chulsar commune council's implementation of its commune development plan and commune investment project (CDP/CIP). Like other communes, the central government allocates a limited annual budget (i.e. USD10,000 to USD20,000) to Borey Chulsar for a range of commune development projects and social services. This annual commune budget does not meet the high requirements of commune development. According to the World Bank-financed Rural Investment and Local Governance Project report, the annual budget has been repeatedly used for repairing or improving the same road infrastructure.

As donors rely on the government system to propose and prioritize their aid requirements, sometimes party connections or a good name or reputation with the central and/or provincial government staff are needed to secure additional external funding. Without external funding, commune councils try to avoid spending their limited financial resources on CCA work: they either avoid climate change or disaster-sensitive projects altogether, or they avoid the expense of environmental analysis unless there is external financial assistance.

Fund availability has been a continued challenge because Borey Chulsar commune competes against other communes which have similar priority needs for limited donor funding (such as the LGCC's climate resilience top-up grant). support is therefore needed from sub-national and local political leaders to set aside funds to better enable responses to climate risks, and (as previously explained) better understanding of these risks is required. This was evident in the interview responses by LGCC donors and government officers, who identified lack of knowledge as a significant reason for the stagnant implementation of any action plans to combat potential climate change impacts. Certainly, as suggested by the donor participants (e.g. UNCDF consultants), increasing awareness and building the capacity of policy makers, including local leaders and decision makers, would enable better insertion of CCA integration into road and other infrastructure development projects.

Hence, financial availability is one of the major obstacles to address CCA issues, specifically at the sub-national (i.e. commune) level (Cuevas et al., 2015; OECD, 2009). Problems of availability, stability, and access to financial sources too often constrain the commune authority from initiating the serious considerations of mainstreaming CCA in their commune development programme and commune investment projects (CDP/CIP). “Without a stable source, local governments worry about the financial responsibility” for CCA activities when funding ceases (Cuevas et al., 2015, p. 4). In other words, such financial constraints lead commune councilors to implement temporary adaptive measures (Measham et al., 2011) only when they can secure external funding source (e.g. climate resilience top-up grant). They are hesitant to establish strategic and long-term measures (Measham et al., 2011).

Accessibility of Funds

Fund accessibility is another layer of challenge for implementing the Borey Chulsar commune investment projects (CIPs). Donors have their own mandate and complex reporting demands which are not meaningful to the commune councilors, who have only a basic level of education and cannot communicate in English or the language of the aid donor in order to access the donor funding. The financial flow from the national to provincial treasury, and then to the commune office, is often delayed due to the bureaucratic and complex budgeting system (NCDDS, 2014a). For example, many CIPs supported by LGCC have had to suspend planned projects because the climate resilience funding was held up in the National Treasury and the contractor could not begin civil work activities once the wet season arrived. Access to funds is problematic for the commune investment projects which must comply with the due diligence of climate resilience. There are reports by NGOs (e.g. Asia Foundation 2005) of cases where a ‘service charge’ was levied by the provincial Treasury before commune councils could withdraw funds (Ninh & Henke, 2005). However, in the case of Borey Chulsar Commune Road, I found no evidence of such a ‘service charge’ during my fieldwork. That may be an exception, given that Borey Chulsar Commune Road was the first demonstration of climate-resilient road practice and, as a result, was closely monitored by donors and all other relevant government agencies.

Furthermore, fund accessibility for commune investment projects is usually highly constrained in terms of their financial capacity. These constraints stem from a lack of

institutional and financial autonomy. Commune councils are often tasked with managing ad-hoc commune infrastructure projects, in addition to one or two additional proactive infrastructure projects (NCDDS, 2014a), and this has to be undertaken within the limits of their annual commune budgets (of annually, 10,000 to 20,000 US dollars). According to (Va, 2015, p. 49):

“We [government ministries] even have insufficient budget to implement the current plans, so it will be very challenging if we practice climate-informed planning. ... it will be very difficult for infrastructure development since we usually design the infrastructure (e.g. irrigation systems) based on the available budget.”

This implies that there is quality discounting for infrastructure development due to budgetary constraints, suggesting that climate-resilient development practice is impossible “if no additional budget is made available” (Va, 2015, p. 49). This fiscal resource dependency and lack of governance authority frequently inhibits effective life-cycle commune investment project design and management. Thus, financial resource constraints can lead many commune councils, including Borey Chulsar, to self-perpetuating short-term infrastructure fixes rather than fully embracing a long-term integration approach. This is a common problem for many local governments.

Climate-resilience appears to be heavily influenced by the governance and technical dominance of the finance providers. The establishment of a co-financing mechanism using the commune council’s budget resources is a noteworthy achievement for the sub-national administration and may allow greater ownership in implementing adaptation activities throughout the country. In this respect, while, the LGCC implementation model follows the argument of Rai et al. (2014, p. 539) “to inform the funding and implementation decisions, there are some emerging challenges that need consideration in future planning and implementation, for example, differing transparency and accountability”.

Stability of funds

Stability of funds was out of the hands of the commune councils as they were dependent on the national government (or even horizontal party lines) and short-term external funding sources. On one hand, the commune councilors were dependent on district,

provincial, and national governments for funding, expertise, and training (Pak, 2010). This necessitated loyalty to district and provincial level officials along political party lines in order to access their funding for development needs (Pak, 2010). On the other hand, Borey Chulsar Commune Road improvement also relied on external funding sources, such as donors or political parties. As a result, when the donor-led climate resilience funding criteria did not require a safeguard report, the Borey Chulsar commune council either disregarded or overlooked the due diligence of climate resilience implementation, even though it had been legalized in the subnational administrative system.

Furthermore, funding stability is a major constraint for mainstreaming CCA into the commune investment projects and the commune chief can become overwhelmed with the issue of who will pay and where the money will come from. Making roads resilient to climate change requires substantial financial investment (Wim Douven & Buurman, 2013) as it increases costs by 30%. During the wet season, roads may become submerged with restricted accessibility to some areas. The seasonal flooding can cause road damage, which then requires costly maintenance budgets. “When budgets are restricted this can lead to poor roads with low transportation speeds and high vehicle maintenance and repair cost” (Wim Douven & Buurman, 2013, p. 163). Fortunately, there is a considerable and increasing level of interest amongst development donors in Cambodia in providing climate resilience funds²² to the sub-national administration, as they have witnessed some of the adverse effects of climate change experienced by villagers. To some extent this interest has been stimulated or increased by the demonstrated success of mainstreaming CCA in Case Study One. The Ministry of Environment has also shown support for this approach. This provides an opportunity to encourage a unified scale-up of funding and to do so in a coordinated manner, to achieve economies of scale and to achieve a unified mainstreaming approach. However, although the leadership of relevant government agencies and commune councilors may be emotionally strong, it can be constrained by their financial capability.

²² Case Study One is a model for a longer-term perspective of climate resilience integration into sub-national development planning policy. The fact is that those who are poor and rely on resource dependency seem to be good followers—they are happy to accept the funding and recommendations without too much questioning.

5.4. Summary and key findings

This chapter discussed Borey Chulsar Commune Road implementation of climate vulnerability reduction assessment (VRA), which was funded by a new climate resilience top-up grant. The research participants clearly recognized the vulnerabilities of climate change on road infrastructure, and hence considered it important for Cambodia's rural road investments to be climate-resilient. The chapter has explained why performance-based climate resilience funding criteria were applied to cover the additional costs of making the commune investment projects resilient to climate change. However, the climate change adaptation and climate resilience agenda, at the moment, are driven by donors, although the government recognises the advantages of an integrated approach.

The entry point of integrating climate change adaptation into commune development investment is through the VRA tool. However, many participants perceived that the adaptation mainstreaming can be conducted through the well-established environmental safeguards (i.e. screening and analysis) procedure of the existing Commune/Sangkat Fund Project Implementation Manual. While many of the subnational administration staff and commune councilors are familiar with the Manual, there is a gap between what is approved in the policy paper and what occurs in practice. In terms of climate resilient practice for an individual commune investment project, there are several advantages for the Borey Chulsar Commune Road, especially in terms of opportunities to engage villagers and commune councilors in addressing the localized climate change impacts. As Cambodia is undergoing political and fiscal decentralization, the commune council is best placed to coordinate with and mobilize potential resources from multilateral donors to safeguard the interests of the poorest and most vulnerable local people (Agrawal & Perrin, 2009; Louis Lebel, Lailai Li, Chayanis Krittasudthacheewa, Muanpong Juntopas, Tatirose Vijitpan, Tomoharu Uchiyama, & Krawanchid, 2012; UNCDF et al., 2010). Nonetheless, this is controversial in the literature, as it depends upon the quality of local government officials and the level of budgeting.

The implementation of Borey Chulsar Commune Road investment was well aligned with the decentralization and empowerment of the commune council to undertake its own project investment planning, prioritization, and implementation. However, the climate-resilient approach largely succeeded due to the tremendous input of external

consultants—which suggests that their time costs exceeded the total expenditure of this road investment.

Finally, it might be premature at this stage to judge the level of success or failure of climate-resilient development practice, given that the paradigm shift of making Borey Chulsar Commune Road resilient to climate change was still essentially at the “learning by doing” stage, for both the donors and the government institutions. The research might be strengthened by identifying whether these are broader issues faced by developing countries, or whether there are Cambodia-specific issues at play, since real development practice is still largely driven by aid agendas. Further investigation is needed, especially for the sustainability and cost-effective perspectives, given that the current climate-resilient project demonstrations have taken for granted both financial stability and cost-benefit components. While the research only reviewed the three related accountable drivers, further research is needed to expand to other commune climate resilient projects and also other aspects of development.

Chapter 6. **Climate Resilience of Provincial 150B Road**

“...efforts on climate resilience have been done on an ad-hoc basis despite the fact that climate change has received a lot of attention in recent years. ... however, at the project-level, climate resilience guidelines can be used to reduce local impacts,” (ADB, 2013a, pp. 5-6).

This chapter examines the institutional role of the Pilot Programme for Climate Resilience (PPCR)²³ investment funding and the Asian Development Bank (ADB) in strengthening the capacity and coordination mechanisms of MPWT to mainstream CCA Provincial Road 150B improvement (hereafter referred to as Case Study Two). It examines how the ADB regional fund and PPCR investment fund enhanced the synergy of road infrastructure development and climate change adaptation, recognizing that neglecting vulnerability to climate change can be problematic for the long-term outcomes of projects. Finally, it analyses the capacity challenges to implementing climate resilience requirements and implications raised at the nexus between the roles of the recipient government and donor funding conditions.

6.1. Provincial Road 150B and climate resilience

As explained in Chapter 4, implementing the climate resilience of Case Study Two was actually designed to catalyse a shift from the ‘business as usual’ sector-by-sector and project-by-project approaches to climate-resilient development practice. In its nature, PPCR emphasizes ‘learning-by-doing’, aiming to increase a climate-resilient development pathway (CIF, 2009b). To access the pilot PPCR investment funding, the implementing agency (i.e. MPWT) must be able to define and determine how building climate resilience is operationalized at the project-level design and implementation. This pilot PPCR investment approach was aligned with ADB’s guidelines for climate proofing investment in the transport sector (ADB, 2011a). In this context, an ADB climate change consultant, Participant 67 explains:

²³ Cambodia receives USD1.50 million grant from the PPCR, 2009-2010 and USD85.00 million grant and concessional loan from the PPCR Phase II, 2011-2014. Due to its prolonged delay, the PPCR Phase II was extended until 2019 (ICEM – International Centre for Environmental Management, 2015).

“...There are disasters such as typhoon, the water level rise in the Mekong. It is due to the openness of the government and available resources including budget to do things differently.”

According to the CIF (2011), since 2009, the Royal Government of Cambodia has worked with the PPCR investment funding administrators, including the World Bank and ADB, to arrange for adaptive capacity development at the development policy and project-level in Cambodia. Actions have included reviewing the sustainability and capacity of current engineering designs, standards, and guidelines to withstand climate change (CIF, 2011; MOE, 2013b). The PPCR investment funding also aims to promote ecosystem based adaptation. This mainly involves environmental or green planning to improve flood and drought management. For example, the transitional designs can include increasing ground cover and increasing the retention of water, to control flooding to some extent. Green planning involves the selection of climate-resilient trees, grass or biomaterials for planting along road embankments (see details in ADB, 2014a, p. 47). However, during my casual consultations with the technical staff and engineers, I found no evidence of these planting techniques mentioned in the updated IEE or incorporated into the design for Provincial Road 150B. Despite requests to MPWT’s project implementation unit and the Korean Consultants International firm involved in the project, I was unable to access the detailed designs and procurement documents of Provincial Road 150B as they were designated as for internal use only.

Nevertheless the updated IEE, prepared by Egis Consulting Firm for ADB and Provincial Road 150B investment, highlights that its road design did demonstrate technical adaptation (e.g. engineering measures) and institutional adaptation (e.g. policy commitments) (MPWT, 2014c). ADB proclaimed this as a successful lesson learned, that has assisted the government with its climate proofing investment in the transport sector and particularly in road projects in Cambodia (ADB, 2014a). ADB highlights the benefits of a climate-resilient road, stressing that it would reduce road closures during extreme weather events; reduce surface flooding and the impounding of water that contributes to road deterioration and adversely impacts roadside communities; and reduce road deterioration due to runoff and increasingly high water tables.

To meet the PPCR investment funding conditionality, ADB established a community-based emergency management intervention, with the participation of The Red Cross, to sustain disaster risk management in Kampong Chhnang province (ADB, 2011b). Nonetheless, it is unclear how the emergency management intervention precisely related to climate-proofing Provincial Road 150B. The latter is a common pool property, benefiting the whole population, based on Ostrom's definitions (see Ostrom, 1990). In any event, the Pilot Programme for Climate Resilience (PPCR)²⁴ supported the resulting adaptation measures for the improvement of Provincial Road 150B for a number of reasons, including emergency risks management system and design standards for protecting the road embankments from potential climate change risks (ADB, 2011b). However, the progress reports, prepared by Korean Consultants International (KCI) for MPWT and ADB, showed that better design standards were simply the result of good practice of normal engineering standards (KCI, 2015).

Webber (2015a) argues that multilateral development banks such as the World Bank and ADB are pursuing pre-eminent experimentation in climate-resilient actions. Thus, any limitation could be simply taken as a learning-by-doing process for staff of the implementing agency and those who are involved as the [climate-proofing development] 'experimenters'. Likewise, Provincial Road 150B incorporated the considerations of climate resilience into the existing development project cycle, despite limited evidence of its resilience as well as some institutional challenges during the project preparation and implementation. According to the guidelines for climate proofing investments in the transport sector (ADB, 2011a, 2014a), mainstreaming climate-resilient actions into Provincial Road 150B should have included raising and strengthening vulnerable sections of the road which are susceptible to flooding, sealing shoulders, and improving longitudinal and cross-drainage. Nonetheless, based on my experience working for several road projects in Cambodia and Lao PDR and my review of climate-proofing of road projects in the independent State of Samoa (World Bank, 2012), these climate-resilient actions should be automatically achieved if there is adherence to best practice for normal engineering and construction environmental management standards. Although ADB's Board of Executive Directors approved the Provincial Road 150B investment in May 2011 (ADB, 2011b), the completion of civil works experienced lengthy delays. I

have already mentioned that Youker (2015), argued that bureaucratic procedural systems and the difficulty of interaction between multilateral donors and the recipient government accounts for most delays. This was the case with Provincial Road 150B, where the major problems were red-tape administrative issues between 2011 and 2013 (MPWT, 2014c). Furthermore, the commencement of civil works endured more than two years of postponement due to compounded wet seasons and time-consuming land and property acquisition in 2014 and 2015 (KCI, 2015).

Given these delays, I was constrained from examining the commencement of Provincial Road 150B. As a result, the analysis was limited to the phases from design preparation to appraisal and implementation. However, I was able to access two Environmental Monitoring Reports prepared by the Korean Consultants International firm for MPWT and ADB (KCI, 2015), and they are one of the core documents, alongside interviews, used in this chapter.

6.2. Evaluative criteria and analysis

The evaluative criteria are important not only for monitoring the climate-resilient actions undertaken by MPWT, the implementing agency, but also in providing information to improve future actions for different phases of the project. If an evaluation shows that climate-resilient actions have achieved the intended objectives of climate resilient practice (MOE, 2013b; Saito, 2014), that information can be incorporated into future road projects of a similar type or location. When asked what criteria are used or envisioned to assess success or failure, several participants employed by ADB (participants 61, 63, 65, and 67) answered that it was impossible to measure. Scholars such as Beevers et al. (2012) and Wim Douven and Buurman (2013) explain that this is because it is difficult to measure CCA success over long time periods, usually longer than an individual project's lifetime. Additionally, if an expected impact does not appear (such as a certain severity of flooding) then it is unclear how to measure the success of the project in meaningful terms. However, these participants agreed that although it is difficult to define criteria, it is necessary to attempt to do so. Some participants (e.g. participants 34, 35, and 36) countered Sveiven's (2010) argument that measures to adapt to the adverse climatic impacts are necessary. Nonetheless, they claim that project preparation and engineering design are the only phases that need to incorporate adaptation measures. The ADB has taken things a little further, and Table 6.1 shows the project cycle for this project as a set

of evaluative criteria, with remarks about the actual monitoring and evaluation activities that took place.

Table 6.1 Indicators to assess mainstreaming climate change adaptation

Indicators/Criteria	Climate change adaptation and resilience
Identification: Climate risks screening started as soon as potential project including projects for ADB financing are identified, and IEE was prepared during the design phase.	A climate change awareness survey was conducted as part of the social impact assessment by a climate change consultant hired by ADB in 2011. This survey was not an adequate or suitable tool to identify engineering and non-engineering measures for climate-resilient road design. The awareness survey was seemingly conducted to tick the boxes for the PPCR investment funding requirements. No Khmer version was found on ADB and government websites
Preparation: Climate risks assessment disclosed to the affected people before the approval, and in a form and language(s) accessible to those being consulted.	
Appraisal: Mitigation measures were implemented. Was monitoring conducted regularly by the implementing agency?	Monitoring was entrusted to the consultants, Korean Consultants International (KCI). No indicators or evidence of climate-resilient measures were mentioned in the environmental monitoring report of 2015.
Implementation: Same as the above	

Sources: ADB's Operations Manual 2009 (ADB, 2013b) and climate proofing ADB's investment guidelines (ADB, 2014a)

ADB, among the multilateral donors, has increased attention to the risk assessment of climate change, another relevant issue that should be considered in the project cycle (MDBs, 2013). The following sections discuss the entry points of mainstreaming CCA in the Provincial Road 150B investment as well as the implementation implications of climate-proofing the road.

6.2.1. Climate vulnerability assessment as the mainstreaming entry point

The ADB task team cooperated with their government client by hiring professional consultants to help the government's implementing staff undertake the project's feasibility study. ADB's Board of Executives approved the project preparatory technical assistance fund for MPWT to enable detailed preparation of the Provincial Road 150B investment much early before the PPCR Sub-Committee approved its climate resilient investment top-up funding for Cambodia. The PPCR Sub-Committee endorsed its climate-resilient investment top-up funding required the Cambodian implementing agencies (e.g. MPWT) to follow the respective multilateral development bank or ADB

operational procedures (CIF, 2009b; MOE, 2013b). Because the PPCR was introduced later than the preparation phase for Provincial Road 150B, ADB did not have the opportunity to apply its updated guidelines on climate proofing in screening climate-related risks throughout the implementation of the project (ADB, 2014a). These guidelines include climate vulnerability and risks assessment methods for assessing climate change impact and associated risks to the project (See also ADB, 2014a, pp. 11,14). For example, the climate proofing guidelines states:

“... climate change adaptation adjustments to engineering specifications, alignments, and master planning; incorporating associated environmental measures and adjusting maintenance and contract scheduling,” (ADB, 2014a, p. 8).

When I enquired about an appropriate method or entry points to guide the MPWT team on mainstreaming CCA, ADB staff said this was in progress for project preparation. For instance, ADB’s climate change specialist, Participant 64, who has worked in Cambodia for many years, explained:

“ADB is addressing climate-resilient development practice in traditional way. We do it through policy, sectoral and project levels. [We are] transforming institutional policy, technology and behaviours. So, we look at where we want to strengthen climate resilience in terms of institutional policy, technology and behaviours of people.”

ADB task team applied a ‘climate risks screening form’ to assess whether or not the project was vulnerable to climate change concerns. Having determined that Provincial Road 150B was vulnerable to climate change risks, ADB then recommended that the government apply for the PPCR investment funding (MOE, 2013b; Seballos & Kreft, 2011). ADB, at this point, was able to exert its influence on the recipient government regarding the importance of climate change risk screening assessment.

However, there is no evidence that the stated site-specific climate vulnerability assessment was conducted in accordance with ADB’s “Guidelines for Climate Proofing Investment” (ADB, 2011a). Instead, due to time constraints at the approval stage, the assessment of climate change impacts on Provincial Road 150B was undertaken in a

different form: a climate change awareness survey (MPWT, 2011b). According to participants 64 and 67, in order to meet the PPCR investment funding criteria, ADB and the Ministry of Public and Transport (MPWT) commissioned Korean Consultants International (KCI) to hastily conduct a climate change awareness survey with residents living along Provincial Road 150B. Two climate change specialists developed a questionnaire for climate change vulnerability profiles and capacity assessments in Kompong Chhnang (MPWT, 2014c). The consultants conducted two visits, using a questionnaire to survey the community's perceptions on climate change awareness and vulnerability. One senior donor officer, Participant 64, justified the community survey, saying it was helpful for broader reasons:

“[The project] is not only about building road, but it is also about disaster prevention such as early warning system which can benefit the community people. There are soft components to support communities to prepare themselves for extreme events. We do not have enough money to climate proof the entire road project. Only the most vulnerable sections are climate-proofed.”

According to ADB's climate proofing guidelines, the awareness survey was not an adequate or suitable tool to identify engineering and non-engineering measures for climate-resilient road design because it did not deal with those issues. As a climate change consultant, participant 81, explained:

“[the] climate change awareness survey does not provide precise or accurate enough... to give the level of detail needed to design proper adaptation responses for Provincial Road 150B. The climate change awareness survey was conducted to tick the boxes for the PPCR investment funding requirements.”

This claim of box-ticking is supported by the fact that I found no *Khmer* version in the websites of either ADB or MPWT. However, according to ADB's climate proofing guidelines for the transport sector (ADB, 2011a), the site-specific climate vulnerability assessment should have been prepared and made available to determine the exact climate risks. These guidelines determine the entry points for assessing climate risks in the project planning stage. They also describe how climate change risks should be factored in during

the other steps of the project cycle, leading to changes to an ongoing project procedure, in order to take advantage of climate resilience.

The survey results showed that villagers were in favour of additional “water capture projects” to provide household water, as they had experienced water access problems throughout the year (MPWT, 2014c, p. 11). The ‘water capture projects’ included extension of water supply distribution pipes to houses, rehabilitation of rainwater storage tanks, and rehabilitation of irrigation dams, water retention dikes and community ponds from the borrow pits (ADB, 2011b; MPWT, 2013b, 2014c). The villagers not only had little knowledge about climate change risks to the road, but they were also unconcerned about climate-resilient roads in general. Indeed, some scholars, such as David et al. (2013); and Gero, et al. (2011) argue that, in fact, villages and community members have their own local language to discuss climate change issues, and this can be missed in formal surveys. The villagers, understandably, focused their attention on more pragmatic and basic needs, such as water access in the dry season and adequate information and compensation of their land and properties, which were affected or acquired for the civil work of Provincial Road 150B.

The results of the awareness survey were integrated into the final 2014 IEE report for environmental and climate change management monitoring (MPWT, 2011a; MPWT, 2014c) and incorporated into the social impact assessment of PRIP (MPWT, 2011b). However, because the survey differed from the climate risk and vulnerability assessment in terms of determining site-specific adaptation measures as inputs for the road improvement design (ADB, 2014a) it did not really address the stronger insistence on climate proofing guidelines required at the project level (ADB, 2011a). In spite of this, PPCR investment funding was formally approved on the 9th of June 2011 (CIF, 2011).

The original design of Provincial Road 150B did not meet the required climate proofing design standards because its feasibility study was not aligned with ADB’s subsequent climate proofing guidelines (KCI, 2011). These guidelines are designed to ensure that the engineering effectively addresses site-specific climate change risks. If the timing had been different, the technical road design could have been modified to meet climate-resilient objectives. As a result, it is quite likely that future adjustments of the Provincial

Road 150B design for climate proofing purposes may be needed to cope with the site-specific climate vulnerability.

6.2.2. Initial environmental examination as the mainstreaming entry point

My review of Provincial Road 150B documents revealed that the 2011 IEE (Initial environmental examination) report, prepared by KCI, does not discuss climate change. In contrast, the 2014 IEE report—reproduced by a second private consulting firm (Egis) — includes results of the 2011 climate change awareness survey referred to above (MPWT, 2014c). Nonetheless, Egis's consultants failed to elaborate on how these findings would be used in the engineering design and bidding documents. Although a review of the PPCR and ADB websites suggested that this was due to insufficient evaluation (just enough to meet the PPCR investment funding criteria), the Environmental consultant, Participant 82 explained that:

“... We should not separate climate change adaptation from environmental safeguards or IEE/EIA process. No, no, no, we must not separate them. Nothing is separate.”

According to the International Association for Impact Assessment (IAIA) (2010a), the IEE/EMP is overwhelmingly accepted as an environmental protection procedure, yet it contains no mention of adherence to adaptation measures. Provincial Road 150B had potential negative impacts related to civil works, which could have been mitigated by the successful implementation of an IEE/EMP (MPWT, 2011a). In addition, the IEE/EMP process recommends public participation in an accessible form in the early phase of the project design. However, environmental scholars and environmental watchdogs still question the ability of the government implementing agency to achieve meaningful and two-way public participation. In contrast, MPWT (2011a) reports that the IEE/EMP process adheres well to the national and donor requirements for meaningful consultation and information disclosure to the affected parties before a project is approved. Nonetheless, it requires proper institutional arrangements for monitoring the implementation of mitigation measures and continued capacity building for the implementing agency (ADB, 2009b). The EMP was then integrated in the bidding documents of civil works during the procurement stage. There is a different version for assessment depending on whether, or to what degree, the clientele or the contractors have

understood the contractually binding conditions. For example, ADB's recent independent operational review proclaimed:

“...the clienteles [and contractor] need to include the safeguard requirements in bidding documents and civil works contracts in the form of legal agreements,”
(ADB, 2014d, p. 9).

It is necessary to include the Environmental Management Plan (EMP) in the bidding documents. This is because specific details such as hazardous location, contractor's camps, borrow pits, rock sources, crushing plants and the like are unknown at the bidding stage. The ADB task team only checked if the contractors addressed the requirements of the EMP when submitting their bids.

More critical observers of development project funding are concerned that the commitment of ADB to environmental 'do no harm' and climate-resilient practices is compromised by an obscure culture of “the routine staff performance assessment based on the amount of loan approval and fund disbursement” (Bank Information Center, 2014, p. ii). This obscure culture is identified in the critiques of two former multilateral development bank managers, Rich (2013); and Wapenhans (1994), who reveal how performance assessment criteria lead the aid project team leaders to focus on disbursement and physical development.

My review of the draft environmental assessment guidelines that MPWT uses (MPWT, 2010) affirms that no adaptation had been integrated generally. The draft guidelines were developed by an independent consulting firm with the participation of MPWT technical and managerial staff under the World Bank-financed provincial and rural road improvement project 2002-2010. Neither adaptation measures nor adaptation options were established through the existing environmental assessment policy in the project cycle. Adaptation-integrated IEE/EIA is relatively new (Agrawala et al., 2012; Boakye-Agyei, 2011; Byer et al., 2009; Chang & Wu, 2013; IAIA, 2010a; Sok et al., 2011; Yi & Hacking, 2011). In this case, the IEE/EMP (or EIAM/EMP) is not designed to address any negative impacts caused by climate change and variability (Boakye-Agyei, 2011). The insight is that in many cases, IEE/EIA procedure is codified in legal obligations, thus making it difficult to modify to take into account vulnerability to climate change.

In contrast, with political and public policy commitment the IEE/EIA procedure has plenty of room to address climate-related hazards given that climate change—like the IEE/EIA issue—is linked to both environment and development concerns. This could form a viable entry point for mainstreaming CCA into the project-IEE/EIA (Agrawala et al., 2012; Boakye-Agyei, 2011; Operations Evaluation Department, 2006). Indeed, Byer et al. (2011), at the first Multilateral Development Bank-organized Climate Change and Impact Assessment Special Symposium in Washington D.C. in 2010, recommended that:

“when planning for the IEE/EIA of an infrastructure project, you should identify how climate change might affect the project, consider a range of alternatives to respond to climate change, predict impacts for these alternatives, consider attitudes toward uncertainties when making a decision (i.e., how risk averse the [project] proponent is.” (IAIA, 2010b, p. 59)

However, as of today, neither ADB nor the World Bank has any legal guideline in force on adaptation-integrated IEE/EIA (Boakye-Agyei, 2011). The Impact Assessment Special Symposium also recommend environmental specialists and practitioners ‘to not wait to have’ all legal guidelines and information to start adaptation-integrated IEE/EIA. This is important because:

“Linking or integrating climate vulnerability assessment into the ex-ante IEE/EIA or not is not a matter [sic] I will do it as a separate activity if we have enough resource. So it is good to have a separate tool to be assessed by a separate climate change adaptation specialist,” (an environmental safeguard specialist, Participant 66).

This practice is aligned with Article 4 of the United Nations Framework Convention on Climate Change (UNFCCC) and sustainable development policies of the ADB, the World Bank, United Nations and other international development agencies who state that: in the context of global climate change, environmental assessment policy should also require consideration of the ‘climatic impacts on a project’. This insight was further affirmed by Participant 73, a national environmental consultant at the Ministry of Environment, who stated that ADB investments should:

“.....consider not only a development project’s positive contribution to climate change (e.g. greenhouse gases reduction), but also the impacts of climate change on a project.”

The adaptation-integrated IEE 2014 (MPWT, 2014c) prepared for Provincial Road 150B shows how environmental assessment procedure recognizes the impacts of climate change at an individual project level. That means with public policy commitment, the environmental assessment (e.g. IEE) can be adjusted to take into account climate change vulnerability (see IAIA, 2010a for an early attempt). In this context, participant 93, a NAPA follow-up consultant from the Cambodia National Adaptation Programme of Action, explains that objectives of the adaptation-integrated IEE/EIA should: manage or reduce the potential risk posed by the impacts of climate change to the project and contribute to climate change action; provide information that will assist their broader climate change action; assist decision makers address climate change implications in a risk management context; and provide assurance to the public that climate change implications are being appropriately considered in the road design.

One compelling reason for considering climate change in the IEE/EIA is that climate assessment data play a key role in any road design and implementation. However, as recommended in the South Pacific Regional Environment Programme and World Bank (2010), an adaptation-integrated IEE/EIA should not seek "to establish new or parallel environmental assessment process", but rather identify a few simple steps to supplement the ex-ante IEE/EIA for assessing climate change impacts and mitigation measures.

Choosing IEE/EIA procedure as an entry point to mainstreaming CCA: 1) identifies a project's potential environmental impacts in its area of influence; 2) identifies and evaluates potential impacts from climate change on the project's area of influence; 3) examines project alternatives; 4) identifies ways of improving road selection, siting, design, and implementation by preventing or minimizing any anticipated adverse impacts from climate change; and 5) includes the process of adapting to anticipated adverse impacts from climate change throughout project implementation.

While the IEE/EIA procedure can be used to do this as a vehicle for adaptation, it also raises a number of issues. These include: firstly, the uncertainties associated with climate

change projections at the project scale are clearly a key bottleneck. These projections are difficult to ascertain and, as such, may result in the risk of unnecessary or even counterproductive investments in altering project design. Secondly, most components of IEE/EIA rely solely on historical climate data. For this reason, Lapitan (2011) argues for a substantial and long-term investment in the provision of climate change information. This is outside the scope of my discussion, but fine-grained and reliable information on precipitation and flood risk is so far unavailable in Southeast Asia. Thirdly, there is clearly a promise in terms of using the IEE/EIA tool as a vehicle to further promote climate proofing at the project-level. However, the government and donors are still at an early stage in terms of determining how to operationalize this. Innovative approaches are currently being developed and tested, and a certain degree of flexibility in implementation must therefore be allowed.

On the other hand, there exists a critical limitation of the existing IEE/EIA process, which was originally designed to identify the impacts of a development project on the environment, but *not to identify the impacts of climate change on a project* (OECD, 2009). Coupling adaptation within environmental safeguards or IEE/EIA would require that the screening process of ADB-funded projects, in particular, be extended to include sensitivity to climate change and for the project's potential to lead to or to avoid maladaptation (making things worse). However, IEE/EIA procedures are codified in legal obligations, making them difficult to modify to formally include adaptation. In this context, Multilateral Development Banks do not yet have any clear procedure 'in place' for including adaptation into their development operation policies. Without legalized procedures, the implementing agency may under- or over-invest in climate risk analysis and in exploring adaptation options (Independent Evaluation Group, 2011). Despite political will, institutional values and capacity can be a block, as can power arrangements (the place of environmental experts within a large organisation), and infrastructure resources to address current and future climate impacts.

It can therefore be concluded that neither of the two methods of assessment (IEE/EIA) are able to creatively address climate resilience concerns because they are somewhat diluted by the institutional inefficiencies of lack of knowledge, and an ambiguous mainstreaming framework. The ex-ante IEE/EIA guidelines need updating to address climate change impacts on individual investment, or the climate vulnerability reduction

assessment guidelines need refining to enable the systematic identification of potential climate risks at the project level (Boakye-Agyei, 2011; Wim Douven & Buurman, 2013). The Terms of References for this task were developed after the release of ADB's Guidelines for Climate Proofing Investment in the Transport Sector (ADB, 2011a). As a result, the climate change consultants of Provincial Road 150B chose to screen and integrate climate vulnerability and adaptation solutions through the project- IEE.

6.3. Discussion

Aligned with the institutional change drivers of Goldman (2005) and the institutional analysis concept of Ostrom (2009), I have argued that institutional and adaptive capacities are the major constraint for project-adaptation actions by the agencies in charge of them. With efforts for mainstreaming CCA into an individual road investment in their infancy, an evaluation study of the climate-resilient practice of Provincial Road 150B may provide the most useful way to improve institutional adaptation readiness. As explained by Cuevas et al. (2015, p. 2) the literature on the adaptation mainstreaming practice and factors that challenge the act of mainstreaming is rather limited, therefore this research used the interview data of my research participants and documented reviews to identify the mainstreaming challenges that affect its implementation of mainstreaming CCA.

The findings from Case Study Two are that efforts for mainstreaming CCA are challenged by continued lack of information, knowledge, and human capacity usable for informed decision-making; and limited institutional ownership. Institutional ownership determines whether the project coordinating entity or implementing institution has the capability including a sufficient budget.

6.3.1. Technical capacity and human resources

The first challenge is the limitation of technical and human resources in the government implementing agency, thanks to a lack of arrangements for implementing staff to be oriented or trained in basic skills about climate change vulnerability, or mainstreaming CCA in the early stage of project design or before beginning the implementation activities. Participant 67, an experienced consultant supporting elaborates:

“CCA tasks were mostly delivered by the foreign consultants due to the fact that MPWT's Social and Environmental Office staff earn low wages and have no

incentive to work”. This participant further added: “I find it is difficult to find counterparts to work with me on climate change. They have many other things to do, and could not catch up with the pace of the project design. ADB has time schedule to design the project... The people I worked with in the Ministry, they know a little bit about climate change, but they are unable to do it”.

As argued by Kakegawa (2012), evidence from the institutional and implementation arrangements affirmed that all monitoring work was entrusted to the contractors, and the consultants. Despite the claim that the government project director exhibits strong leadership and dedication in an ADB report to its executive board of directors (ADB, 2015), a common problem that Case Study Two confronted was still that the government officials have lack of interest in this work due to their low incentives and low level of skills. Although the PMU 3’s director and manager were generally active (MPWT, 2014c) according to the national transport guidelines and standards, insufficient attention has been paid to issues associated with climate change in road projects that received no climate resilience top-up grants. The national transport development strategy (MPWT, 2014b) does not integrate implementable measures or ways to address the potential climate change risks and adaptation options. In particular, the current strategy aims to facilitate and encourage initiatives to promote more climate-resilient infrastructure, however without clear sources of budget allocation and individual roles and responsibilities (MPWT, 2014b, p14).

Almost every participant identified technical and human capacity constraints across the key actors, especially the limitations of donors, government, and the private sector (such as contractors). These constraints generally involve the availability and credibility of information; the capacity of the implementing agency for environmental implementation and monitoring; the problem of recording the climate resilience measures agreed by the government implementing institution and ADB; and the incentives for government employees to perform these various tasks.

While there is very low adaptive knowledge and capacity among citizens, because their understanding of climate change and response options are relatively limited (MOE, 2013a), the engineers’ comfort zone exacerbates mainstreaming obstacles, due to their

lack of knowledge and appreciation for environmental protection and climate resilience (Lasco et al. 1996; Lasco et al., 2009):

“Climate change is not certain and not scientific. So, [the government] engineer can only design based on estimation of potential risks. We do engineering design based on scientific prediction of flood returning period at 10 years or 20 years. But such scientific prediction is unreliable,” (Participant 71).

ADB and MPWT hired two different consulting firms: KCI, which is contracted to act as the details design and supervision consultants and Egis, which is contracted to develop climate resilience measures for the Provincial Road 105B (MPWT, 2011a, c). These two private consulting firms are to provide hands-on capacity development to government staff (ADB, 2015b), nonetheless there is little evidence that actual capacity building has been achieved, as many government staff have few incentives to improve their knowledge and practice in their work (Hughes, 2009). Government officials are not always dedicated in their work due to their poor salaries and low qualifications (ADB, 2015b). Due to MPWT’s strong leadership and an increasing incidence of annual flood damage, ADB’s recent completion report highlights that the same MPWT management have made efforts to coordinate with ADB and other development partners to promote climate-resilient development practice. According to Kakegawa (2012, p. 351). “[t]he fundamental weakness seems to stem from the lack of government commitment to strengthen their mandate” and increase adequate incentives to staff who are qualified and committed in their roles. Additionally, the donor-led institutional development framework has side effects such as a brain drain to the private sector and civil society. As a result, the donor-led system can easily lead to a lack of ownership in the institutions and legal frameworks, which are likely to have weaker policy enforcement (Goldman, 2005; Kakegawa, 2012).

6.3.2. Institutional capacity

Institutional capacity plays important roles in initiating and promoting the development practices that incorporate climate change risks and adaptation measures. Aid donors and the aid recipient both try to counter red-tape complexity in adapting or amending their institutional rules, norms, and traditional practices to address the new, additional issues of climate change impacts. They also require new and different capacities to perform their additional duties in innovative ways. The governance issues in promoting adaptation in

developing countries arise because of institutional structure and culture. International and national level policy-making needs to manage sustainable infrastructure development and the already-constrained resources needed at project-level (Regmi & Bhandari, 2013). Due to an increasing incidence of annual flood damage, ADB's recent completion report highlighted that MPWT management has made more efforts to coordinate with ADB and other development partners to promote climate-resilient practice.

Governance and Ownership

The governance challenge is that mainstreaming may adversely affect the as-usual development process because to 'add-on' adaptation conditions may lead to failure, or what are sometimes termed maladaptation consequences (Barnett, 2013; IPCC, 2007a). In principle, the Government's ownership and dedication is critical for long-term continuation of the climate-resilience agenda. However, when the debate focuses on 'who gets the final decision-making power', nearly all the participants agree that donors and ADB should drive the decision-making process. Their debate is aligned with Lewis, et al.'s factual conclusion that multilateral development bank staff clearly have more power in this relationship when it comes to development projects in aid-dependent countries (2003). One infrastructure consultant, Participant 83 conveyed this straightforwardly:

"You can make a matrix. Question/answer from ADB is based on their investment priorities. ADB's response about the process about how government engages with sub-national authorities and points to their decision-making. Does the government consult with sub-national authorities and local communities? I do not think so. The question about the reality is "did we engage with the provinces [sub-national authorities] on priority projects [for climate change adaptation]? But they (ADB and the Ministry of Finance and Economy) made decisions about priority projects without proper consultation with the needs of provinces and districts."

Goldman (2005) and Gutner (2005) carefully present their analyses and document examples of cases where donor aid has powerfully influenced the design and management of infrastructure investment projects in developing countries. Their interpretation of course differs from the donor perspective, given that they need to optimize the compliance and due diligence for their shareholders or Board of Directors. In this circumstance, one safeguard specialist, participant 66 explains:

“Decision-making power is mostly in ADB because [ADB] wanted to do things right. It is ADB driven because government ownership is still weak. I am sorry to say that we do have more leverage. It would be great if the government ownership is there, as the Indian government has. That should be the way we should. I hope ADB and the World Bank will continue supporting the government...I am not impressed if we have a good EMP (prepared by external consultants) because I know that the government may not have capacity to implement it.”

ADB and other donors can apply the stick and carrot policy by imposing a condition of climate resilience compliance. For example, one climate change specialist, participant 82 explains:

“ADB do not and will not lend money to the implementing ministry that does not mainstream CCA into the development implemented by their own ministry.”

However, this has not been achieved in practice. Ownership empowerment may be solely on the donor agenda in aid-dependent countries. For example, it is evident from Provincial Road 150B documents, and talking with participants, that mainstreaming is only one of several priorities imposed by donors and by the general public (ADB, 2011b; Measham et al., 2011). Nonetheless, mainstreaming at the project-level is still in the early-pilot stage and more empirical evaluation research like this study is necessary.

Contracting issues

Similarly, there was no arrangement for the private sector contractor to be oriented to the foundations of what, how and why their construction work should be done, which is critical in relation to environmental and climate change risks. As a result, technical adaptation can be neglected, with no steps taken to ensure that construction work responds to anthropogenic risks. For example, one national consultant who has engaged with the engineering design and implementation and is now based at the Ministry of Environment, Participant 74 notes that:

“Engineers and contractors are very conservative and they do not like to change the engineering design when they do not fully understand or have enough knowledge about the change.”

While these contractors are profit-oriented (see also Kakegawa, 2012; Quintero, 2007), the implementing institution and ADB tend to trust their abilities, whereas in reality it is far from certain that climate resilience requirements are being met.

Consultants such as those employed by KCI firm are contracted to support MPWT to monitor and report on the construction and environmental management plan progress, and this is regularly requested by the contractor (MPWT, 2011a, 2014c). However, in this case the construction contractor's environmental expert, who was assigned to participate in the implementation of the construction-environmental management plan, was clearly unfamiliar with the ongoing climate resilience requirements or processes. Although an environmental expert is positioned on construction sites, he/she typically performs daily inspections of ongoing civil work progress rather than monitoring adherence to environmental and climate proofing codes. Had the adherence to climate change were built in, all he has to do was to follow the checklist of adaptation measures (Sok, 2015).

As the bidding documents do not specify the minimum qualifications required of the environmental specialist, the curriculum vitae (CV) submitted to fill this position was not considered by the bidding commission. Moreover, with a focus on profits, the construction contractor would have little interest in hiring a highly qualified environmental specialist. As a result, similar to donor-funded projects in Central Asia (ADB, 2014c), after winning the bidding it appears that the construction contractor hires an environmental specialist whose qualifications are not sufficient to accomplish neither the climate-proofing codes nor the environmental tasks envisaged by the bidding documents.

My numerous casual conversations with the research participants confirmed the scholarly critiques that the consultants of KCI could be inferior to the MDB team leaders and government officials, and currently have to compromise their technical input based on actual needs (see Goldman, 2005; Rosien, 2010). This can worsen the quality. Therefore, it is critical for the ADB task team to provide ongoing monitoring support to its clientele during the project implementation for at least two reasons: (i) due to their workload and low wages, the government officers have relied on external consultants; and (ii) many management and engineering staff have prioritized their focus on physical development rather than the best practices of sustainable and resilient development.

This study also found that the IEE/EMP compliance fell short due to a conflict of interest in that KCI was responsible for the IEE/EMP preparation and the detailed engineering design. Such practices contribute little to the enhancement of client ‘ownership’, something which was raised repeatedly by the donors as problematic for climate resilience implementation. This finding reinforces claims that dependent relationships exist where powerful multilateral donors influence the management and decision-making process of IEE/EMP preparation and implementation (Ear, 2007a, 2007b; Goldman, 2005). Weakness in the IEE/EMP enforcement and during the project implementation stage suggests that both MPWT and ADB had minimal oversight of compliance to environmental standards, in practice.

Institutional power

When considering the decision-making power relationship, it comes as no surprise that the donors often pre-determine how MPWT should respond to mainstreaming CCA, given that they know what they and the PPCR financiers are expecting. Participant 66, one senior safeguard specialist, argues that:

“Decision-making power is mostly in ADB because we [ADB] wanted to do things right. It is ADB driven because government ownership is still weak. I am sorry to say that we have more leverage.”

While this participant expresses remorse about power inequalities, donors have often tried to control the project without meaningfully consulting the public at the grass-root level. With regards to ownership empowerment, which has often been talked about as part of the donor agenda, donors often believe they should (pre)determine how the funds are applied. Participant 83, a donor’s international environmental consultant (discussing the PPCR formulation) expresses concern:

“Questions about how PPCR loan and grant have been set up for the government. Decision has been made by ADB and the Ministry of Finance and Economy on which existing ADB projects can use PPCR investment fund [without consultation with local level]. One can question on funding source from MDBs to the real community people. The PPCR investment money is not for strengthening the Ministry of Finance and Economy.”

On the practical side, ‘walking the talk’ of mainstreaming in development is difficult. For example, it is evident from Provincial Road 150B documents and participants that mainstreaming represents only one requirement of top competing priorities imposed by donors and the general public (ADB, 2011b; Measham et al., 2011). Furthermore, mainstreaming at the project-level is still in the early pilot stage and more empirical evaluation research is necessary in a number of aspects. There are four issues.

First, mainstreaming may adversely affect the as-usual development process because to ‘add-on’ climate resilience options may lead to frustration or skepticism due to already limited resources or inadequate infrastructure (Seballos & Kreft, 2011). To avoid this, it has become common practice for both donors and the recipient government to show something has been done before the project activities.

“No economic analysis for PPCR investment fund to understand what benefits over costs for climate resilience. I would go back to ADB on two levels. A first level is on the guidelines for resilient infrastructure to guide decision-making on options versus costs of climate change adaptation. For instance, what new costs and costs for maintenance of a retrofitting infrastructure? Decision makers need to decide whether they will invest or not. So, this is about rapid cost-benefit analysis for construction materials and infrastructure design. A second level is on community engagement to understand their climate change adaptation. Community people should be engaged in the CBA process” (Participant 83).

Scholars such as Agrawala and van Aalst (2008) caution that mainstreaming may place additional burden on administrative and technical staff, leading to excessive workload. As such, mainstreaming may not reduce the amount of damage or risks of climate change, but may, instead, waste already scarce resources allocated for infrastructure improvements.

Second, the perspective of adaptation solutions has a relatively short history for donors such as ADB (Adam, 2014; Persson & Klein, 2008). Thus it is not surprising that the institutional constraints tend to emphasize the importance of overcoming a lack of information and adaptive capacity. Independent evaluation assessment like this study and extra internal efforts to compile lessons learned can be a way to better the situation.

Third, ADB often pre-determines how MPWT should respond to mainstreaming CCA. Ownership empowerment may be on the ADB agenda; nonetheless it has been inadequately achieved in reality, at least in the cases I examined. By supplying technical and financial resources that are depended upon by the recipient government, MPWT is unlikely to own the process (Hughes, 2009).

Fourth, responding to vulnerability of climate change, scholars such as Barnett (2013) and Agrawala and van Aalst (2008) argue that climate resilience must be integrated into the road investment policy and project in order to achieve a climate-resilient solution (IPCC, 2007b). However, not every donor institution and its clientele are on the same page regarding the development mainstream, even if they have received “the informed inclusion of relevant climate vulnerability concerns into ...their development investment policy and project” (Ayers, Huq, Faisal, & Hussain, 2014, p. 41). Thus, if ADB had supported MPWT to integrate climate resilience into the ex-ante institutional decision-making processes, adaptation measures would have been considered even without the add-on climate resilience budget. The idea is appealing in theory; nonetheless, there has been only slow progress (CIF, 2011). In other words, addressing adaptation and development aid together is not simple, given that different agencies are responsible for adaptation and development and that coordination between these donor agencies’ is a “perennial problem” (AfDB, 2013, p. 15), since their mandates often differ. As outlined in the IPCC’s fourth assessment report (2007a), limited actions are evident across the board despite a conducive window for mainstreaming CCA into donor-assisted development projects (Sietz et al., 2011; Suraje et al., 2005).

According to its Environment Operational Directions (2013–2020:14), ADB makes its commitment to expand its adaptation operations at the country level by mobilizing internal resources and external resources such as the Pilot Programme for Climate Resilience (PPCR). One ADB staff member, Participant 63 emphasizes:

“ADB is addressing climate-resilient development practice in a traditional way and transformational level. We do it through policy, sectoral and project levels. [We are] transforming institutional policy, technology and behaviours. So, we look at where we want to strengthen climate resilience in terms of institutional policy, technology and behaviours of people.”

This participant further explains that at the project level, ADB supports the government implementing institution to ensure they are not compromised by climate variability and other natural hazards.

“Climate proofing will be embedded in the project cycle, beginning with preliminary risk screening and detailed climate impact, vulnerability, and adaptation assessment, if required,” (Participant 63).

However, some academics and civil society organizations remain ‘strident sceptics’ about ADB-backed infrastructure investments in Asia (Goldman, 2005; Roy, 2010; Wesley, 2003). Indeed, without free external adaptation money such as the PPCR investment funding, it is quite likely, they argue, that ADB may continue with its ‘business as usual’ approach, as suggested in the recent road project Completion Report in Cambodia (ADB, 2015b).

6.3.3. Financial capacity

As part of the conceptual analysis, the research emphasizes the interplay between adaptation mainstreaming and finance. Incentives and financial aspects are omnipresent (universal) in the donor-initiated development agenda (Goldman, 2005) as the key stakeholders such as ADB and MPWT continue to portray the implementation success as a unique medium for securing continued climate resilience and other investment funding flows (Pasgaard, 2015).

The financial capacity constraints stem from their lack of institutional autonomy, and a wide range of reactive resource management activities in which they are engaged. Based on my experience working with donor-aided road investments, expert ministries are often tasked with managing ad-hoc development projects, in addition to a few planned projects within their limited annual budgets. Thus, financial and other resource (e.g. human capital) constraints can lead MPWT to self-perpetuating short-term reactive fixes rather than fully embrace a long-term adaptation integration approach.

Financial availability

Donors are vital for the flow of adaptation funding and development aid in a country like Cambodia. In principle, measures to integrate adaptation into development should have

occurred a decade ago in response to UNFCCC efforts (see also IPCC, 2007b). The adaptation deficit in the development sector is due to the political economy of aid, with unequal power and resources, and even lack of willingness, to tackle such issues. Climate resilience is relatively new for agencies promoting social development, for example, as Ayers (2009) and Bumpus & Cole (2010) suggest. Government partners in aid-dependent nations are usually highly constrained in terms of their financial capacity (Ayers & Huq, 2009). They may lack institutional autonomy, which leads to insufficient “money for financing change” without external support (Webber, 2008, p. 981). Based on my experience working with donor-aided development and environment programmes in Cambodia and Lao PDR, their government implementing institutions are often tasked with managing ad-hoc development projects, in addition to a few planned projects within their limited annual budgets. Thus, financial and other resources (e.g. human capital) constraints can lead many sectoral agencies to self-perpetuating short-term reactive fixes rather than fully embracing a long-term adaptation integration approach.[examples?] This has already been a problem for many aid-dependent countries (Ayers & Huq, 2009). In short, there is little consensus on where and how resources for the adaptation can be sustained.

Financial accessibility

Financial accessibility constraints to mainstreaming occur across levels ranging from national to local, and the individual project-level. Budget allocation for climate resilience is the greatest challenge for infrastructure investments in developing countries such as Cambodia, given that the domestic budget is small compared to the external funding source. In 2012, the Ministry of Public Works and Transport (MPWT) received a total national budget of USD101.6 million (USD10.6 million in recurrent budget and USD91 million in capital budget) whereas USD388.5 million were disbursed by donor aid to support the implementation of the Ministry’s Public Investments Plan (MPWT, 2014a). Beside external adaptation funds such as the PPCR, none of the national budget has been allocated for climate-resilient road infrastructure, which involves additional costs. That means the climate resilience fund is highly ad-hoc and generally implemented through a project modality according to donor drive or external aid conditions.

The global adaptation budget can be accessed to cover climate-resilient incremental costs (CIF, 2009a; MOE, 2013b). The underlying problem is the continuation of budget

allocation for materializing a long-term commitment. With respect to this, an environmental consultant based at the Ministry of Environment, participant 80 emphasizes the current challenge:

“The implication of higher cost per unit and requirements for more soil, more drainage expenses. Worth deciding based on cost-benefit analysis (as part of the risk analysis) in the feasibility study. It is worth doing climate change adaptation?”

From a mid-term and long-term perspective, there is little agreement on where and how the resources, specifically for adaptation mainstreaming will be sustained. Both the developing countries and academics have voiced their concerns about the trade-offs among environmental protection, climate resilience, and development, particularly if the three inter-related factors are not isolatable (Yamin, 2005). They are afraid that industrialized countries are attempting to divert adaptation funds into their traditional development aid portfolio rather than committing to new and additional funds for adaptation (Yamin, 2005). In this context, they are concerned that donors will convert their international development assistance for other urgent needs such as emergency services and food security to the climate change funds (Michaelowa & Michaelowa, 2007).

Financial stability

Financial stability and dependency is another major challenge because donors exert power with an ideological purpose. For instance, they may specify funding criteria, ensuring that no climate resilience funds will be provided unless the implementing institution of the recipient government adheres to those criteria.

“Donors will pay for climate change adaptation expense. As you know the government has a limited budget. I believe donors such as ADB and World Bank will push for the climate change adaptation considerations because they want to do things for the benefits of society. It is their policies to do good project investments that benefit to society.... Sometimes, we know the potential risks, but we say: let's go ahead because people are waiting for roads and we know the government has budget constraints. We did things according to the limited budget allocation,” (Participant 74).

In the process of learning by doing climate-resilient pilots, there is and will likely be an increasing flow of funding linked to global climate change, and more Development partners' support to the Cambodian Government in addressing climate change risks. However, MPWT is not yet empowered with autonomy over financial matters such as climate resilience fund allocation and management through project design and procurement. Finance therefore shapes the continuity of development mainstreaming. The answer: scaling up efforts and climatic considerations in the financing of projects, as scholarship by academics (Goldman, 2005; Webber, 2015a) and non-profit watchdogs (NGO Forum, 2013; NGO Forum on ADB, 2010) suggests. Through the multilateral donors' decision-making process, their stakes and interest are high in hearing what they expect to hear, particularly hearing language that meets funding criteria. Thus, ability to use and make use of language that the financiers expect (e.g. emerging climate resilience concerns), is a promising ticket to secure continued project funds (Pasgaard, 2015). A senior government official, Participant 75 highlights:

“...making road resilient to climate change requires additional costs. We need donors to support/finance the additional costs. Climate change adaptation is new for me too. We all can learn together through the pilot programme for adapting to climate change”.

With the government project director's commitment, ADB arranged for adaptive capacity development. Although the PPCR investment fund was allocated to identify potential adaptation options and prioritize them, using, for example, an economic analysis of climate proofing measures required more discussion. Furthermore, engineering and non-engineering adjustments to support the decision-making process should be triangulated with the economic analysis (ADB, 2011a).

Incremental climate-resilient costs

As mentioned, there is an increasing global climate change flow of funding to support the Royal Government of Cambodia in addressing climate change risks—for example through the Cambodia Climate Change Alliance (CCCA) II and Pilot Programme for Climate Resilience (PPCR) Phase II. Incorporating climate-resilient measures into Provincial Road 150B improvement requires additional expenses (25% to 30% over normal road construction) in the PPCR Phase II. However, the expected benefits of this

incremental investment in terms of anticipated reduction in future maintenance or repair costs are explicitly quantified in “monetary terms” (ADB, 2014a, p. 47). Sources such as the PPCR Phase II fund can be used to finance the costs of survey, design, construction and construction supervision for climate resilience (CIF, 2009a; MOE, 2013b). For example, one donor representative, participant 64, who promotes climate-proofing practice comments:

“We do not even know the incremental costs of climate-proofing” for the PPCR - sub-committee when we submitted the PRIP proposal for PPCR investment fund approval. We asked for exception as we do not want Cambodia to lose this PPCR money. The DDIS consultants will design parts of the road need climate-proofing.”

The confusion over the issues of climate resilience versus good development is due to the belief, claimed by some scholars such as Schipper (2004), that mainstreaming is unnecessary because adequate development automatically reduces the levels of relative or total risks to environmental assets and from climate change. This quote is particularly telling:

“Budget is a major constraint for us. There is often fixed budget allocated for engineers to do their design. Sometimes, there is limited budget for engineers to do detailed engineering survey that covers hydrology. Decision makers will say that this is not environmental or climate change project. It is road project, so engineers should focus mainly on physical engineering design. Decision makers look for low cost infrastructure project and not high-cost infrastructure design and implementation,” (Participant 71).

In this regard, adequate development has not been clearly defined. Hence, there is suspicion of any financial saving from mainstreaming adapting to climate change as there is a lack of scientific and empirical evidence to convince the present and new development policy formulators.

6.4. Summary and key findings

This chapter analysed how an individual road project—Provincial Road 150B investment—is much more than just infrastructure development. While recognizing the need for road infrastructure, the chapter also discussed negative climate change impacts and adaptation measures in terms of *induced* infrastructure development. I examined the methods of mainstreaming CCA into Provincial Road 150B rebuilding. The research found at least two methods in which the need for adaptation can be assessed for the road investments: either one can facilitate the inclusion of climate risks and adaptation, in the ex-ante IEE/EIA (Boakye-Agyei, 2011; Byer et al., 2011; IAIA, 2010a) or a climate vulnerability reduction assessment, which originates from the disaster risk management policy (ADB, 2009a; IDB, 2007; UNDP, 2015). Perhaps no one method can address all risks and accommodate all capacities. It is, therefore, unimportant whether or not there is a separate tool for climate vulnerability reduction assessment. This is a point I return to in the concluding chapter, but what is most important is having the resources to address climate change risks. For instance, any climate change impact assessments are similar to the existing IEE/EIA procedure with regard to how they could be incorporated into the identification or appraisal stage of the project cycle. Although IEE/EIA emphasizes the impacts of the project on the environment and people, while climate change risk assessments look at the impacts of climate change and variability on the project, each is an assessment that has to be considered (Saito, 2014).

This Chapter reviewed to what extent the implementing agency has to implement adaptation standards if there was almost no opportunity for the contractor to be trained in the early phases. I suggested that the promotion of adaptation would fall short or were likely neglected after the exit of the PPCR investment funding legacy. However, climate resilient development, in reality, face challenges in implementation due to the disparate expectations, resources, and abilities between multilateral donor (e.g. ADB) and the recipient government. According to Rosien (2010), similar challenges also exist for dealing with other development issues such as road safety or gender equality. MPWT not only lacks the requisite technical skills and resources, but the many duties of implementation for which they are responsible exceed their local capacity for meeting international standards. This Chapter provided a full description of the institutional capacity of the selected road project and how it was delivered, including the additional capacity needed and training required for effective adaptation management. Furthermore,

it highlighted the need for clear communication at an early stage of the respective roles and responsibilities of the contractor in charge of road rehabilitation or management, and of MPWT and ADB for the adherence to the agreed adaptation measures.

Chapter 7. Discussion and Conclusion

As discussed in Chapter 1, this thesis has investigated the mainstreaming of climate change adaptation (CCA)—a new, informal rule-in-use—into a development aid portfolio at the micro, operational level. The integration of mainstreaming CCA into project-decision-making here is an additional donor conditionality, or a new informal policy, implemented as a “rational problem solving” measure (Mosse, 2004, p. 641) that is passed on to the recipient governments. The findings counter the arguments for integrating CCA into the ex-ante IEE/EIA tool. The findings also counter the argument that political leadership and resource commitments will guarantee the success of a particular environmental solution. The findings uphold those studies that argue there is no single best pathway for mainstreaming CCA. Achieving such a common goal requires transformative change: from doing nothing to taking actions for including CCA matters into the project decision-making process. The findings suggest that mainstreaming CCA itself is a process of change, rather than an outcome, that enables further climate-resilient investments.

Methodologically, the thesis used qualitative social research based on Yin’s ethnographic analysis of Case Studies. Two different types of road investment (rural and provincial) were selected for investigation, with the principle inquiry being *how climate change adaptation is, institutionally, integrated into road improvement projects* in the Cambodian floodplains. Consequently, chapters 5 and 6 analysed empirical data and relevant literature from two Cambodian Case Studies: (i) Borey Chulsar Commune Road improvement project of the Local Governments for Climate Change (LGCC) initiative, co-aided by UNCDF and the European Union-supported Cambodia Climate Change Alliance trust fund (NCDDS, 2013b); and (ii) Provincial Road 150B project of the Provincial Road Improvement Programme (PRIP), co-financed by the regional Asian Development Bank (ADB) and the Pilot Programme for Climate Resilience (PPCR) (ADB, 2011b). These two Case Studies provide insights for scholars and practitioners seeking understanding of institutional change and challenges in the face of climate change on the ground. Analytically, I operationalized Goldman’s institutional change drivers and Ostrom’s institutional analysis and development concept to guide the analysis of my fieldwork data.

This concluding chapter synthesizes and reflects on the work presented in previous chapters by examining how the current structure and conditions of international donor aid influence the decision-making process of the road project. It collates the empirical results of the thesis to provide a road map for future projects, and returns to the research aim. The next section consolidates the empirical findings from the preceding chapters in order to cover the main themes of CCA and institutional accountability and the challenges of development aid. The third section provides policy recommendations and the contributions of these key findings to the previously identified knowledge gaps. The final section highlights the research limitations and areas for possible future research.

7.1. Revisiting the research aim and questions

This thesis examines what multilateral donors have actually done to address problems associated with local climate change adaptation (CCA), from the viewpoint of their institutional values and decision-making power. The central research question was *how have donors ensured that the [recipient] government implementing agencies mainstream and manage potential climatic impacts and adaptation options in road investments at a micro, operational level?* Subsidiary questions relating to the cases were:

- 1) To what extent have climate change adaptation issues been included in the project-environmental safeguards policy and practice?
- 2) Why and to what extent has climate resilience funding conditionality been introduced to influence development decision-making?
- 3) How do donors ensure the recipient government mainstreams climate change adaptation measures into development decision-making?
- 4) What are the challenges and implications raised at the nexus between the recipient government and donors?

In answering Subsidiary Question 1 in relation to the content of environmental safeguards to address climate change adaptation and how this content affects climate risks and adaptation options, I found that ‘environmental assessment’ policy was triggered in both Case Studies due to the potential environmental impacts of road-building civil work (MPWT, 2014c; NCDDS, 2009b). However, I discovered that Case Study One failed to prepare any environmental assessment report (Commune Database Online, 2014) because its donors did not attend to the environmental safeguards, as stipulated by their climate

resilience funding conditions (NCDDS, 2012b). This is perhaps a failure of donor-driven efforts (Goldman, 2005), or a common feature of country-based safeguard systems that lack adequate external monitoring assistance (Kakegawa, 2012; Park, 2015; Wenar, 2006). My own inference regarding this situation reflects the long-term problem of aid effectiveness and donor coordination in aid-dependent countries such as Cambodia. The same problem of donor aid coordination repeatedly occurs regardless of the fact that the same multilateral donors financed the National Committee for Decentralization and Deconcentration Secretariat (NCDDS) to establish country-based environmental safeguard policy. NCDDS has used this environmental safeguard policy as part of their Commune/Sangkat Fund projects (NCDDS, 2009a; Richter, 2014) since the first decade of the twenty first century. The effects and results of donor aid have likely been shaped by different organizational interests and characteristics of those donor institutions (D'Agostino & Sovacool, 2011). The literature also bears this out (Goldman, 2005; Hughes, 2009; Ostrom et al., 1993; Webber, 2015b).

Regarding the contextual factors in the two Case Studies and the debate around donor aid characteristics, as discussed by Wenar (2006) and Hughes (2009), the government implementing institutions of both Case Studies have developed their own rules and guidelines on environmental safeguards systems, overturning those initiated by multilateral donors during the 2000s. Both Case Studies showed similar accountability to their donors' interest and the public regarding environmentally-sound development practice, although developed through their different governance structures.

Case Study One was required to adhere to the NCDDS' own environmental safeguards in the Commune/Sangkat Fund Project Implementation Manual, whereas Case Study Two follows MPWT's own environmental safeguards and ADB's Safeguard Policy Statement that superseded the national legislation. The Cambodian Ministry of Environment's EIA sub-decree (MOE, 1999) and MPWT's draft environmental safeguard guidelines (MPWT, 2010) were both funded by multilateral aid during the last decade. Both Case Studies include the incorporation of environmental and safety standards, which should have occurred after an IEE/EMP was developed, as part of their bidding documents and construction contracts. However, the environmental safeguard policies of both institutions do not yet incorporate requirements for addressing CCA, although GHGs (greenhouse gases) emissions are accounted for in passing. That is

aligned with the donor statement that grant or loan funding to the recipients should “... use safeguard measures as conditions of their loans to shield against collateral damage to communities and the environment those projects can cause, notably in [road] transport. Without such shields, road investment projects can deteriorate the environment ... and affects livelihoods of local people” (KCI, 2011, p. ix).

In response to Subsidiary Question 2 on the adherence to the informal rule of climate resilience funding conditionality, I found both road investments are vulnerable to extreme climate risks, including inundation in the shortened wet season and dust clouds in the prolonged dry season. Both Case Studies aimed to demonstrate methods to overcome climate change challenges in road investments as well as their benefits. The climate resilience funding criteria were introduced to support the preparation and management of the two road investments to ensure resilience to weather extreme events such as rain intensity and flash flooding.

Case Study One was given a performance-based climate resilience (PBCR) grant through a systematic selection process stipulated in the Manual (NCDDS, 2012a). It was nominated and scored as 'most vulnerable' to climate-related hazards and categorized as one of the top-priority commune investment projects (CIPs) listed in the annual commune development plan (CDP) in Borey Chulsar commune, Takeo province. In contrast, Case Study Two was allocated Pilot Programme for Climate Resilience (PPCR) funding only because it happened to be a part of an ADB infrastructure proposal when the Climate Investment Fund Sub-committee approved the demonstration of Cambodian climate resilient investments, PPCR Phase II (CIF, 2011). In addition to different funding arrangements, the two Case Studies used separate tools for conducting their respective climate change vulnerability and risks assessment in their investment locations.

Case Study One assessed the climate change impacts by applying a commune-based Vulnerability Reduction Assessment (VRA) tool, originally developed by UNDP-GEF small grant programmes (UNDP, 2015). This commune-based VRA was used as an entry point to generate community knowledge and perception about climate-resilient measures. The VRA process was facilitated and conducted by a team consisting of trained sub-national government officials in 2012. The CCA measures which were identified by the commune council and villagers were then integrated into the annual commune

development plan and commune investment project (CIP) in 2013. However, when I asked how the Case Study One climate-resilient road differs from other commune roads, it transpired that it is generally the successful enforcement of existing sub-national engineering (technical) standards for commune road infrastructure projects that distinguishes it, rather than any particular innovation related to CCA. In this context of climate-resilient enhancement, the innovation refers to any new idea related to engineering techniques (e.g. new or change in structural design for flood-proofing) and non-engineering methods (e.g. deep thick root grass like Vetiver for soil erosion control), which promotes and advances the protection of road or embankment structures from damage. Innovation through a new idea or a change of engineering and non-engineering design is distinct from or complementary to the existing road standards.

Case Study Two's approach to climate change impacts assessment is rather ad-hoc and inconsistent in several ways. ADB hired an external consultant—an international Climate Change Specialist—to conduct a climate change survey as part of the socio-economic survey in 2011 (CIF, 2009a; KCI, 2011). The external consultant conducted a perception survey with stakeholders and community members living along Provincial Road 150B. The survey results were then incorporated into the 2011 Report and Recommendation of the President to the ADB Board of Directors (ADB, 2011b). I was unsuccessful in gaining empirical evidence as to why the survey findings are not reflected in the 2011 IEE report (MPWT, 2011a). However, ADB tasked a different international consultant in 2014 to update the IEE report (MPWT, 2014c), which includes some climate-resilient measures. It seemed that addressing CCA (e.g. converting borrow-pits into community ponds) were irrelevant or too precise to actually recommend amending the Case Study Two's engineering or technical design.

As acknowledged by Agrawala et al. (2012); and Ayers et al. (2014), there is no single best pathway for mainstreaming CCA. The empirical findings show that action on addressing climate change impacts in the road investment portfolio made sense in these cases due to the shared goals of CCA and sustainable development (Donner & Webber, 2014; IPCC, 2007b).

The empirical findings of this thesis uphold the views of Va (2015) who argues that mainstreaming CCA itself is a process of institutional transformation, rather than an

outcome, that enables further climate-resilient development planning and investments. Achieving such a common goal of sustainable and resilient development projects requires transformative change (Goldman, 2005; Tang, 2011)— assuming that the recipient governments have political commitment to changing their institutional procedure and leadership so that road development, planning and budgeting can all work towards this goal. However, it might be too early to evaluate the scale of success or failure due to the early stage of climate-resilient demonstrations in these two Case Studies, both of which could be supported or rejected by other similar road investment projects in other parts of Cambodia, or in other aid-dependent countries that have received climate resilience top-up grants from the same sources. The findings counter the arguments of some scholars, such as Cuevas et al. (2015), who debate whether political leadership and commitments can guarantee the success of a particular environmental solution. That is because there are other inter-related factors—such as new or modified governance structure, public engagement and technology—are unpredictable, especially in Cambodia where its political leaders face their already-strained resources and already-strained priorities.

In response to Subsidiary Question 3, concerning how donors support the government implementing agencies to adhere to climate resilience, the research identified two adaptation methods: climate vulnerability reduction assessment and adaptation-integrated environmental assessment policy (e.g. IEE/EIA). Although the theory and practice of climate-resilient activities is emerging and there are no affirmed methods of mainstreaming resilient measures, this research found that both methods were prepared for Case Study Two. However, only a climate change awareness survey, rather than a genuine climate vulnerability assessment or climate impact assessment, was conducted due to time limitations and the conditionality of funding. Even if there had been greater compliance, it seems that no single method can address all risks and accommodate all capacities. Thus it is somewhat unimportant whether climate-resilient measures are mainstreamed through the ex-ante environmental assessment (i.e. IEE/EIA), or a separate tool for climate vulnerability reduction assessment or hydrological impact assessment is used. What is most important is having the resources to address operational challenges. The question is why? What do the government and donor want from the two mainstreaming methods? As argued by international development scholars such as Goldman (2005); Va (2015); and Webber (2015b), development donors, more or less,

have a notable leverage to drive the mainstreaming pathways and the aid projects that they finance.

The thesis has argued that the donors and the granting of donor aid have merely ensured the recipient government's commitment to meet its pre-set agenda. It is questionable if the pre-set agenda is always aligned with the government's resource limitations in implementing its national and sectoral development policies and strategic actions. However, as argued by Hughes (2009); and Ndiaye (2009), the process used to achieve this overlooks a number of important efficiency and efficacy dimensions. Because donors and the government wish to deliver efficiency and efficacy in their road investments, the critical dimension of mainstreaming practice does not occur as it should. To this end, the donors and the government need to know and assess how, for example, climate-resilient investments, actually perform best on the ground prior to making the decision to scale up or decide on greater financing.

Both Case Studies were initiated and advanced by the multilateral donors to establish a common mechanism to raise awareness of the public, policy makers and key stakeholders and to strengthen the existing planning and budgeting system for country-based mainstreaming of CCA, regardless of future financial sources. However, the experience of Case Study One, as well as development aid researchers and scholars such as (Hughes, 2009); and Pheakdey (2015), verify that such commitment will gradually disappear due to limited institutional capacity and resources materializing in the absence of donors.

The power relations between the donors and their respective clientele directly or indirectly influenced the decision-making process. Donor support and power in the decision-making process can be broadly defined as the ability, influence, bureaucratic authority, force, compliance or resources to determine decisions. In principle, bureaucratic authority relies on holding resources and power. Within the two Case Studies, there was a uniform organization so that international or expatriate staff were the decision influencers (or sometimes power controllers), overriding local staff and communicating directly with the donors or team leaders, or even an executive board. However, international staff may not have full understanding of the local needs and working structure. As discussed above, the literature, and many participants, referred to donors and international staff as ultimately influencing, or even controlling, technical and

financial decision-making due to weak institutional capacity and governance credibility in the host institutions.

As Goldman (2005) argues, power relations between multilateral donors and their clientele can be authoritative. Nonetheless, power is sometimes controlled indirectly by the resource holders, including aid donors, as the aid recipients are badly constrained by their “lack of economic power” (Käkönen et al., 2014, p. 352). It should be noted that during my field research with the two cases, I often learned that donors considered their decision-making influence as a way for ownership and capacity building of weak and dependent clientele. However, the hidden agenda is to enable project disbursement to proceed so that the work could be seen to progress. This sentiment has been emphasized by some scholars, such as Hughes (2009), and was also expressed during the casual conversations outside my formal interviews with donor representatives, government staff and external consultants who directly engaged in the design and implementation of the two Cast Studies. This sentiment infers that power relations (for instance, between the donors and the implementing agencies as well as the consultants and the government staff) is unequal, although the multilateral donors promote ownership and decision-making power to the government implementing agencies and local staff.

In the context of Borey Chulsar Commune Road, LGCC implementing staff and commune councils appear quite happy to accept donors’ ‘Capacity Building’ design in the form of various awareness actions, with trained staff deploying their skills to achieve emerging climate-resilient development tasks and increasingly sharing their skills to enhance local institutional capacity. In this instance, the commune-based VRA was the main tool that helped build the public and community awareness through their participation in and conduct of VRA. More needs to be done for the capacity building on CCA planning for sub-national government staff, including commune councilors. There is an assumption here that the VRA exercise contributes to increasing awareness of villagers who are engaged throughout the process.

MPWT has prepared its five-year national transport policy and action plan for climate change response (MPWT, 2014a). While MPWT is dedicated to mainstreaming CCA into its [transport] sectoral planning and budgeting system for road investment projects, it indicates that a first critical step is to guide MPWT itself and to assist its development

partners, such as ADB, in developing concrete and appropriate climate-resilient actions. The timeframe is still unclear, as is the budget allocation for materializing the commitment for climate change response in the road investment portfolio.

In response to Subsidiary Question 4, regarding the intuitional change and challenges in mainstreaming CCA, the empirical data at both national and grassroots levels highlights that accountability efforts for climate-resilient investment practice were mainly challenged by three inter-related capacities: technical, institutional, and financial. The findings uphold aid literature and the debates of scholars such as Cuevas et al. (2015); and Yasuda (2015) regarding the importance of these challenges in weak state institutions. As argued by Cuevas et al. (2015), the technical, institutional, and financial capacities remain the top challenge ahead for all.

Particularly, Case Study One reflects a range of challenges that account for how commune councils and the sub-national administration structured their actions to address the investment impacts on the environment, as well as the impacts of climate change on the investment. Currently, the empirical findings verify that the CCA agenda is driven by the multilateral donors or the availability of donor aid. Development practitioners and scholars such as Boakye-Agyei (2011); and Sok et al. (2011) highlight the additional advantages of an integrated approach to address not only the environmental impacts, but also climate change impacts in the project-decision-making process. However, stakeholders are concerned that addressing CCA issues should not undermine the ex-ante environmental safeguards (Boakye-Agyei, 2011) as seen in the findings of Case Study One, presented in Chapter 5. As suggested by (Hughes, 2009; Un & Hughes, 2011), undermining the ex-ante commitment can be a common result where different influences and drivers underpin the agenda of different donors. A solution to this kind of problem is that donors or donor aid and the respective recipients should not only adhere to the new or additional resilience requirements, but also do due diligence to meet the ex-ante safeguards (i.e. the existing IEE/EIA compliance) in order to promote long-term sustainable development in the context of environmental change.

In other words, the new donor requirement (e.g. climate resilience top-up funding) should ensure efficient coordination with other donors (who required ex-ante safeguard

compliance) and encourage the recipient to enforce their existing Commune/Sangkat environmental safeguard procedures (see NCDDS, 2009).

All actors, particularly the government implementing agencies and implementing staff at all levels, should accord equal weight and efforts for all competing priorities regardless of financial sources or the donor aid conditions. These challenges critically influence the practical level of maximizing CCA. The need for integrated mainstream procedures, especially at the project level, becomes more pressing. As illustrated by Lasco et al. (1996), this is primarily because a large number of physical infrastructure investments are yet designed to adapt to environmental hazards and extreme weather-related events, and the conventional national priorities are often biased towards economic growth.

The challenges broadly influence the pathway that the donors have created to ensure that the recipient government effectively promotes equitable and climate-resilient practice. In this respect, the decision of whether or not to dilute climate resilient practice is closely connected to institutional incentives. As suggested in the studies of Cuevas et al. (2015); and Goldman (2005) and the grey literature, these three challenges are broadly discussed in the development aid literature, and this research upholds their importance.

The first challenge is the technical information and knowledge regarding institutional, *soft* and *hard* adaptation measures²⁵. There is a lack of corridor impact studies as well as non-existent or unclear arrangements, for the private sector contractor to receive a proper and timely orientation on what, how and why their construction work activities may be impacted by climate change uncertainty and risks. In other words, there is no arrangement to ensure their construction work is cognizant of climatic impacts. The lack of orientation already suggests that technical adaptation can be neglected in this context because *Engineers and contractors do not understand or have enough knowledge about climate change and impacts*. While these contractors are profit-oriented and some will unfortunately pay less attention to non-profit issues such as environmental impacts or climate change impacts (see also Kakegawa, 2012; Quintero, 2007), the implementing

²⁵ *Soft adaptation* reflects the climate change awareness activities through climate change awareness survey or VRA training and implementation at the project level. *Hard adaptation* refers to the modifications in road structural and engineering design.

institution and ADB tend to trust their ability with their limited understanding of climate resilience requirements.

The second challenge reflects the limitation of institutional capacity and human resources in the government implementing agency. Thanks to limited arrangements for implementing staff to be oriented or trained in basic skills about climate change vulnerability, mainstreaming CCA will likely be implemented in the early phase of project design, or before beginning the implementation activities, which should have occurred for the road design stage in the Case Study Two. Despite the claim that the government project director exhibits strong leadership and dedication in the ADB report to its executive board of directors (ADB, 2015), a common problem confronting Case Two is that the government officials have little motivation to work on these issues due to their low incentives, salary and skill levels (ADB, 2015b; Hughes, 2009).

The third challenge refers to a long-standing financial problem in terms of availability, accessibility and reliability. The findings showed the donors find their own way to assist the government implementing agencies to tick the boxes in order to meet climate resilience conditionality and tap more climate resilience funds. For example, incorporating climate-proofing measures into the road improvement requires an additional 25% to 30% expenses. Regardless of the huge incremental costs, the expected benefits of this investment in terms of anticipated reduction in future maintenance or repair costs “are not explicitly quantified in monetary terms” (ADB, 2014, p. 47). As discussed in Chapter 6, the question of financial capacity was predominantly raised on the basis that the performing tasks have been delivered according to the amount of budget allocation (*tveu kar tam teuk leuy* in Khmer).

7.2. Discussion

In responding to the principle discussion of *how climate change adaptation is institutionalized into an individual road investment in Cambodia*, the empirical data demonstrates a common, consolidated method to determine where and when it should be incorporated into 'normal' investment projects. The empirical findings identify responses to CCA, highlighting constraints to the mainstream development at the project scale. The two Case Studies support Regi and Star (2014) who demonstrate the differences in progress and success are due to the different approach and funding conditionality applied

by different donors. Both Case Studies progressed with respect to aid policy influence in terms of turning discussion on an integrated development approach into actions on the ground.

As illustrated by Regi and Star (2014, p. 205) and in the literature review in Chapter 2, the findings demonstrate a donor-driven and short-term mainstreaming approach, instead of focusing more on achieving a nationally-owned, integrated, and long-term approach. Based on the lessons learned from the two Case Studies, the most suitable operational mechanism, as argued in the results chapters, is to have integrated institutional mechanisms and locally-responsive institutional structures that can address adverse climatic impacts not only at the policy level, but also at the project level. In order to understand the effectiveness of mainstream development and the nexus of the two inter-related aspects of CCA and development aid projects, the performance and process outcomes at the grassroots level need to be better understood. The empirical findings affirm Regi and Star's argument (2014, p. 205) that donor-initiated mainstream development efforts have been undertaken in an ad-hoc manner and have been limited to the lifetime of development aid or of the aid project. The current up-scaling is limited to donor-funded projects rather than within the government system, however the findings demonstrate that the approach taken by the donors to the mainstream development (for instance, mainstreaming CCA) raises issues of long term sustainability.

The findings from the two Case Studies can be seen as a first step toward studying climatic impacts into road investments²⁶. There are important considerations with regard to raising awareness of the equitable, climate-resilient road options in floodplains. Donor aid objectives for equitable, sustainable and resilient development may remain elusive during the lifetime of aid projects, however, a question remains as to how much the influence of the aid legacy and consequent institutional change in the government system will continue to survive after the donor funding is exhausted.

²⁶ The conditions surrounding the drivers of institutional change for sustainable and resilient development practices were identified and assessed. The results suggest that: the challenges exist in a certain spectrum, in which they can be either constraints or opportunities for mainstreaming. Consequently, the institutional change drivers are the factors that depict the institutional, technical, and financial capacities; hence, they are the factors that affect the mainstreaming exercise.

The research findings show that the government implementing institutions (the clientele of donors) are not resistant to fostering institutional change and accountability tied to the climate resilience funding criteria, despite their limited knowledge of the implications. Regarding climate-resilient practice, although the two Case Studies reveal some positive progress in terms of institutional trajectories, they also indicate that there is an immediate need to establish a CCA funding pool (nationally, sub-nationally or by sector) to ensure that the institutional transformation's legacy continues when the external funding ends. The funding instability of donor aid and climate resilience seems to be the greatest concern for all actors, particularly the implementing agencies and beneficiaries. As illustrated by Cuevas et al. (2015, p. 15), other pressing concerns involve improving information, coordination, access, and effective use of the climate resilience funding resources. The results indicate that the donor aid policy, or rules-in-use—specifically the climate resilience funding criteria—provide an open opportunity for “well-built roads or good roads”, but has not fully succeeded in this regard.

Overall, the results are relevant to other development aid projects in other development sectors or other aid-dependent countries. The findings reinforce the literature, confirming that investing in design and management for sustainable and resilient road investment portfolio is a complicated environment that requires an integrated, mainstream development (see Wim Douven et al., 2012).

The implications of these thesis findings could help donors and their clientele in considering future road and other infrastructure investments, especially with regard to climate change concerns. It is critical to evaluate the process outcome in terms of mainstream cost-effectiveness, through which villagers directly benefit. Mainstream development is increasingly recognized and leads to building capacity for policy reform and institutional change, however, effective outcomes are still contentious or inclusive.

The implications from this thesis iterate some challenges to draw from provided that the climate-resilience for the road infrastructure investments is still relatively new. Although, mainstreaming CCA efforts are increasing in Cambodia (CIF, 2009; MOE, 2013; NCDDS, 2014); these challenges could be drawn as lessons learned from successes or failures, to inspire and inform further actions in similar road investments in other situations, places or domains.

7.3. Contribution to knowledge

As many donor aid projects have not yet adapted to climate change, this research provides new empirical evidence to support climate-resilient development practice. Therefore, this thesis offers insights into the existing body of knowledge and literature in several important ways.

First, the outcome of the research contributes to overcoming knowledge gaps about the debates around the entry points or pathways of mainstreaming CCA into development in general and climate-resilient development practice, specifically. The research also contributes to building on empirical evidence to advance theories of impact assessment (Agrawala, et al., 2012; Stephen, 2013) and institutional change (Inderberg & Eikeland, 2009; Goldman, 2005; Sietz, et al., 2008; Tang, 2011) in international development studies at the operational scale. The ultimate goal is that scholars and development experts can provide better theoretical and empirical understanding in order to facilitate and foster climate-resilient development practice. Furthermore, the research outcomes offer insights into a growing interest area of climate-resilient development activities for recipient governments, donors, civil society organisations, and other development players.

It makes an original contribution to narrowing the research gaps concerning the debates around the mainstreaming CCA of donor aid and international development. While there has been considerable research on the etymology of an integrated institutional analysis in development sustainability in the anthropogenic climate change context, most of it has investigated the inter-linkages between only two of the following theoretical concepts: between environmental safeguards and CCA (Agrawala et al., 2012; Boakye-Agyei, 2011; Byer et al., 2009; Sok et al., 2011; Xiangbai, 2013); or between safeguards and donor-funded transmission line projects (Kakegawa, 2012). However, the thesis makes the unique empirical contribution of conducting analysis of the mainstreaming of CCA and development aid projects. My analysis is based on the empirical evaluation of development aid projects in Cambodia, which show that three things - technical capacity, financial capacity, and institutional capacity - can either smooth or hinder the integration of CCA into the development portfolio.

Second, this research investigated the two road investments in floodplains in order to better understand the dynamics and linkages of the concepts of CCA and donor aid at the

micro, operational level. It adds to theory of institutional change related to impact assessments in international development studies. It makes a contribution through analysing how these concepts are understood and practiced on the ground by multilateral donors and their government partners (from Chapters 4 to 6). This is of significant importance, since they have been directly implementing and conducting activities on the ground to promote sustainable, equitable, and resilient development policy in Cambodia (MOE, 2013a).

This thesis also contributes to the body of knowledge on CCA by emphasizing road infrastructure investments and problems it encounters. There are insights into a growing interest area of climate-resilient activities, not only at the levels of national or sectoral policy and strategy but also at project-level, for recipient governments, donors, and other development players. In other words, because many donor-funded projects have not yet adapted to climate change, while facing environmental challenges, this research provides new empirical evidence to support a trajectory of not only enhancing environmentally-sound development, but also promoting climate-resilient practice to evolve within the global warming context.

A third contribution is to Ostrom's institutional analysis and development frameworks, which was a normative approach that has been applied extensively to other complex environmental problems such as management of common resources (Ostrom, 1990), local development planning (Cox & Ostrom, 2010; Cuevas et al., 2015), and global environmental governance and large-scale [dam] infrastructure investments (Yasuda, 2015). As explained by Ostrom (2011), the process performance in development decision-making is influenced by the interactive patterns between rules (in use), decision power and actors. However, Ostrom did not elaborate her institutional analysis and development concept as much at the micro and operational level of the development aid project. Actually, since donor aid projects have a limited timeframe, this thesis also explored the perceptions of what would happen without donor funding or after the funding ends. This has been revealed as a problem of donor aid legacy.

Ostrom's frameworks have not yet been applied in the road sub-sector at the project level in Cambodia. Furthermore, the inter-related technical, institutional and financial capacities are not well leveraged in Ostrom's institutional analysis concept. Thus, the

empirical findings elaborate these institutional change drivers and challenging factors that the donors and their respective clienteles [can] encounter at the operational level.

The main contribution has been to apply Ostrom's work through the analysis of climate-resilient road demonstrations in the Cambodian floodplains. The empirical findings reported in Chapters 5 and 6 imply that the institutional analysis and development concept in Figure 1.2 was useful for analyzing the formal and informal policies initiated by the development aid at operational level. Not only do the only actors, rules, and biophysical and material conditions interact in different ways, but also the rules themselves (i.e. IEE/EIA or VRA) have different directions of interactions (e.g. adaptation-integrated IEE). As supported by Yasuda (2015, p. 214), this contrasts with the spirit of institutional analysis, which explains only “a one-way explanatory direction of how rules influence actors” Another implication is that institutional analysis does not distinguish legalized standards from the informal conditionality of climate resilience funding. Ostrom treats all rules, legislations, traditions and norms that affect actors’ interactive patterns and behaviors under one classification (Ostrom, 2011). From an academic perspective, identifying the influence of the informal rule or policy to the actors’ behaviors and development aid is often more complex and more debatable than rules guiding formal policy (Yasuda, 2015).

Based on the empirical findings, Goldman’s (2005) institutional change and Ostrom’s (2011) institutional analysis for development can be adapted and developed to fit the donor-aided development investments at the project-level, as shown in Figure 7.1.

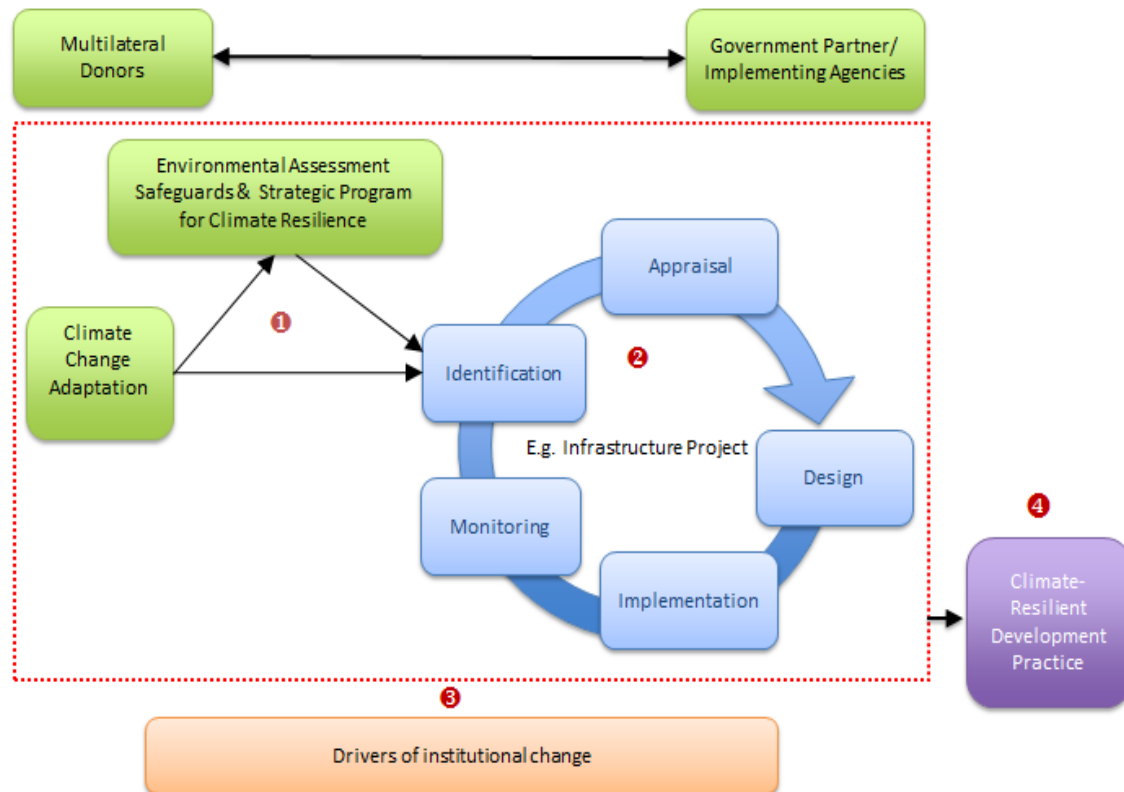


Figure 7.1 A proposed analytical framework of climate-resilient development projects adopted and developed from Ostrom's and Goldman's institutional change concepts

Source: Author (2016)

Stage one assesses the due diligence of the rule-in-use (e.g. environmental safeguards and climate resilience compliance) and possibly the implementation staffing capacity for materializing environmentally-sustainable and climate-resilient development practice. This stage begins with a content review of the Climate Resilience approach for guiding to take into account mainstreaming CCA considerations into project decision-making. This stage examines the efforts and effectiveness of building actor awareness and capacity. Awareness and capacity building can include climate information and awareness campaigns to the relevant stakeholders about the synergies of CCA with development pathways and possible processes that must be established. This stage examines the efforts and effectiveness of improving climate information services and providing empirical evidence of its added value to decision-makers and other stakeholders are critical. Efforts for improving climate-informed decision need to be

made in the alignment of development with CCA priorities, and in building scientific, technical and financial capacity for mainstreamed development at the operational scale.

Stage two focuses on the analysis of the factors related to the action arena and interaction patterns, which in this context, extends to cover not only the actors and implementation arrangements, but also to the consequences of mainstreaming entry-points or interactive patterns of development mainstreaming. This stage immediately determines an entry point to screen, assess, analyze, and prioritize climate risks and adaptation measures into a development project cycle—identification, appraisal, detailed design, implementation, and monitoring, based on the hands-on resources and experience. Importantly, there is a need to review institutional arrangements and capacity development actions including examining the challenges (barriers) and opportunities (enablers) to strengthen the ability of the recipient government in learning and acting on project CCA.

Stage three covers consequences of the rule-in-use discussed in the first stage and pathway consequences of the action arena and interaction patterns in the mainstreaming of CCA outlined in the second stage. Stage three requires receptivity across relevant institutions and stakeholders for transformation to make use of new information and technologies relevant to CCA. This stage involves the evaluative criteria and the transformational drivers of institutional change (e.g. new or additional budget allocation, innovative technology, decision-making power, and institutional values: to learn and to act) that multilateral donors and the recipient government choose to exert their efforts to act on mainstreaming CCA into an individual project. According to (Goldman, 2005; Ostrom, 2011), this stage of institutional change is critical for the research analysis and understanding of the current performance and future trajectory of mainstreaming CCA process in general and the entry point of mainstreaming CCA into the investment planning and operation in specific. In short, Stage three determines the level of success or failure in the process of mainstreaming CCA consideration into an individual project life cycle.

Lastly, Stage four does not simply illustrate the outcome, but covers process and consequences extensively in all the previous three stages with regard to mainstreaming CCA and climate-resilient development practices. In other words, this Stage four examines a paradox shift from “businesses as-usual” to [road infrastructure] investment

planning, design, and operations that systematically mainstream CCA consideration into the entire decision-making process. It draws conclusions about the implications of the project outcome resulting from mainstreaming CCA under the chosen 'Climate Resilience approach' (for instance, precise reactions, and perceptions if it is premature to assess). If the outcome shows improved welfare of the majority, mainstreaming CCA into investment project planning and operations under the approach can thus be legitimized and reproduced.

Referring to Figures 1.2 and 7.1 on the institutional change and analytical framework, this research concludes that project-level mainstreaming is a 'complex' result or process outcome because society is never simple and predictable. There are a number of complex factors involved in mainstreaming CCA, and their complexity influenced the process and performance outcome of mainstreaming CCA considerations due to complex institutional structure and dynamic and power interaction between donors and the recipients. Thus, institutional change toward climate-resilient and environmentally-friendly development practices is an ongoing process which, like gender mainstreaming, requires continued interventions by the donors and the government to improve institutional accountability and development effectiveness. Importantly, proper compliance with policy and practice is deemed essential to harness the benefits of rules- in-use. Although further consultation with decision makers is necessary, this thesis recommends that the conditionality of CCA should be used to further improvement of road investments in the future. Hence, the donor aid objectives for resilient development outcomes may be achieved beyond the lifetime of aid projects. The legacy of donor aid, such as the emerging CCA assistance and climate resilience grants, has a good intention to provide an open opportunity to reinforce good, long-lasting road infrastructure. As discussed in Chapters 5 and 6, the research found no credible evidence of new ideas or innovation (e.g. new engineering techniques and non-engineering options) that are different from the existing standards of good road projects. For example, raising the road surface to the precious flood level is a solution to adapt to flooding events. Levelling-up the road surface (e.g. half meter higher than highest recorded flood according to the rural road development standards) to address flood-damage in floodplains is widely known, however is often constrained by budget or technical availability in developing countries. In the two Case Studies, climate-resilient practice was promoted to satisfy the climate resilience funding conditionality; however, this has not been accomplished given the short-timeframe of climate-resilient

demonstration in recent years as discussed Chapters 5 and 6. Continued efforts are necessary for collecting, analyzing, compiling, and sharing the momentum and trajectory of climate-resilient development practices under both door aid legacy and other funding sources. Furthermore, technological GIS observation map, climate projected modelling and cost-benefit analysis of different adaptation alternatives should be proposed, analysed and prioritized if the donors and their recipient government is serious about sustainable climate-resilient road infrastructure.

In relation to the knowledge gaps discussed in Chapter 1, the research highlighted the importance of mainstreaming ‘cross-cutting issues’ which are a high priority, as well as identifying long-term needs for local economic development and poverty reduction. The institutional analysis and development framework applied in the analysis could be further applied and tested in the context of different development aid projects, particularly those with complex sets of different formal and informal rules in use or policies. Institutional change is needed to mainstream CCA, generating process outcomes that may achieve, or fail to meet, the expectations of climate-resilient practices now and in future. While the institutional analysis concept was developed to evaluate the policy implications at national or regional or community levels, this thesis used Ostrom’s modified institutional analysis and development concept to guide the assessment of the process outcome of any individual development project or individual investment where the benefits and impacts are directly felt at the ‘grassroots’ level. Finally, the findings contribute to public policy, environmental management, and international development studies and with particular reference to the broad field of human geography. Flooding is a serious environmental risk that is humanized through settlement, land use, and infrastructure.

7.4. Contribution to development practice

Critical analysis of the empirical findings of this study contributes to the knowledge about policy and practice in the governance of development aid and investments in Cambodia. The research findings further provide the following recommendations for contributing to development policy and practice, both now and in future.

The first and most important recommendation is that donors should continue supporting recipient governments to update and revise their environmental safeguard guidelines (e.g. IEE/EIA guidelines) to include adaptation when it is feasible. The environmental

safeguards policy and guidelines should be used for not only achieving environmental and human protection, but also climate resilient practice regardless of financial investment sources (Goldman, 2005; Kakegawa, 2012).

A number of the empirical findings are applicable to road investments in other contexts, enabling general conclusions to be drawn on the issue of adaptation management. For example, many environmental assessment documents, prepared by international consultants, recommend ideas and systems that are difficult for government employees to implement, or are unfit for implementation in the local socio-cultural or economical context. Furthermore, donors should assist in a long-term capacity transfer to the local public servants and local consultants (Hughes, 2009; Kakegawa, 2012). To assess the adequacy of MPWT's institutional capacity and commitment for climate resilience, the following questions can be useful:

- How does the Project identify and allocate human, technical and financial resources?
- Are there any processes for balancing and resolving conflicts and other project priorities?
- Is there a process for periodic review, monitoring and reporting?
- Do responsible staff have adequate knowledge and experience with similar road projects, including managing consultants and contractors, community engagement and grievance resolution?

Another recommendation is that climate proofing should be increasingly measured when making decisions on road projects. The potential risks and vulnerabilities of climate change must be screened or assessed for every infrastructure project financed by the multilateral donor, particularly those projects in climate-sensitive locations, taking into account the need for year-round transport services (MDBs, 2015). However, factors reflected in making climate-resilient adjustments should include cost-effectiveness and scientific climate projections, as using results of the climate change awareness or commune-based VRA are insufficient. Furthermore, the current engineering designs, standards, and guidelines fail to appropriately value the long-term implications of climate change impacts.

A further recommendation relates to the multilateral donors who are challenged by constant deadlines (e.g. disbursing of project budgets in a timely manner) and their mandate for poverty alleviation in developing countries. Yet, with a new institutional transformation for climate-resilient development practice, donors have aimed to put efforts into “upstreaming policy support” so that the concepts of CCA and climate resilience are replicable regardless of financial sources. In the absence of a free flow of climate resilience top-up funding, the question is how much budget, and people’s time is needed, and how successfully can they negotiate with the government partners to invest? Kakegawa (2012) suggests a transformation should be broadly and consistently incorporated in the country’s assistance or partnership strategies as early as possible to ensure that climate-resilient alternatives are accounted for. The empirical data implies that the presence of a climate change adaptation specialist in Cambodia (e.g. in the ADB Country Office) may be necessary at the early stage of piloting climate-resilient practices. Climate change adaptation is still a relatively new and uncertain concept and, of course, more awareness and training should be organized as part of the institutional change process (Cuevas et al., 2015; Goldman, 2005)

In order to avoid conflicts of interest, it is also recommended that contracts awarded to international consultants and consulting firms ensure that hands-on capacity and skills are provided, not only to the government staff but also to the contractors who actually implement the civil work activities on the ground. My own experience engaging with many of the World Bank-assisted road projects and reports by ADB (2014e) showed that implementation of the road investments runs smoothly only if the contractors are made aware of the technical and environmental monitoring requirements at the outset of a particular project, specifically during the pre-mobilization discussions.

One more essential recommendation relates to the fact that the two Case Studies piloted different (top-down or a bottom-up) pathways in their stakeholder engagements: Case Study One uses the VRA tool as a means for the two way consultations with the villagers and local community throughout the entire process of commune development planning, budgeting and implementation. Case Study Two uses MWPT staff and external consultants for less interactive involvement with the villagers. It is vital to create a more conducive environment for local ideas to be acknowledged and taken into account in the climate-resilient development decision-making processes. Both Case Studies highlighted

the need to motivate research institutions, academics, expert consultants, and civil society organisations (CSOs) to play a more critical role as facilitators in linking top-down and bottom-up processes so as to smooth the enforcement and improvement of sustainable and climate-resilient development policy and practice that effectively respond to the actual situation (Kim & Chem, 2014).

Finally, and to conclude, there is a strong case for further specifying and mainstreaming CCA into projects. There are entry points for mainstreaming climatic considerations at all stages of the project cycle. Mainstreaming CCA at project level leads towards more integrated, effective, efficient and sustainable responses. But this is unlikely to be the sole answer for safeguarding sustainability in the face of climatic impacts if other existing sustainable factors such as environmental safeguards are not prioritized.

It is expected that the adaptation efforts should continue to be at the forefront of donors' aid and international development agendas. Based on the demonstrations of the two Case Studies, mainstream development can be achieved across a multiple governance structure. However, mainstream development is rather complex and requires good governance and bottom-up institutional arrangements, in addition to passing the key challenges of technical, institutional, and financial aspects as elaborated in Chapters 5 and 6.

7.5. Limitations and further research

Each research design and analytical framework has its positive and negative aspects, and this research faced some limitations within its methodology and coverage. This prompts suggestions for future research work.

The first limitation was the focus on adaptation to climate change in the infrastructure sector. Theoretically and as discussed in the literature review in Chapter 2, CCA issues should be embedded not only at the higher levels of national and sectoral policy and planning (Karthi et al., 2006). Nevertheless, CCA issues should also be taken into account at the lower levels (Byer et al., 2009). Generating theory, or scrutinising mainstreaming of CCA at broader governance levels was not central to, or closely studied, in this research. In this regard, the central focus of was the micro, operational or project level, specifically mainstreaming into an individual road investment. Its focus lies within

this limited scope due to the early stage of climate-resilient demonstration in the infrastructure sector, and my own time limitations. Deeper and broader analysis could be made. For instance, the empirical findings could benefit from follow-up research on political power and political economy in influencing the agenda of climate resilience funding.

The second restriction is that the two Case Studies were reviewed in-depth using an ethnographic and systematic approach. This can constrain the ability to contextualize the empirical findings and implications. I reviewed the literature and practices of other similar climate-resilient projects to identify key aspects of general lessons and policy recommendation in the final Chapter, but the aim was not to generalize. Hence, as debated in case study methodology (Yin, 2009), the empirical findings and implications should not be generalized across a larger spectrum. The two road investments, which were selected for evaluation analysis during the thesis, can be considered premature to the extent to that they have resulted in climate resilience whose performance outcome may take decades to appropriately evaluate. However, Rai et al. (2014, p. 539) argue that past experience in Bangladesh, involving specific interventions related to climate change, does reduce environmental hazards and negative climate change impacts. A logical step for further research is to consider replicating the research framework in Figure 1.2 by using a larger sample to allow multiple comparisons of within-case and cross-case analyses between positions of development investments and donor initiatives. As this thesis has a limited number of Case Studies, the analysis resulted primarily in indications of the probable success and failure of the mainstreaming framework. Future research should therefore attempt to expand the analysis to a larger number of donor-funded projects in the same sector, but by the same government implementing institutions before generalizing the research findings or results. Nonetheless, for the purpose of generalization, the analysis of a large number of comparable road projects in the same socio-economic and locational context could provide more valuable insights.

The third constraint is that the findings of the two Case Studies may be difficult to contextualise in other sectors that are vulnerable to a changing climate. For instance, agricultural development projects are mostly sensitive to environmental impacts and vulnerable to climate change impacts. Future research should therefore focus on applying the modified framework in other sectors, or examine these same operational issues within

road investments funded by bilateral development agencies, the private sector or individual investors. Overall, there is an increasing trajectory of climate-resilient projects that will be operationalized in the future. It will be extremely helpful to examine whether other climate-resilient operations—either funded by multilateral donor aid or funding sources—are aligned with or contradictory to my research findings. Investment projects in different sectors with different rules in use may produce distinct findings given that demand for, and drivers of the institutional change can lead to diverse results. This thesis highlights that it is critical to maximize CCA into the decision-making of investment planning and budgeting; through which villagers directly benefit. Nevertheless, top-down and bottom-up mainstreaming approaches are complementary. Although further studies interviewing a range of management or decision makers is necessary, this thesis recommends that lessons learned and implications from the rolling out of the two Case Studies should be used for further improvement.

Finally, the analysis in this thesis was only focused on Cambodia, while similar resilient innovations have been demonstrated in other countries and geographical areas. Additional studies examining similar road investments operated in other countries or involving different infrastructure (e.g. irrigation) investments within the region would definitely provide more valuable insights into the linkages of CCA and development aid portfolios. There is scope to prospectively test the methodology and research approach in other aid recipient countries. In addition, the analytical framework is also relevant for Australia and developed countries to help planning for effective mechanisms to support CCA. The findings presented from the two Case Studies can be seen as a first step toward an integrated development approach into road infrastructure investments. The research findings may therefore be of assistance to donors, decision makers, and political leaders. Additional studies could contribute further to academic discourse and everyday practice.

References

- Adam, H. N. (2014). Mainstreaming adaptation in India—the Mahatma Gandhi National Rural Employment Guarantee Act and climate change. *Climate and Development* (ahead-of-print), 1-11.
- ADB. (2005). Climate Proofing: A Risk-based Approach to Adaptation. *Pacific Studies Series* from <https://www.adb.org/sites/default/files/publication/28796/climate-proofing.pdf>
- ADB. (2009a). Mainstreaming climate change in ADB operations: climate change implementation plan for the Pacific (2009-2015). Manila, Philippines.
- ADB. (2009b). Safeguard Policy Statement. Manila, Philippines: Asian Development Bank.
- ADB. (2011a). Guidelines for Climate Proofing Investment in the Transport Sector: Road Infrastructure Projects. Manila, Philippines: Asian Development Bank.
- ADB. (2011b). Report and Recommendation of the President to the Board of Directors: Proposed Loan, Technical Assistance, and Administration of Loan and Grant to the Kingdom of Cambodia for the Provincial Roads Improvement Programme.
- ADB. (2013a). *Maximizing Environmental Benefits and Climate Proofing Transport Projects*. Paper presented at the Maximizing Environmental Benefits and Climate Proofing Transport Workshop, Manila, Philippines.
- ADB. (2013b). Operations Manual (OM Section F1/OP) for the Safeguard Policy Statement 2009. Manila, Philippines: Asian Development Bank.
- ADB. (2013c). Stakeholder Engagement in Preparing Investment Plans for the Climate Investment Funds: Case Studies from Asia (Second Edition). Manila, Philippines: Asian Development Bank.
- ADB. (2014a). Climate proofing ADB investment in the transport sector: Initial experience. Manila, Philippines: Asian Development Bank.
- ADB. (2014b). Concept Note of the Cambodia: Second Road Asset Management Project.
- ADB. (2014c). Improving the Implementation of Environmental Safeguards in Central and West Asia: Kyrgyz Republic Country Report.
- ADB. (2014d). Safeguards Operational Review: ADB Processes, Portfolio, Country Systems, and Financial Intermediaries. Manila, Philippines: Asian Development Bank.
- ADB. (2014e). Solomon Islands Road (Sector) Improvement Project: Project Completion Report

- ADB. (2015a). Asian Development Bank and Cambodia Factsheet.
- ADB. (2015b). Cambodia Road Asset Management Project: Completion Report.
- ADB. (2015c). Vulnerability Assessment and Adaptation Planning for Building Resilient Mekong Towns, Volume 4 of the Resource Kit for Building Resilience and Sustainability in Mekong Towns, Prepared by ICEM – International Centre for Environmental Management for the Asian Development Bank and Nordic Development Fund (TA 8186). Manila, Philippines: Asian Development Bank.
- Adger, W. N., Hug, S., Brown, K., Conway, D., & Hulme, M. (2009a). Adaptation to Climate Change in the Developing World. In E. L. F. Schipper & I. Burton (Eds.), *Adaptation to Climate Change* (pp. 295-312). UK: Earthcan.
- Adger, W. N., Lorenzoni, I., & O'Brien, K. L. (2009b). *Adapting to Climate Change: Thresholds, Values, Governance*: Cambridge: Cambridge University Press.
- AfDB. (2013). Environmental Mainstreaming, Safeguards and Results: Bank Road Projects and their Enabling Policy Environment, 1999-2010.
- Agrawal, A., & Perrin, N. (2009). Climate adaptation, local institutions and rural livelihoods. *Adapting to climate change: thresholds, values, governance*, 350-367.
- Agrawala, S. (2005). *Bridge over troubled waters: Linking climate change and development*: OECD.
- Agrawala, S., Matus Kramer, A., Prudent-Richard, G., Sainsbury, M., & Schreitter, V. (2012). Incorporating climate change impacts and adaptation in Environmental Impact Assessments: Opportunities and Challenges. *Climate and Development*, 4(1), 26-39.
- Agrawala, S., & van Aalst, M. (2008). Adapting development cooperation to adapt to climate change. *Climate Policy*, 8(2), 183-193.
- Ahsan, K., & Gunawan, I. (2010). Analysis of cost and schedule performance of international development projects. *International Journal of Project Management*, 28(1), 68-78.
- Anshory-Yusuf, A., & Francisco, H. (2009). Climate change vulnerability mapping for Southeast Asia *Climate change vulnerability mapping for Southeast Asia B2 - Climate change vulnerability mapping for Southeast Asia*. Singapore: Economy and Environment Program for Southeast Asia.
- Ayers, J. (2009). International funding to support urban adaptation to climate change. *Environment and Urbanization*, 21(1), 225-240. doi: 10.1177/0956247809103021

- Ayers, J., & Abeysinghe, A. (2013). International Aid and Adaptation to Climate Change. In F. Robert (Ed.), *The Handbook of Global Climate and Environment Policy* (pp. 486-506). United States: John Wiley & Sons Ltd.
- Ayers, J., & Dodman, D. (2010). Climate change adaptation and development: the state of the debate. *Progress in Development Studies*, 10(2), 161-168.
- Ayers, J., & Huq, S. (2009). Supporting Adaptation to Climate Change: What Role for Official Development Assistance? *Development Policy Review*, 27(6), 675-692.
- Ayers, J., Huq, S., Faisal, A., & Hussain, S. (2014). Mainstreaming climate change adaptation into development: a case study of Bangladesh. *Wiley Interdisciplinary Reviews: Climate Change*, 5(1), 37-51.
- Ayers, J., Kaur, N., & Anderson, S. (2011). Negotiating Climate Resilience in Nepal. *IDS Bulletin*, 42(3), 70-79. doi: 10.1111/j.1759-5436.2011.00224.x
- Babb, S. (2009). *Behind the development banks: Washington politics, world poverty, and the wealth of nations*: University of Chicago Press.
- Babbie, E. R. (2008). *The basics of social research*: Wadsworth Publishing Company.
- Baird, I. G., & Quastel, N. (2015). Rescaling and Reordering Nature–Society Relations: The Nam Theun 2 Hydropower Dam and Laos–Thailand Electricity Networks. *Annals of the Association of American Geographers*, 1-19. doi: 10.1080/00045608.2015.1064511
- Bangladesh Bridge Authority. (2010). Environmental Impact Assessment Report of the Padma Multipurpose Bridge Design Project for the Asian Development Bank. Daka: Bangladesh Bridge Authority.
- Bank Information Center. (2014). Recommendations for Reorganizing the World Bank Safeguard Function: Priorities for Consultation on a Safeguard Implementation Plan. Washington DC: The World Bank.
- Barnett, J. (2001). Adapting to climate change in Pacific Island countries: the problem of uncertainty. *World Development*, 29(6), 977-993.
- Barnett, J. (2013). Minimizing the risk of maladaptation: a framework for analysis. In J. Palutikof, S. L. Boulter, A. J. Ash, M. Stafford Smith, M. Parry, M. Waschka & D. Guitart (Eds.), *Climate Adaptation Futures*: John Wiley & Sons.
- Barnett, J., Barnett, S., & O'Neill. (2010). Maladaptation. *Global Environmental Change*, 20(2), 211-213.
- Bass, S., Annandale, D., Binh, P. V., Dong, T. P., Nam, H. A., Oanh, L. T. K., . . . Trieu, V. V. (2010). *Integrating environment and development in Viet Nam: Achievements, challenges and next steps*. United Kingdom: IIED.

- Batterbury, S. (2008). Anthropology and global warming: The need for environmental engagement. *The Australian Journal of Anthropology*, 19(1), 62-68.
- Batterbury, S., Batterbury, J., & Fernando. (2006). Rescaling Governance and the Impacts of Political and Environmental Decentralization: An Introduction. *World Development*, 34(11), 1851-1863.
- Batterbury, S., & Forsyth, T. (1999). Fighting back: Human adaptations in marginal environments. *Science and Policy for Sustainable Development*, 6-11.
- Bazeley, P. (2007). *Qualitative data analysis with NVivo*: Los Angeles ; London : SAGE, 2007.
- Bazeley, P., & Jackson, K. (2013). *Qualitative data analysis with NVivo*. Sage Publications Limited.
- Bebbington, A. J., & Bury, J. T. (2009). Institutional challenges for mining and sustainability in Peru. *Proceedings of the National Academy of Sciences*, 106(41), 17296-17301.
- Beevers, L., Douven, W., Lazuardi, H., & Verheij, H. (2012). Cumulative impacts of road developments in floodplains. *Transportation research part D: transport and environment*, 17(5), 398-404.
- Bell, A., Collins, N., Ells, C., de Romily, G., Rossiter, A., & Young, R. (2002). Evaluation of the ClimAdapt Guide to Incorporating Climate Change into the Environmental Impact Assessment Process *Research and Development Monograph Series, ClimAdapt-Nova Scotia's Climate Change Adaptation Initiative*. Canada: The Canadian Environmental Assessment Agency.
- Benson, E., Forbes, A., Korkeakoski, M., Latif, R., & Lham, D. (2014). Environment and climate mainstreaming: challenges and successes. *Development in Practice*, 24(4), 605-614.
- Berrang-Ford, L., Ford, J. D., & Paterson, J. (2011). Are we adapting to climate change? *Global Environmental Change*, 21(1), 25-33.
- Boakye-Agyei, K. (2011). Approaching climate adjusted environmental due diligence for multilateral financial institutions. *International Journal of Climate Change Strategies and Management*, 3(3), 264-274. doi: 10.1108/17568691111153410
- Borey Chulsar Commune Chief. (2013). *Presentation of Climate-resilient road improvement in Borey Chulsa, Takeo*. Training of Trainers in November 2014, Phnom Penh, Cambodia.
- Brautigam, D. (2009). *The dragon's gift: the real story of China in Africa*: Oxford University Press.
- Bumpus, A. G., & Cole, J. C. (2010). How can the current CDM deliver sustainable development? *Wiley Interdisciplinary Reviews: Climate Change*, 1(4), 541-547.

- Buntaine, M. T. (2011). Does the Asian Development Bank respond to past environmental performance when allocating environmentally risky financing? *World Development*, 39(3), 336-350.
- Burgos, S., & Ear, S. (2010). China's Strategic Interests in Cambodia: Influence and Resources. *Asian Survey*, 50(3), 615-639.
- Byer, P., Cestti, R., Croal, P., Fisher, W., Hazell, S., Kolhoff, A., & Kørnøv, L. (2012). Climate Change in Impact Assessment: International Best Practice Principles. Special Publication Series No. 8. *International Association for Impact Assessment (IAIA)*.
- Byer, P. H., Colombo, A. F., Sabelli, A., & Ches, C. (2011). *Decision-making under uncertainties for adapting to climate change in project environmental assessments*: Canadian Environmental Assessment Agency.
- Byer, P. H., Lalani, M. J., & Yeomans, J. S. (2009). Addressing and Communicating Climate Change and Its Uncertainties in Project Environmental Impact Assessments. *Journal of Environmental Assessment Policy & Management*, 11(1), 29-50.
- Capstick, S., Kelly, J., Barrett, A., & Penailillo, R. (2014). *Incorporating Climate Change Impacts into Environmental Assessments*. Paper presented at the 34th Annual Conference of the International Association for Impact Assessment, Enjoy Hotel and Casino | Viña del Mar | Chile.
- Care International. (2010). Toolkit for Integrating Climate Change Adaptation into Development Projects. Care International.
- Caufield, C. (1996). *Masters of illusion: the World Bank and the poverty of nations*: Henry Holt.
- Chang, I.-S., & Wu, J. (2013). Integration of climate change considerations into environmental impact assessment—implementation, problems and recommendations for China. *Frontiers of Environmental Science & Engineering*, 7(4), 598-607.
- Chay, N. (2006). *Toward an effective international development assistance: grassroots level community in Cambodia*. (Doctor Degree), Waseda University, Japan.
- CIF. (2009a). Countries Identified for Scaled-Up Adaptation Funding: Governments make decisions on climate resilience pilot program. Washington DC: World Bank.
- CIF. (2009b). Programming and Financing Modalities for the SCF Targeted Program, The Pilot Program for Climate Resilience (PPCR). Washington DC: World Bank.
- CIF. (2011). Strategic Program for Climate Resilience for Cambodia. Washington DC: World Bank.

- Clark, D., Fox, J. A., & Treakle, K. (2003). *Demanding Accountability: Civil Society Claims and the World Bank Inspection Panel*: Rowman & Littlefield Publishers.
- Clement, F. C. (2008). *A multi-level analysis of forest policies in Northern Vietnam: Uplands, people, institutions and discourses*. Newcastle University.
- Commune Database Online. (2014). Commune Database Online (Online Database). Retrieved 1 October 2013 <http://db.ncdd.gov.kh/cdbonline/home/index.castle>
- Connell, J. (2015). Is “good” resettlement policy unimplementable? Learning from advocacy in Cambodia. *Development in Practice*, 25(5), 655-672.
- Cox, M., & Ostrom, E. (2010). *Applying A Social-Ecological System Framework to the Study of the Taos Valley Irrigation System Over Time*. Paper presented at the 13th Economics of Infrastructures Conference, Delft University of Technology.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: Sage.
- Creswell, J. W., Hanson, W. E., Plano, V. L. C., & Morales, A. (2007). Qualitative research designs selection and implementation. *The Counselling Psychologist*, 35(2), 236-264.
- Cuevas, S. C., Peterson, A., & Morrison, T. (2014). An Analytical Framework for Investigating Complex Institutions in Climate Change Adaptation: The Institutional Environment Matrix *Handbook of Climate Change Adaptation* (pp. 1-22): Springer.
- Cuevas, S. C., Peterson, A., Morrison, T., & Robinson, C. (2015). Challenges in mainstreaming climate change adaptation into local land use planning: evidence from Albay, Philippines. *International Journal of Climate Change: impacts and responses*, 7, 45-65.
- Curtis, B., Ness, B., & Ironwood, M. (2005). *Integrating Climate Change Adaptation Capabilities into the US Environmental Impact Assessment Process: Prospects According to Practitioners*. Lunds Universitet.
- D'Agostino, A., & Sovacool, B. (2011). Sewing climate-resilient seeds: implementing climate change adaptation best practices in rural Cambodia. *Mitigation & Adaptation Strategies for Global Change*, 16(6), 699-720. doi: 10.1007/s11027-011-9289-7
- Dalal-Clayton, B., & Bass, S. (2009). The challenges of environmental mainstreaming. *Issues Paper, International Institute for Environment and Development* (available at www.environmental-mainstreaming.org).
- David, A., Braby, J., Zeidler, J., Kandjinga, L., & Ndokosho, J. (2013). Building adaptive capacity in rural Namibia: Community information toolkits on climate change. *International Journal of Climate Change Strategies and Management*, 5(2), 215-229.

- Dazè, A., Ravesloot, B., & TANGO International. (2013). Cambodia Environmental and Climate Change Assessment. Cambodia.
- Denzin, N. K., & Lincoln, Y. S. (2008). Competing Paradigms in Qualitative Research / Egon G. Guba & Yvonna S. Lincoln *The landscape of qualitative research / Norman K. Denzin, Yvonna S. Lincoln, editors*: Los Angeles : Sage Publications, c2008.
- Donner, S. D., & Webber, S. (2014). Obstacles to climate change adaptation decisions: a case study of sea-level rise and coastal protection measures in Kiribati. *Sustainability science*, 9(3), 331-345.
- Douven, W., & Buurman, J. (2013). Planning practice in support of economically and environmentally sustainable roads in floodplains: The case of the Mekong delta floodplains. *Journal of environmental management*, 128, 161-168.
- Douven, W., Buurman, J., Beevers, L., Verheij, H., Goichot, M., Nguyen, N. A., . . . Ngoc, H. M. (2012). Resistance versus resilience approaches in road planning and design in delta areas: Mekong floodplains in Cambodia and Vietnam. *Journal of Environmental Planning and Management*, 55(10), 1289-1310.
- Douven, W., Goichot, M., & Verheij, H. (2009). Roads and Floods: Best Practice Guidelines for the Integrated Planning and Design of Economically Sound and Environmentally Friendly Roads in the Mekong Floodplains of Cambodia and Viet Nam: Synthesis Report: Delft Cluster.
- Ear, S. (2007a). Does Aid Dependence Worsen Governance? *International Public Management Journal*, 10(3), 259-286. doi: 10.1080/10967490701515580
- Ear, S. (2007b). The Political Economy of Aid and Governance in Cambodia. *Asian Journal of Political Science*, 15(1), 68-96. doi: 10.1080/02185370701315624
- Eng, N. (2014). *The politics of decentralisation in Cambodia: the district level*. (PhD), Monash University, Victoria, Australia. Retrieved from <http://arrow.monash.edu.au/hdl/1959.1/965644>
- European Commission. (2010). *Global Climate Change Alliance Regional Conference for Asia Report* Dhaka, Bangladesh.
- Fünfgeld, H. (2010). Institutional challenges to climate risk management in cities. *Current Opinion in Environmental Sustainability*, 2(3), 156-160.
- Furlow, J., Smith, J. B., Anderson, G., Breed, W., & Padgham, J. (2011). Building resilience to climate change through development assistance: USAID's climate adaptation program. *Climatic change*, 108(3), 411-421.
- Gero, A., Méheux, K., Dominey-Howes, D., Dalezios, N. R., & Pavol, N. (2011). Integrating community based disaster risk reduction and climate change adaptation: examples from the Pacific. *Natural Hazards & Earth System Sciences*, 11(1), 101-113. doi: 10.5194/nhess-11-101-2011

- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory; strategies for qualitative research* [by] Barney G. Glaser and Anselm L. Strauss: Chicago, Aldine Pub. Co. [1967].
- Goldman, M. (2005). *Imperial nature: the World Bank and struggles for social justice in the age of globalization*. New Haven and London: Yale University Press.
- Gutner, T. (2002). *Banking on the environment: Multilateral development banks and their environmental performance in Central and Eastern Europe*. Cambridge, MA and London: MIT Press.
- Gutner, T. (2005). Explaining the gaps between mandate and performance: agency theory and World Bank environmental reform. *Global Environmental Politics*, 5(2), 10-37.
- Heng, C. (2014). *Changing aid landscape and Cambodia's future development agenda*. Paper presented at the Aid Development Policy 2014, Australia National University <http://devpolicy.org/2015-Australasian-aid-conference/presentations/Plenary-1/Heng-Chou.pdf>
- Heng, P. (2012). Cambodia–China Relations: A Positive-Sum Game? *Journal of Current Southeast Asian Affairs*, 31(2), 57-85.
- Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative health research*, 15(9), 1277-1288.
- Hug, S., & Reid, H. (2009). Mainstreaming Adaptation in Development. In E. L. F. Schipper & I. Burton (Eds.), *Adaptation to Climate Change* (pp. 313-322). UK: Earthscan.
- Hughes, C. (2009). *Dependent communities: aid and politics in Cambodia and East Timor*: SEAP Publications.
- Hughes, C., & Un, K. (2011). *Cambodia's economic transformation*. Copenhagen: NIAS Press.
- Huq, S., & Ayers, J. (2008). Taking steps: mainstreaming national adaptation. *IIED Briefing Paper*, IIED.
- IAIA. (2010a). Background Document for the November 2010: IAIA Climate Change and Impact Assessment Symposium *IAIA climate change and impact assessment symposium*. Denmark: International Association for Impact Assessment.
- IAIA. (2010b). *Climate Change and Impact Assessment Special Symposium*. Paper presented at the IAIA climate change and impact assessment symposium, Denmark.
- ICEM. (2015). Mainstreaming Climate Resilience into Development Planning in Cambodia (TA 8179-CAM) Package 1. Cambodia: ICEM.

- IDB. (2007). Disaster risk management policy: Inter-American Development Bank.
- IDB. (2015). Addressing climate change within disaster risk management: A practical guide for IDB project *Technical Note N. IDB-TN-806*: Inter-American Development Bank.
- Independent Evaluation Group. (2011). *Adapting to Climate Change: Assessing World Bank Group Experience*. World Bank, Washington DC.
- Inderberg, T. H., & Eikeland, P. O. (2009). Limits to adaptation: analysing institutional constraints. In W. N. Adger, I. Lorenzoni & K. L. O'Brien (Eds.), *Adapting to climate change: thresholds, values, governance*: Cambridge University Press, 2009.
- IPCC. (2007a). *Climate Change 2007: impacts, adaptation and vulnerability: contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change / edited by Martin Parry ... [et al.]*: Cambridge, U.K. ; New York : Cambridge University Press, 2007.
- IPCC. (2007b). Fourth Assessment Report: Climate Change 2007. Retrieved 28 November 2012, from http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch18s18-7-1.html
- IPCC. (2014). *Climate Change 2014–Impacts, Adaptation and Vulnerability: Regional Aspects*: Cambridge University Press.
- John, C., & Try, T. (2012). Mid-Term Review: Cambodia Climate Change Alliance. Cambodia: UNDP.
- Joshi, N. N., Ostrom, E., Shivakoti, G. P., & Lam, W. F. (2000). Institutional opportunities and constraints in the performance of farmer-managed irrigation systems in Nepal. *Asia-Pacific Journal of Rural Development*, 10(2), 67-92.
- Kakegawa, M. (2012). *Improving institutional accountability: Environmental and social policy compliance in Asian Development Bank-funded projects in Cambodia, Laos, and Vietnam*. (Doctoral Degree), University of California, Santa Cruz.
- Käkönen, M., Lebel, L., Karhunmaa, K., Va, D., & Try, T. (2014). Rendering Climate Change Governable in the Least-Developed Countries: Policy Narratives and Expert Technologies in Cambodia. *Forum for Development Studies*, 41(3), 351-376.
- Kamau, J. W., & Mwaura, F. (2013). Climate change adaptation and EIA studies in Kenya. *International Journal of Climate Change Strategies and Management*, 5(2), 152-165.
- Kartha, S., Bhandari, P., van Schaik, L., Cornland, D., & Kjelle'n, B. (2006). Adaptation as a strategic issue in the climate negotiations. Nairobi: Centre for European Policy Studies (CEPS).

- KCI. (2011). Technical Assistance Consultant's Report for Cambodia: Preparing the Provincial Roads Improvement Programme (TA 7665-CAM). Phnom Penh, Cambodia: Korea Consultants International.
- KCI. (2015). Provincial Road Improvement Programme: Environmental Monitoring Report, January to June 2015. Phnom Penh, Cambodia: Korea Consultants International (KCI) Ltd., .
- Keller, G. R. (2002). Rural Roads Vulnerability Reduction Assessment, Mitigation Measures, and Training. *Natural Hazards Review*, 3(4), 139-147.
- Kim, S., & Chem, P. (2014). Climate Change Vulnerability and Adaptation Assessment: Methods and Tools Applied in Cambodia, Special Report No. 13. Phnom Penh, Cambodia: Cambodia Development Resource Institute (CDRI).
- Klein, R. J., Kartha, S., Persson, A., Watkiss, P., Ackerman, F., Downing, T. E., & Kjellen, B. (2008). Adaptation: Needs, financing and institutions. Stockholm, Sweden: Stockholm Environment Institute.
- Klein, R. J. T., Eriksen, S. E. H., Næss, L. O., Hammill, A., Tanner, T. M., Robledo, C., & O'Brien, K. L. (2007). Portfolio screening to support the mainstreaming of adaptation to climate change into development assistance. *Climatic Change*, 84(1), 23-44.
- Klein, R. J. T., & Möhner, A. (2011). The Political Dimension of Vulnerability: Implications for the Green Climate Fund. *IDS Bulletin*, 42(3), 15-22. doi: 10.1111/j.1759-5436.2011.00218.x
- Klein, R. J. T., Schipper, E. L. F., & Dessai, S. (2005). Integrating mitigation and adaptation into climate and development policy: three research questions. *Environmental Science & Policy*, 8(6), 579-588. doi: 10.1016/j.envsci.2005.06.010
- Lapitan, R. (2011). *Climate risk reduction and climate change adaptation: strategizing entry points and mainstreaming in the Philippine EIA [environmental impact assignment] system*. Paper presented at the Metro Manila Commission Professorial Chair Lecture, CFNR, College, Laguna (Philippines), 28 Jun 2011.
- Lasco, R. D., Pulhin, F. B., Jaranilla-Sanchez, P. A., Delfino, R. J. P., Gerpacio, R., & Garcia, K. (1996). Mainstreaming Climate Change Adaptation in the Philippines: CRAF-Philippines.
- Lasco, R. D., Pulhin, F. B., Jaranilla-Sanchez, P. A., Delfino, R. J. P., Gerpacio, R., & Garcia, K. (2009). Mainstreaming adaptation in developing countries: The case of the Philippines. *Climate and Development*, 1(2), 130-146. doi: 10.3763/cdev.2009.0009
- Lavell, A. (2004). The Lower Lempa River Valley, El Salvador: Risk Reduction and Development Project. Bankoff, G., Frerks, G., D. Hilhorst (eds.) *Mapping Vulnerability: Disasters, Development and People*, Earthscan: London.

- Lebow, R. N. (2000). Contingency, catalysts, and international system change. *Political Science Quarterly*, 115(4), 591-616.
- Levina, E., & Tirpak, D. (2006). *Adaptation to Climate Change: Key Terms*. Paris, France: OECD and International Energy Agency.
- Levy, J. S. (2008). Case studies: Types, designs, and logics of inference. *Conflict Management and Peace Science*, 25(1), 1-18. doi: 10.1080/07388940701860318
- Lewis, D., Bebbington, A. J., Batterbury, S. P., Shah, A., Olson, E., Siddiqi, M. S., & Duvall, S. (2003). Practice, power and meaning: frameworks for studying organizational culture in multi-agency rural development projects. *Journal of International Development*, 15(5), 541-557.
- Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (Vol. 4, pp. 97-128). London: SAGE Publications, Inc.
- Louis Lebel, Lailai Li, Chayanis Krittasudthacheewa, Muanpong Juntopas, Tatirose Vijitpan, Tomoharu Uchiyama, & Krawanchid, D. (2012). *Mainstreaming climate change adaptation into development planning*. Bangkok: Adaptation Knowledge Platform and Stockholm Environment Institute.
- Marshall, C., & Rossman, G. B. (2014). *Designing qualitative research*. London: SAGE Publications, Inc.
- McGinnis, M. D. (2011). Updated Guide to IAD and the Language of the Ostrom Workshop: A Simplified Overview of a Complex Framework for the Analysis of Institutions and their Development. *Policy Studies Journal*, 39(1), 163-177.
- MDBs. (2013). *Joint Report on MDB Climate Finance 2012*.
- MDBs. (2015). *Progress Report (2014–2015) of the MDB Working Group on Sustainable Transport*.
- Measham, T. G., Preston, B. L., Smith, T. F., Brooke, C., Gorddard, R., Withycombe, G., & Morrison, C. (2011). Adapting to climate change through local municipal planning: barriers and challenges. *Mitigation and Adaptation Strategies for Global Change*, 16(8), 889-909. doi: 10.1007/s11027-011-9301-2
- Merriam, S. B. (1998). *Qualitative Research and Case Study Applications in Education. Revised and Expanded from "Case Study Research in Education."*: ERIC.
- Michaelowa, A., & Michaelowa, K. (2007). Climate or development: Is ODA diverted from its original purpose? *Climatic change*, 84(1), 5-21.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. London: SAGE Publications, Inc.

- MOE. (1999). *Sub-degree on environmental impact assessment*. Phnom Penh, Cambodia: Ministry of Environment Retrieved from http://www.cambodiainvestment.gov.kh/sub-decree-72-anrk-bk-on-environment-impact-assessment-process-pdf_990811.html, accessed on 16 June 2015.
- MOE. (2009). *Cambodia Pilot Program for Climate Resilience*.
- MOE. (2011). Understanding public perceptions of climate change in Cambodia. Phnom Penh, Cambodia: Ministry of Environment.
- MOE. (2012). Cambodia Climate Change Alliance Review of Pilot Projects. Phnom Penh, Cambodia: Ministry of Environment.
- MOE. (2013a). *Cambodia Climate Change Strategic Plan 2014-2023*. Phnom Penh, Cambodia: Ministry of Environment Retrieved from <http://www.camclimate.org.kh/en/policies/nccc-news/197-cccsp-2014-2023-kh-en-final.html>.
- MOE. (2013b). *Cambodia Pilot Program for Climate Resilience (updated from the 2009 version)*. Phnom Penh, Cambodia: Ministry of Environment Retrieved from <https://www-cif.climateinvestmentfunds.org>.
- Momtaz, S. (2012). *A critical review of environmental impacts assessment system in Bangladesh using a holistic approach* (PhD), University of Newcastle.
- Mortimore, M. J. (1989). *Adapting to drought: Farmers, famines, and desertification in West Africa*: Cambridge University Press.
- Mosse, D. (2004). Is good policy unimplementable? Reflections on the ethnography of aid policy and practice. *Development and change*, 35(4), 639-671.
- Mosse, D. (2005). *Cultivating development: An ethnography of aid policy and practice (anthropology, culture and society series)*. London: Pluto Press.
- MPWT. (2010). *Provincial and Rural Road Improvement Project: Environmental and social safeguards guidelines (developed under the Policy and Human Resource Development grant (TF56974) 2009-2010*. Phnom Penh, Cambodia: MPWT.
- MPWT. (2011a). Provincial Roads Improvement Programme: Initial Environmental Examination. Phnom Penh, Cambodia: MPWT.
- MPWT. (2011b). Resettlement Plan of the Provincial Roads Improvement Programme (150B, NR53, and 151B). Phnom Penh, Cambodia: MPWT.
- MPWT. (2013a). *Climate Change Strategic Plan For Climate Change Adaptation And Greenhouse Gas Mitigation In Transport Sector*. Phnom Penh, Cambodia: Ministry of Public Works and Transport.

- MPWT. (2013b). *Provincial Roads Improvement Programme: Project Administration Manual*. Phnom Penh, Cambodia: Ministry of Public Works and Transport Retrieved from <https://www.adb.org/projects/43309-013/main>.
- MPWT. (2014a). *Climate Change Action Plan for Transport Sector 2014-2018*. Phnom Penh, Cambodia: Ministry of Public Works and Transport.
- MPWT. (2014b). *Integrated Urban Environmental Management in the Tonle Sap Basin Project – Kampong Chhnang (RRP CAM 42285-013)*. Phnom Penh, Cambodia: MPWT Retrieved from <http://www.adb.org/sites/default/files/linked-documents/42285-013-sd-02.pdf>.
- MPWT. (2014c). *Provincial Roads Improvement Programme: Updated Initial Environmental Examination 2014 (original IEE 2011)*. Phnom Penh, Cambodia: Ministry of Public Works and Transport.
- Müller, B., & Winkler, H. (2008). One step forward, two steps back? The governance of the World Bank Climate Investment Funds. *Energy and Environment Comment*. February. Oxford, UK: Oxford Institute for Energy Studies. http://www.oxfordenergy.org/pdfs/comment_0208-1.pdf.
- NCCDS. (2013). Project Implementation Database. Retrieved 20 August 2015, from <http://db.ncdd.gov.kh/pid/project/home/view.castle?pid=af31f0b7-47f5-4935-85e0-a0b600bb765a>
- NCDDS. (2009a). *Commune/Sangkat Fund Project Implementation Manual*. Phnom Penh, Cambodia: NCDDS Retrieved from www.ncdd.gov.kh.
- NCDDS. (2009b). *Guideline on Commune/Sangkat Development Plan and Commune/Sangkat Investment Project*. Phnom Penh, Cambodia: Royal Government of Cambodia Retrieved from www.ncdd.gov.kh.
- NCDDS. (2011). *Local Governments and Climate Change (LGCC) Project Document - NCDDS in partnership with UNCDF (NCDD-UNCDF) Revised 22 Sept 2012*. Phnom Penh, Cambodia: NCDDS Retrieved from www.ncdd.gov.kh.
- NCDDS. (2012a). *Local Government for Climate Resilience: Guideline to Selection of Projects for Performance Based Climate Resilience Grant Funding, 2012*. Phnom Penh, Cambodia: NCDDS Retrieved from www.ncdd.gov.kh.
- NCDDS. (2012b). Report on the performance assessment system for allocation of PBCR grants of LGCC project. Phnom Penh, Cambodia: NCDDS.
- NCDDS. (2013a). Case Study: Climate Proofing of Investment Projects in Takeo Province. Phnom Penh, Cambodia: NCDDS.
- NCDDS. (2013b). Local Government and Climate Change Annual Report 2013. Phnom Penh, Cambodia.

- NCDDS. (2013c). Second Quarterly Progress Report of Local Governments for Climate Change. Phnom Penh, Cambodia: NCDDS.
- NCDDS. (2014a). *Draft Report of the Assessment of Local Governments and Climate Change Project in Cambodia*. NCDDS. Phnom Penh, Cambodia.
- NCDDS. (2014b). *Trainers Manual: Mainstreaming Climate Change Adaptation and Disaster Risk Management into Commune/Sangkat (Sub-National) Development Planning, Presentation 2*. NCDDS. Phnom Penh, Cambodia.
- Ndiaye, R. (2009). *The World Bank's Participatory Development Approach in the Country Assistance Strategy (CAS) Paper for the Republic of Senegal: Rhetoric or Reality?*, University of Kansas.
- Neuman, W. L., & Kreuger, L. (2003). *Social work research methods: Qualitative and quantitative approaches*. Boston, United States: Allyn and Bacon.
- NGO Forum. (2013). Climate Change Financing in Cambodia. Cambodia: NGO Forum.
- NGO Forum on ADB. (2010). Mainstreaming climate change into the environmental impact assessment process: Critical analysis of projects funded by the Asian Development Bank.
- NGO Forum on Cambodia. (2015). NGOs Discuss on Environmental Impact Assessment Law. Retrieved 8 October 2015, from <http://www.ngoforum.org.kh/index.php/en/hot-news/events/267-environmental-impact-assessment-eia-law>
- Nielsen, J. Ø., & Sejersen, F. (2012). Earth System Science, the IPCC and the problem of downward causation in human geographies of Global Climate Change. *Geografisk Tidsskrift-Danish Journal of Geography*, 112(2), 194-202. doi: 10.1080/00167223.2012.741885
- Ninh, K., & Henke, R. (2005). Commune councils in Cambodia: a national survey on their functions and performance, with a special focus on conflict resolution. Phnom Penh, Cambodia: The Asia Foundation.
- OECD. (2009). Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance. Paris, France: OECD Publishing.
- Operations Evaluation Department. (2006). Special evaluation study of environmental safeguards. Manila: Asian Development Bank.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge, England: Cambridge University Press.
- Ostrom, E. (2009). *Understanding institutional diversity*. Princeton, United States: Princeton University Press.

- Ostrom, E. (2011). Background on the institutional analysis and development framework. *Policy Studies Journal*, 39(1), 7-27.
- Ostrom, E., Schroeder, L., & Wynne, S. (1993). *Institutional incentives and sustainable development: infrastructure policies in perspective*: Westview Press.
- Pak, K. (2010). *A Dominant Party in a Weak State: How the Ruling Party in Cambodia Has Managed to Stay Dominant*. (Doctoral Degree), The Australian National University.
- Palutikof, J., Parry, M., Stafford Smith, M., Ash, A. J., Boulter, S. L., & Waschka, M. (2003). The past, present, and future of adaptation: setting the context and naming the challenges. In J. Palutikof, S. L. Boulter, A. J. Ash, M. Stafford Smith, M. Parry, M. Waschka & D. Guitart (Eds.), *Climate Adaptation Futures* (pp. 3-29). United Kingdom: John Wiley & Sons.
- Park, S. (2015). Assessing Accountability in Practice: The Asian Development Bank's Accountability Mechanism. *Global Policy*, 6(4), 455-465.
- Pasgaard, M. (2015). Lost in translation? How project actors shape REDD+ policy and outcomes in Cambodia. *Asia Pacific Viewpoint*, 56(1), 111-127.
- Persson, Å., & Klein, R. J. T. (2008). *Mainstreaming adaptation to climate change into official development assistance: integration of long-term climate concerns and short-term development needs*. Paper presented at the Conference on the Human Dimensions of Global Environmental Change: Long-Term Policies: Governing Social-Ecological Change, Berlin.
- Persson, Å., & Klein, R. J. T. (2009). Mainstreaming adaptation to climate change in official development assistance: Challenges to foreign policy integration. *Climate Change and Foreign Policy: Case Studies from East to West*, 162-177.
- Pheakdey, H. (2015). China's role in the Cambodian energy sector: Catalyst or antagonist for development? *South East Asia Research*, 23(3), 405-422.
- Poliski, M. M., & Ostrom, E. (1999). *An institutional framework for policy analysis and design*. Paper presented at the Workshop in Political Theory and Policy Analysis Working Paper W98-27. Indiana University, Bloomington, IN.
- QSR International. (2012). *The NVivo Workbook*: QSR International Pty, Ltd.,.
- Quintero, J. D. (2007). *Mainstreaming Conservation in Infrastructure Projects: Case Studies from Latin America*. Washington DC: World Bank.
- Rai, N., Huq, S., & Huq, M. J. (2014). Climate resilient planning in Bangladesh: a review of progress and early experiences of moving from planning to implementation. *Development in Practice*, 24(4), 527-543. doi: 10.1080/09614524.2014.908822
- Regi, B. R., & Star, C. (2014). Identifying operational mechanisms for mainstreaming community-based adaptation in Nepal. *Climate and Development*, 6(4), 306-317.

- Regmi, B. R., & Bhandari, D. (2013). Climate change adaptation in Nepal: Exploring ways to overcome the barriers. *Journal of Forest and Livelihood*, 11(1), 43-61.
- Regmi, M. B., & Hanaoka, S. (2011). A survey on impacts of climate change on road transport infrastructure and adaptation strategies in Asia. *Environmental Economics and Policy Studies*, 13(1), 21-41.
- Rich, B. (2013). *Mortgaging the earth: The World Bank, environmental impoverishment, and the crisis of development*. Washington, Covelo and London: Island Press.
- Richter, I. (2014). Guideline on mainstreaming of climate change and disaster measures into sub-national planning (commune level): NCDDS.
- Riddell, R. C. (2007). *Does foreign aid really work?* : Oxford University Press.
- Rosien, J. (2010). Understanding the Asian Development Bank's Safeguard Policy: What protections does the Bank's new Safeguard Policy provide for communities and the environment? In K. Dinh (Ed.). Victoria, Australia: Oxfam Australia.
- Roy, A. (2010). *Poverty capital: Microfinance and the making of development*. New York and London: Routledge.
- Royal Government of Cambodia. (2003). Cambodia Millennium Development Goals Report 2003.
- Saito, N. (2014). Climate-proofing urban infrastructure in developing countries: challenges, advantages, and considerations under uncertainty. *Society for Social Management Systems Internet Journal*.
- Sarantakos, S. (1998). *Social research / Sotirios Sarantakos*: Basingstoke, Hamps. : Macmillan, 1998. 2nd ed.
- Sato, J., Shiga, H., Kobayashi, T., & Kondoh, H. (2011). "Emerging donors" from a recipient perspective: An institutional analysis of foreign aid in Cambodia. *World Development*, 39(12), 2091-2104.
- Schipper, E. L. F. (2004). *Exploring adaptation to climate change: A development perspective*. (Doctoral Dissertation), University of East Anglia.
- Schipper, E. L. F. (2006). Conceptual History of Adaptation in the UNFCCC Process. *Review of European Community & International Environmental Law*, 15(1), 82-92.
- Schipper, E. L. F., & Burton, I. (2009). *Understanding Adaptation: Origins, Concepts, Practice and Policy*. Stockholm: Earthscan Publishers.
- Sean Capstick, J. K., and Allison Barrett. (2014). *Incorporating Climate Change Impacts into Environmental Assessments*. 34th Annual Conference of the International Association for Impact Assessment.

- Seballos, F., & Kreft, S. (2011). Towards an Understanding of the Political Economy of the PPCR. *IDS Bulletin*, 42(3), 33-41. doi: 10.1111/j.1759-5436.2011.00220.x
- SEI. (2015). Climate change adaptation readiness in the ASEAN countries. Chulalongkorn University, Bangkok, Thailand: Stockholm Environment Institute - Asia.
- Serrao-Neumann, S., Choy, D. L., van Staden, R., Crick, F., Sahin, O., Guan, H., & Chai, G. (2011). *Climate Change Impacts on Road Infrastructure Systems and Services in South East Queensland: Implications For Infrastructure Planning And Management*. Paper presented at the State of Australian Cities Conference 2011 Proceedings, State of Australian Cities National Conference.
- Sietz, D., Boschütz, M., & Klein, R. J. T. (2011). Mainstreaming climate adaptation into development assistance: rationale, institutional barriers and opportunities in Mozambique. *Environmental Science and Policy*, 14, 493-502. doi: 10.1016/j.envsci.2011.01.001
- Sietz, D., Boschütz, M., Klein, R. J. T., Lotsch, A., & World Bank. (2008). Mainstreaming climate adaptation into development assistance in Mozambique: institutional barriers and opportunities *Policy research working paper 4711*. Washington, D.C.: World Bank.
- Sok, V., Boruff, B. J., & Morrison-Saunders, A. (2011). Addressing climate change through environmental impact assessment: international perspectives from a survey of IAIA members. *Impact Assessment and Project Appraisal*, 29(4), 317-325.
- South Pacific Regional Environment Programme, & World Bank. (2010). Guide to the Integration of Climate Change Adaptation into the Environmental Impact Assessment (EIA) Process. Apia, Samoa: Caribbean Community (CARICOM) and South Pacific Regional Environment Programme (SPREP).
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, California: Sage.
- Stephen, D. (2013). How much adaptation: are existing policy and institutions enough? . In J. Palutikof, S. L. Boulter, A. J. Ash, M. Stafford Smith, M. Parry, M. Waschka & D. Guitart (Eds.), *Climate Adaptation Futures [electronic resource]*. Chichester: Wiley.
- Suraje, D., Xianfu, L., & James, S. R. (2005). On the role of climate scenarios for adaptation planning. *Global Environmental Change*, 15, 87-97. doi: 10.1016/j.gloenvcha.2004.12.004
- Sveiven, S. (2010). Are the European financial institutions climate proofing their investments. Amsterdam, Netherlands: Instituut voor Milieuvraagstukken, Vrije Universiteit.

- Tan, C. (2008). No Additionality, New Conditionality: A Critique of the World Bank's Proposed Climate Investment Funds. *Third World Network*, <http://www.foe.org> (accessed 20 December 2010).
- Tang, S. (2011). *A General Theory of Institutional Change*. London and New York: Routledge.
- Tol, R. S., Fankhauser, S., & Smith, J. B. (1998). The scope for adaptation to climate change: what can we learn from the impact literature? *Global Environmental Change*, 8(2), 109-123.
- Trærup, S. L. M. (2010). *Ensuring Sustainable Development within a Changing Climate*. (Doctoral Degree Publications), University of Copenhagen.
- Uittenbroek, C. J., Janssen-Jansen, L. B., & Runhaar, H. A. C. (2012). Mainstreaming climate adaptation into urban planning: overcoming barriers, seizing opportunities and evaluating the results in two Dutch case studies. *Regional Environmental Change*, 13(2), 399-411. doi: 10.1007/s10113-012-0348-8
- UNCDF, UNDP, & UNEP. (2010). Local Governance and Climate Change. Phnom Penh, Cambodia: UNCDF, UNDP, UNEP.
- UNDP. (2009a). Cambodia Climate Change Alliance Program Document. Phnom Penh, Cambodia: UNDP.
- UNDP. (2009b). Guidelines for Climate Change Proofing in UNDP Projects and Program in Armenia. Armenia: UNDP.
- UNDP. (2010). Screening Tools and Guidelines to Support the Mainstreaming of Climate Change Adaptation into Development Assistance – A Stocktaking Report. Phnom Penh, Cambodia: UNDP.
- UNDP. (2011). Cambodia Human Development Report: The future for rural livelihoods in the face of climate (pp. xi). Phnom Penh, Cambodia: UNDP.
- UNDP. (2012). Cambodia Climate Change Country Phnom Penh, Cambodia: UNDP.
- UNDP. (2013). Cambodia United Nations Development Programme Annual Report 2013. Phnom Penh, Cambodia: UNDP.
- UNDP. (2015). Practitioner's Handbook: Implementing the Vulnerability Reduction Assessment. Phnom Penh, Cambodia: UNDP.
- Uy, N., & Shaw, R. (2010). Climate change adaptation in ASEAN: Actions and challenges. *Climate Change Adaptation and Disaster Risk reduction: Issues and Challenges. Community, Environment and Disaster Risk Management*, 4, 349-368.
- Va, D. (2015). *Climate Change Adaptation Planning in Cambodia and Potential for Improvement* (PhD), Bond University, Australia.

- Va, D. (Forthcoming). *Integrating community knowledge into local planning for climate change in Cambodia*. Phnom Penh, Cambodia.
- Va, D., Bajracharya, B., Lebel, L., Regan, M., & Taplin, R. (2015). Narrowing gaps between research and policy development in climate change adaptation work in the water resources and agriculture sectors of Cambodia. *Climate Policy* (ahead-of-print), 1-16.
- VoA. (2015). World Bank Does Little As Villagers Threatened and Jailed for Protesting Big Projects. Retrieved 14 September 2015, from <http://www.voacambodia.com/content/world-bank-does-little-as-villagers-threatened-and-jailed-for-protesting-big-projects/2959923.html>
- Wade, R. (1997). Greening the Bank: the struggle over the environment, 1970-1995. *The World Bank: its first half century*, 2, 611-734.
- Wapenhans, W. (1994). The Political Economy of Structural Adjustment: An External Perspective. In R. V. D. Hoeven & F. V. D. Kraaij (Eds.), *Structural Adjustment and Beyond in Sub-Saharan Africa*. London, UK & Portsmouth NH: Ministry of Foreign Affairs (DGIS), The Hague in association with James Currey.
- Watts, M., & Peet, R. (2004). Liberating political ecology. *Liberation ecologies: Environment, development, social movements*, 2.
- Webber, S. (2008). *Adapting kiribati, adapting projects: What happens when the world bank does climate change adaptation?*, University of British Columbia.
- Webber, S. (2015a). *Adaptation ecologies: circuits of climate change finance, policy, and science in the Pacific Islands*. (Doctoral Degree), University of British Columbia, Columbia.
- Webber, S. (2015b). Mobile Adaptation and Sticky Experiments: Circulating Best Practices and Lessons Learned in Climate Change Adaptation. *Geographical Research*, 53(1), 26-38.
- Wenar, L. (2006). Accountability in international development aid. *Ethics & International Affairs*, 20(1), 1-23.
- Wesley, M. S. (2003). *Regional Organisations of the Asia-Pacific: Exploring Institutional Change*: <http://dx.doi.org/10.1057/9781403944023>.
- Wickham, M., & Woods, M. (2005). Reflecting on the Strategic Use of CAQDAS to Manage and Report on the Qualitative Research Process. *The qualitative report*, 10(4), 687-702.
- World Bank. (2003). Project Appraisal Document, Cambodia-Rural Investment and Local Governance Program (RILGP). Washington DC: World Bank.

- World Bank. (2009). Reducing the Risk of Disaster and Climate Vulnerability in the Pacific Islands - Republic of Kiribati Country Assessment. Washington DC: World Bank.
- World Bank. (2011). Implementation Completion and Results Report, Cambodia-Rural Investment and Local Governance Project Washington DC: World Bank.
- World Bank. (2012). Enhancing the climate resilience of the west coast road project: The pilot program for climate resilience (PPCR) to the Independent State of Samoa *Project Appraisal Document (PAD)*. Washington DC: World Bank.
- World Bank. (2015). Ketsona Emergency Reconstruction and Rehabilitation Project: Implementation Completion Report (ICR). Washington DC: World Bank.
- World Bank. (2016). Project Appraisal Document of Land Allocation for Social and Economic Development Project II. Washington DC: World Bank.
- Xiangbai, H. (2013). Integrating climate change factors within China's environmental impact assessment legislation: New challenges and developments. *Environment and Development Journal*.
- Yamin, F. (2005). The European Union and future climate policy: is mainstreaming adaptation a distraction or part of the solution? *Climate Policy*, 5(3), 349-361.
- Yasuda, Y. (2015). *Rules, Norms and NGO Advocacy Strategies: Hydropower Development on the Mekong River*. New York: Routledge.
- Yi, J., & Hacking, T. (2011). Incorporating Climate Change into Environmental Impact Assessment: Perspectives from Urban Development Projects in South Korea. *Procedia Engineering*, 21, 907-914. doi: 10.1016/j.proeng.2011.11.2093
- Yin, R. K. (1994). *Case study research: design and methods* (2 ed.). Thousand Oaks California: Sage.
- Yin, R. K. (2009). *Case study research: design and methods* (4 ed.). California: Sage.
- Yin, R. K., & Davis, D. (2007). Adding new dimensions to case study evaluations: The case of evaluating comprehensive reforms. *New directions for evaluation*, 2007(113), 75-93.
- Youker, R. (2015). Managing international development projects—lessons learned. *PM World Journal*, IV(II), 1-3.
- Young, O. R. (2002). *The institutional dimensions of environmental change: fit, interplay, and scale*. Cambridge, Massachusetts, London, England: MIT press.

Appendix A. Data Collection Methods, Ethics, and Quality Criteria

Face-to-face interviews such as semi-structured interview, focus group discussion and casual conversation for the data collection are elaborated as the following:

A semi-structured interview is employed with specifically members of the donor task team and staff of the government implementing institutions. The representatives of the local authorities and other stakeholders were purposely selected for the interview. The order of the themes to be explored was flexible so as to allow the participants to express what they consider to be important. For the busy participants who do not have enough time for one-time interview, I managed to have a few short interviews or informal conversations so as to gather data on all the studied aspects. I developed interview guides for (i) donor task team members, (ii) staff of the government implementing institutions, (iii) stakeholders such as civil society organizations, other government agencies, and other donors, and (iv) representatives of the local authority and community people who live in the project sites.

The semi-structured interviews were conducted with experts and participants involving with the design and implementation of the case study projects. The experts and participants are from different institutions including academia, international development agencies, civil servants, civil society organizations, and consultants. They are based in Phnom Penh capital city and provincial sites (Kompong Speu, Kompong Channang, Takeo, and Battambang) in Cambodia. I also approached to interview (via Skype or telephone) consultants, donor safeguard secretariat advisors and climate change adaptation specialists who were not in Cambodia during my field research to understand their inputs, corporate policies and actions with regards to climate-resilience development practice.

To assure privacy and confidentiality, each interview was at the participants' work office or designated venue accepted by the participant during the appointment arrangement. Each semi-structured interview was posed with a range of open-ended questions and lasted in average between 45 minutes to 60 minutes.

A focus group discussion was conducted with villagers including road users and those living along the two road improvement sites. There are between 4 to 8 participants recruited for each focus group discussion. Each focus group discussion lasted around 60 minutes. The recruitment of focus group participants continued until the information collected allows for meaningful understanding of the research questions. For this research, the proposed sample size is adequate given to the in-depth nature of the information gathering process. The focus group discussions were organized in the compound of temple, charity house, and common gathering points in each commune to ensure the safety of participants and researcher. These premises are commonly accessible to the public. The premises are spacious and suitable for focus group discussion.

The focus group discussions were employed to generate the data as this method induces the bringing in of a number of informant representatives together to discuss a series of questions. The purpose of the focus group discussion is to find out what the participants' real response is to the issue, impacts, and challenges of incorporating climate change adaptation into the project-level. The data from the focus discussion enables me to obtain further information in addition to those from the individual interviews.

Each community participant was granted a small gift of appreciation (or refreshment after the focus group discussion) valued USD3.00 to USD5.00 to compensate for their time since they would otherwise be engaged in income generating/livelihood activities during this time. Every focus group discussion was tape-recorded with permission from the participants. Recording enables me to note the issues which may have been forgotten. The focus group participants' perceptions are useful for data analysis in addition to a wide range of responses which I can obtain during an individual interview.

Conversations with a wide range of participants—particularly the project beneficiaries, implementing staff, and local authorities at the project sites. The conversations allowed me to gather additional background information and to gain insight and understanding of the studied context that are not provided in the project documents and reports. The conversations specifically allowed me to informally explore the background information, responses and perceived benefits to the adaptation-mainstreaming exercise at the local-level.

Observation is crucial for the research to scrutinize how meanings are expressed materially and in action, in complementing to the face-to-face interviews, in terms of contextual information and opportunity to witness the events as they occur. I used the participatory direct observation to collect purposive data, thereby taking notes of tone of voice, silence, and agitations with regards to the interview and its settings. I always tried to be as open-minded as possible during my visit to the project sites to observe and notice every event and interaction at the two road rehabilitation sites. I wrote down my detailed observations and use them to improve my primary list of observation subjects. The observations were conducted before, during and after the face-to-face interviews. I also wrote up my personal reflection with regard to the interviews, its settings and the observations. I took as many pictures as I could for visual aid and my data analysis.

Appendix B. Interview Guides and Observation Checklist

Interview Guides

Please feel free to talk about anything you deem important. Please let me know or disregard when you prefer not to discuss about any particular question. You will remain anonymous and the information you provide me will be unknown to anyone else. Your name and identify will be changed in my thesis. Lastly, is it ok if I record this interview? I can assure you that no one but me will be in procession of the recording.

1. Self-introduction—why do you work for climate change adaptation (CCA)/Climate resilience?
2. What climate change risks impose on infrastructure/how is infrastructure vulnerable to climate change risks?
3. How to address those climate change risks from engineering measures?
4. How to address those climate change risks from non-engineering measures?
5. What do you think about using money for CCA?
6. Has this project prepared an environmental safeguard or Environmental Assessment (e.g. IEE/EIA) report? How does this IEE/EIA link to CCA /VRA?
7. Should CCA measures be addressed through IEE/EIA or VRA? Why?
8. What is your opinion about the IEE/EIA (environmental assessment safeguard) prepared for the project?
9. What is your opinion about CCA/VRA/adaptation-integrated IEE/EIA prepared for the project?
10. Which are an appropriate method and entry points for mainstreaming CCA?
11. What are enabling factors for mainstreaming CCA into the project cycle?
12. What are challenging factors for mainstreaming CCA into the project cycles?
13. How do you/donors assure the government to mainstream CCA?

14. How have stakeholders (e.g. NGO, academic, or consultant) been engaged?
15. How do the government(s) like about mainstreaming CCA?
16. How do the donors like about mainstreaming CCA?
17. How do community people react to CCA?
18. Who decided the final CCA measures/outcome?
19. What are value-added for government, donors, and community?
20. What resources are allocated for monitoring CCA implementation?
21. How CCA experience is compiled for future?
22. How shall the project-CCA be done differently without donors?
23. Additional information or question you may have at the end²⁷?

Observation Checklist at the Two Road Rehabilitation Sites

Observation Number.

Date:

Objectives: To observe the actual situation on the ground versus the content in the documents and triangulate the primary and secondary data collected.

What to observe	Remark/Note
What (potential) climate change risks do local authority and community people face?	
How do the local authority and community people address those climate change risks in their daily life?	
What are the environmental conditions of the road (e.g. before and after rehabilitation)?	
Why is the road vulnerable to flooding/intensive raining?	
How is the road vulnerable to other extreme events (e.g. drought or storm)?	

²⁷ Guides for the semi-structure interviews consisting of 23 open questions were developed and finalized incorporating comments and suggestions received during the pre-test exercise in Phnom Penh mid-August 2013. The 23 questions were used for autocodes.

Appendix B. Interview Guides and Observation Checklist

What engineering measures have been introduced for environmental protection and climate resilience purpose?	
What non-engineering (e.g. ecosystem-based adaptation) measures have been introduced for environmental protection and climate resilience?	
What drainage structures have been put in place to capture run-off or flooding problem?	
What emergency system or mechanism is available to cope with extreme climatic events (e.g. natural disaster)?	
Other observations	

Appendix C: List of Research Participants

List of participants engaged with Borey Chulsar Commune Road Improvement

Participant Number	Position/Roles	Institution/Location	Interview Date
1.	Technical Coordination and Management	UNCDF	23 October 2013
2.	Financial and Administrative Management	UNCDF	4 June 2014
3.	Technical Coordination and Management	UNCDF	27 November 2013
4.	Technical Coordination and Management	United Nations Development Programme (UNDP)	9 November 2013
5.	Technical and Trust Fund Coordination	United Nations Development Programme	9 November 2013
6.	Climate Change Consultant	Cambodia Climate Change Alliance Program	17 November 2013
7.	Climate Change and Communication Consultant	Cambodia Climate Change Alliance	18 December 2013
8.	Technical Coordination and Management	Embassy of Sweden in Cambodia	12 November 2013
9.	Programme Coordination and Management	United Nations Development Programme	26 October 2013
10.	Programme Coordination and Management	United Nations Development Programme	N.D
11.	Deputy Governor	Borey Chulsar District, Takeo	29 November 2013
12.	Commune Councilor	Borey Chulsar Commune and District, Takeo	30 November 2013
13.	Village Chief	Borey Chulsar Commune and District, Takeo	29 November 2013
14.	Village Chief	Borey Chulsar Commune and District, Takeo	29 November 2013
15.	Development Planning and Administration	Battambang Governor Office	June 2014
16.	Village Chief	Battambang -Thmarkaul	June 2014
17.	District Development Planning	Battambang -Thmarkaul	June 2014
18.	Financial and Administrative Management	Cambodia Climate Change Alliance Program	9 November 2013
19.	Cost-Benefit Analyses Expert	Cambodia Climate Change Alliance Program	17 November 2013
20.	National Planning and Technical Coordination	National Committee for Sub-National Democratic Development (NCDDS)	1 November 2013

Appendix C: List of Research Participants

21.	Provincial Planning and Technical Coordination	LGCC Takeo	28 November 2013
22.	District Planning and Technical Coordination	LGCC Takeo	22 November 2013
23.	Technical Service Contractor 1	LGCC Takeo	2 December 2013
24.	Technical Service Contractor 2	Battambang	June 2014
25.	Technical Service Contractor 3	Battambang	June 2014
26.	Infrastructure Advisor	Battambang	June 2014
27.	District Planning and Technical Coordination	Battambang -Thmarkaul	June 2014
28.	Clergyman	Battambang -Thmarkaul	June 2014
29.	Infrastructure Advisor	NCDDS LASED	1 June 2014
30.	Environmental Safeguard Coordination and Management	NCDDS	3 June 2014
31.	Environmental Safeguard Coordination and Management	NCDDS through Small Holders Program	2 June 2014
32.	Planning and Administrative Management	Borey Chulsar District	1 June 2014
33.	Commune Technical Support Unit	Borey Chulsar District	1 June 2014
34.	Technical Service Contractor 4	Dike at Pey Village, Bati	June 2014
35.	Technical Service Contractor 5	replaced Kong Mao BoreiChulsar	June 2014
36.	Technical Service Contractor 6	replaced Kong Mao in Pey village Bati	June 2014
37.	Former Commune Councilor	Borey Chulsar	June 2014
38.	Vender (Focus Group Discussion (FGD1))	Ang Kroch	29 November 2013
39.	Farmer	Ang Kroch	-
40.	Student	Ang Kroch	-
41.	Farmer	Ang Kroch	-
42.	Farmer (FGD2)	Ang Kroch	30 November 2013
43.	Dressmaker	Ang Kroch	-

Appendix C: List of Research Participants

44.	Dressmaker	Ang Kroch	-
45.	Farmer	Ang Kroch	-
46.	Farmer	Ang Kroch	-
47.	Vender	Ang Kroch	-
48.	Student	Ang Kroch	-
49.	Farmer (FGD3)	Borey Chulsar Village	30 November 2013
50.	Farmer	Borey Chulsar Village	-
51.	Vender	Borey Chulsar Village	-
52.	Farmer	Borey Chulsar Village	-
53.	Farmer	Borey Chulsar Village	-
54.	Elderly adult (FGD4)	Borey Chulsar Village	30 November 2013
55.	Elderly adult	Borey Chulsar Village	-
56.	Villager	Borey Chulsar Village	-
57.	Villager	Borey Chulsar Village	-
58.	Villager	Borey Chulsar Village	-
59.	Villager	Borey Chulsar Village	-

List of participants engaged with Case Study Two, Provincial Road 150B Improvement

60.	Climate Change Advisor	Freelancer	Nov 2014
61.	Transport Specialist	Asian Development Bank	19 August 2013
62.	Programme Coordination and Management	Asian Development Bank	6 September 2013
63.	Climate Change Specialist	Asian Development Bank	13 September 2013
64.	Climate Change Specialist	Asian Development Bank	21 September 2013
65.	Climate Change Consultant	Asian Development Bank	21 September 2013

Appendix C: List of Research Participants

66.	Environmental Specialist	Asian Development Bank	14 November 2013
67.	Climate Change Specialist	Korean Consultants International	15 November 2013
68.	Infrastructure Specialist	Asian Development Bank	30 August 2013
69.	Environmental Specialist	World Bank	27 October 2013
70.	Environmental Specialist	World Bank/Cambodia Climate Change Alliance Program	27 October 2013
71.	Infrastructure Programme Coordination and Management	AusAID (DFAT now)	31 October 2013
72.	Independent Researcher and Consultant	Ministry of Land, Urbanization and Construction	26 October 2013
73.	Deputy Director	Ministry of Environment	11 September 2013
74.	Social and Environmental Planning and Management	Ministry of Public Works and Transport (MPWT)	1 November 2013
75.	Programme Coordination and Management	Ministry of Public Works and Transport (MPWT)	18 August 2013
76.	EIA Lecturer and Consultant	Royal University of Phnom Penh	5 September 2013
77.	Deputy Director	Ministry of Environment	23 October 2013
78.	Deputy Director	Ministry of Rural Development	14 November 2013
79.	Environmental Specialist	Ministry of Rural Development and Ministry of Public Works and Transport	3 and 12 September 2013
80.	Environmental Specialist	Ministry of Public Works and Transport/ Korean Consultants International	8 November 2013
81.	Climate Change Specialist	Ministry of Rural Development	23 October and 12 November 2013
82.	Climate Change Specialist	Ministry of Rural Development	15 November 2013
83.	Climate Change Advisor	Ministry of Environment	26 November 2013
84.	Road Engineer	Korean Consultants International	2 December 2013
85.	Team Leader	Korean Consultants International	16 December 2013
86.	Programme Manager	Ministry of Public Works and Transport (MPWT)	16 December 2013
87.	Team Member and Leader	Egis Ltd.	4 June 2014

Appendix C: List of Research Participants

88.	Team Member and Leader	Egis Ltd.	4 June 2014
89.	Engineer	Ministry of Rural Development	25 November 2013
90.	Engineer	Ministry of Rural Development	26 November 2013
91.	Climate Change Adaptation Specialist	Nordic Development Fund at Ministry of Rural Development	26 November 2013
92.	Land management Advisor	Ministry of Land, Construction and Urbanization	21 August 2013
93.	Environmental Lecturer and Consultant	Royal University of Phnom Penh	25 October 2013
94.	Farmer (FGD 5)	Taches Commune	1 September 2013
95.	Farmer	Taches Commune	1 September 2013
96.	Vender	Taches Commune	1 September 2013
97.	Vender	Taches Commune	1 September 2013
98.	Vender	Taches Commune	1 September 2013
99.	Housewife (FGD 6)	Taches Commune	1 September 2013
100.	Farmer	Taches Commune	1 September 2013
101.	Farmer	Taches Commune	1 September 2013
102.	Farmer	Taches Commune	1 September 2013
103.	Farmer	Taches Commune	1 September 2013