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GOVERNING REDD+ IN CAMBODIA
Co-production of salient, credible and legitimate policy knowledge

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A DISSERTATION

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Abstract

This dissertation examines the processes and factors that influence how Cambodia's National REDD+ Strategy (NRS) and three of the policy documents that constituted its thematic chapters were produced. These are 1) Assessment of land use, forest policy and governance in Cambodia (Drivers Study), 2) Designing an effective, efficient, and equitable system for allocation of incentives for REDD+ in Cambodia (Financing Study), and 3) Preliminary review and approach to develop a safeguards information system for REDD+ in Cambodia (Safeguards Study). Various methods were used to conduct the research, such as analyses of archival materials, institutional ethnography, semi-structured interviews with key informants, observations of REDD+ policy dialogues, and focus group discussions. Data collection was from April 2013 to December 2015. Data analyses were done with the aid of a data analysis software, NVivo 10. A combination of functions were used to perform broad-brush and specific explorations of the coded data.

Findings from this dissertation are presented in two parts. First, the monograph empirically reveals that no final decisions were adopted on findings from any of the three case studies despite the fact that each of them took between one to two years to produce. Most importantly, key results from these studies were not used in the NRS drafting process. The reasons for this omissions vary depending on the study. For example, results from the Drivers Study were not usable in the NRS since it produced no consensus on the drivers of deforestation and forest degradation. Stakeholders rationalize their reservations regarding the Drivers Study on the ground of its data credibility, saliency and legitimacy. On the other hand, results from the Financing Study were not usable in the NRS because the study simply failed to achieve its main objective – that was, producing a compelling case to convince stakeholders that REDD+ can be an attractive economic option for them to transform their business-as-usual practices to a management regime that would benefit them. Findings from the Safeguards Study were not readily usable for the NRS because decision makers complained that its content might be too technically complicated to be implementable. Finally, while six NRS working drafts were produced and consulted with more than 1,000 stakeholders from local to international level, the content presented at COP21 of the UNFCCC was not those of the working drafts. As of March 2016, finalization of the NRS is still pending.

The second part of the monograph theoretically explores this discrepancy through concepts in sustainability science and political ecology. Based on findings from the three case studies and the NRS, the monograph makes the central argument that while boundary work does contribute to stakeholders' perceptions of REDD+ policy documents as salient, credible and legitimate, the effectiveness of this boundary work depends on the combined impacts of contexts and boundary agents. Although contexts for the production of the four case studies are characterized by multiple sources and uses of knowledge, this study found that the former is less significant than the latter. It also found that in highly politicized contexts, effective boundary work is performed through boundary agents, instead of the formally established institutional arrangements. Boundary agents are defined by their abilities to facilitate communication, translation and mediation of the different political and personal interests that stakeholders bring into the policy process. The dissertation concludes that the process to develop a NRS and its content is both a technical and political exercise. Therefore, the ability to establish and to manage political alliances or strategic partnerships is crucial to ensure that the final draft of the NRS is not only technically credible, but also politically salient and legitimate for its target audiences.

Key words: Sustainability Science, Political Ecology, Effective Boundary Work, Organizational Culture, Relations of Power, National REDD+ Strategy, Cambodia

ACADEMIC HISTORY

Name: Pheakkdey Nguon **Date: May 2016**

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06/2014 – 01/2015	Wildlife Conservation Society, Institutional and Policy Specialist for drafting the National Sustainable Forest Finance Conservation Strategy in Cambodia
07/2013 – 12/2014	UN-REDD Programme via UNDP Cambodia, Lead national consultant for developing Cambodia's approach to REDD+ safeguards information system
04/2013 – 11/2014	Forestry Administration, Ministry of Agriculture, Forestry and Fisheries, Affiliate Researcher of the Office of Forest Carbon Credit and Climate Change

08/2013 – 07/2014	Ministry of Environment, National REDD+ Expert, Enhancing Climate Change Resilience of Rural Communities Living in Protected Areas in Cambodia
04/ – 05/2014	Wildlife Conservation Society, Co-author of Cambodia' Emissions Reduction Project Idea Note, submitted to the World Bank's Carbon Fund 10th Meeting.
11/2013	Fauna and Flora International and Non-Timber Forest Products-Exchange Programme, Technical Specialist on Social and Environmental Safeguards for Community Carbon Pool Programme, Hanoi, Vietnam
09/2012 – 10/2013	Clark University, Research Assistant to Prof. Colin Polsky, Decision Center for a Desert City II: Urban Climate Adaptation Grant, US National Science Foundation
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11/2008 – 03/2012	Earth Systems Consulting Pty. Ltd., Environmental Consultant for Australia's office/ Country Representative for Cambodia's office
10/2005 – 12/2007	Servants to Asia's Urban Poor, Project Manager and Curriculum Developer
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DEDICATION

For my loving family, especially my grandmother.

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Ernest Hemingway is often quoted for saying that "writing, at its best, is a lonely life." I found this to be very true especially during the last several months of my dissertation monograph writing phase. I had to reduce a lot of my social life, in particular the time I often spend talking with my family over the phone or skype, to concentrate on finishing my writing. While I absolutely felt guilty about this, my family has been incredibly supportive and understanding as always. For that, they are the first group of people that I would like to thank for making this dissertation possible. My grandmother has always been my most avid supporter since I was a child. I had a lot of medical problems growing up. Because both of my parents were, still are, working full time, my grandmother took care of me. I did poorly during my elementary school due to my health. My grandmother never gives up on me and has always insisted that I complete my education. This PhD is a testament to her love, support and encouragement.

Next, I would like to thank my doctoral committee at Clark University which included Prof. Anthony Bebbington, Prof. Ronald Eastman, Prof. Dominik Kulakowski and Prof. Colin Polsky as well as my external advisor Prof Diana Liverman at the University of Arizona. Given their caliber, the most intimidating thing about writing this monograph for me was the question that I constantly asked myself – will this be good enough for my committee? These are the people that I think very highly of; therefore, it was nerve racking knowing that they would be reading what I wrote. Whenever my nerve got the best of me, I have Tony to thank for the great advice, directions and genuine support. I completely trust and believe in Tony because I know that he knows best and wants the best for his students. I never doubt his advice. It has worked out extremely well so far. I have learned so much from him as a person. The quality I admire most about Tony is his kindness despite provocation. Everyone agrees that he is a great role model.

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There are so many great moments that happened throughout the doctoral program, one of which was a chance to meet Prince Albert II of Monaco in Monte Carlo as part of the ceremony for the Intergovernmental Panel on Climate Change (IPCC) Scholarship

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It has been a great experience. It definitely is a worthwhile endeavor!

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Abbreviations

ADB	Asian Development Bank
AFD	Action for Development
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action
BUR	Biannual Update Report
CAVAC	Cambodia Agricultural Value Chain Programme
CCBS/A	Climate Community and Biodiversity Standard/ Alliance
CCCA	Cambodia Climate Change Alliance
CCI	Clinton Climate Initiative
CDA	Children Development Association
CDM	Clean Development Mechanism
CF	Community Forestry
CFi	Community Fisheries
CFI	Community Forestry International
CG	REDD+ Consultation Group
CIFOR	Center for International Forestry Research
CLEC	Community Legal Education Center
CNP	Cambodia Nations REDD+ Programme
COP	Conference of the Parties
COMIFAC	Commission des Forêts d'Afrique Centrale
CPAs	Community Protected Areas
CRDT	Cambodia Rural Development Team
CS	Communications Specialist
CSO	Civil Society Organizations
CSO-REDD+	Cambodia CSO-REDD+ Network
DDFD	Drivers of Deforestation and Forest Degradation
Drivers Study	Assessment of Land Use, Forest Policy and Governance in Cambodia
DSA	Daily Subsistence Allowance

ELCs	Economic Land Concessions
ER	Emissions Reduction
ES	Earth Systems Consulting Pty Ltd.
ESMF	Environmental and Social Management Frameworks
ET	REDD+ Expert Team
EU	European Union
FA	Forestry Administration
FAO	Food and Agriculture Organization of the United Nations
FCPF	World Bank's Forest Carbon Partnership Facility
FFI	Fauna and Flora International
FiA	Fisheries Administration
Financing Study	Designing an Effective, Efficient, and Equitable System for Allocation of Incentives for REDD+ in Cambodia
FIP	World Bank's Forest Investment Programme
FLEGT	Forest Law Enforcement, Governance and Trade
FPIC	Free Prior Informed Consent
FREL/FRL	Forest Reference Emission Level/ Forest Reference Level
GCF	Green Climate Fund
GDANCP	General Department for the Administration of Nature Conservation and Protection, Ministry of Environment
GG	REDD+ Gender Group
GHG	Greenhouse Gas
IAS	Incentives Allocation System
IP	Indigenous Peoples
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
JNR	Jurisdictional and/or Nested REDD+
LES	Lighting Engineering Solutions
LULUCF	Land Use, Land-Use Change and Forestry

MAFF	Ministry of Agriculture, Forestry and Fisheries
MBT	Mlup Baitong
MCF	Monk Community Forest
MDTF	Multi-Donor Trust Fund
MEF	Ministry of Economy and Finance
MIME	Ministry of Industry, Mines and Energy
MLMUPC	Ministry of Land Management, Urban Planning and Construction
MoE	Ministry of Environment
MoI	Ministry of Interior
MoWA	Ministry of Women's Affairs
MRD	Ministry of Rural Development
MRV	Measurement, Reporting and Verification
MRV/M	Monitoring, Measurement, Reporting and Verification
MRV/ REL	MRV/ Reference Emissions Level
M&E	Monitoring and Evaluation
NC	National Communication
NCCC	National Climate Change Committee
NCGG	National Committee on Green Growth
NCSD	National Committee for Sustainable Development
NFI	National Forest Inventory
NFMS	National Forest Monitoring System
NFP	National Forest Programme
NGOs	Non-Governmental Organizations
NGOF	NGO Forum on Cambodia
NPASMP	National Protected Areas Strategic Management Plan
NPD	National Programme Director
NPM	National Project Manager
NRC	National REDD+ Committee
NRS	National REDD+ Strategy

NSDP	National Strategic Development Plan
NTFP	Non-Timber Forest Products
NTFP-EP	Non-Timber Forest Products-Exchange Programme
OFCCCC	Office of Forest Carbon Credits and Climate Change, FA, MAFF
OMC	Oddar Meanchey Province
OP	World Bank's Operational Policies
OTADGFA	Office of the Technical Advisor to Director General of the Forestry Administration
PAMs	Policies and Measures
PC	Programme Coordinator
PCIs	Principles, Criteria and Indicators
PEB	Programme Executive Board
PLRs	Policies, Laws and Regulations
PM	Prime Minister
PMU	Programme Management Unit
RBP	Results-based Payment
RECOFTC	Center for People and Forests
REDD+	Reducing Emissions from Deforestation and forest Degradation, conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks
RGC	Royal Government of Cambodia
Roadmap	Cambodia National REDD+ Roadmap
R-PIN	Readiness Plan Idea Note
R-PP	Readiness Preparation Proposal
RTS	REDD+ Taskforce Secretariat
RUA	Royal University of Agriculture
RUPP	Royal University of Phnom Penh
Safeguards Study	Preliminary Review and Approach to Develop a Safeguards Information System (SIS) for REDD+ in Cambodia

SBSTA	Subsidiary Body for Scientific and Technical Advice
SEPC	Social and Environmental Principles and Criteria
SESA	Strategic Environmental and Social Assessments
SFM	Sustainable Forest Management, UNDP
SIS	Safeguards Information System
SLCs	Social Land Concessions
SPF	Seima Protection Forest
SPFF	Strategic Planning Framework for Fisheries
SWG	REDD+ Small Working Group
TA to DG-FA	Technical Advisor to Director General of the Forestry Administration
TCP	Technical Cooperation Programme, FAO
TF	Taskforce
TGC	Terra Global Capital
ToR	Terms of Reference
TS	Technical Specialist
TTs	REDD+ Technical Teams
TWG	Technical Working Group
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
UNDP	United Nations Development Programme
USAID	United Stated Agency for International Development
VCS	Verified Carbon Standard
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature

Section I: Introduction and Overview

Chapter 1: Introduction

1.1. International efforts to address climate change

The Intergovernmental Panel on Climate Change (IPCC) has confirmed in its fifth assessment report that it is extremely likely (with more than 95 percent certainty) that human activities have been the main cause of climate change since the 1950s (IPCC 2014). The assessment report stated that both natural and human systems on all continents have been impacted by changes in climate, although evidence of observed climate change impacts is strongest and most comprehensive for natural systems. The report concluded that climate change impacts on human systems have been observed to be uneven geographically because of differences in social and economic contexts and capabilities. This conclusion resonates with one of the founding principles in human-environment geography, which argues that throughout history, human societies have adjusted/ adapted to cope with changes in climate variability and extremes (Marsh 1864, Burton, Kates and White 1978, Kates, Turner and Clark 1990, Liverman, Yarnal and Turner 2004). For example, drawing from various case studies in developed and developing countries, human-environment geographers have advanced this principle by demonstrating that society's ability to cope with climatic variations depend not only on the physical environment, but also to a significant extent on cultural, social, political and economic determinants (White 1945, Liverman 1990, Kates et al. 2001, Adger 2006, Polsky, Neff and Yarnal 2007, Moser and Boykoff 2013).

Since 1992, both developed and developing countries have adopted an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), to address the adverse impacts of climate change, while taking into consideration their common but differentiated responsibilities and their national and regional development priorities, objectives and circumstances (UNFCCC 1992)[i]. Currently, there are 195 Parties to the Convention. The core focus of the UNFCCC treaty is the need to reduce greenhouse gas (GHG) emissions so that global temperature increases are limited to below 2 degrees Celsius or 3.56 degree Fahrenheit in order to avoid dangerous climate change (Liverman 1990). Members of the UNFCCC have been meeting annually at Conference of the Parties (COP) since the adoption of the Convention to discuss, adopt, and later implement policies and measures to reduce GHG. These policies and measures are commonly, but somewhat arbitrarily, categorized into those that focus on adaptation to climate change and those that focus on mitigation.

According to the UNFCCC's Glossary, adaptation refers to "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (UNFCCC 2015e). Examples can include improving flood defense systems, establishing early warning systems for hurricanes and switching to crops that are resilient to drought conditions, or restructuring communication systems, business operations and government policies (UNFCCC 2015b). On the other hand, mitigation, in the context of climate change refers to "any human intervention to reduce the sources or enhance the sinks of greenhouse gases" (UNFCCC 2015d). Examples include improving the efficiency of fossil fuels use for industrial processes or electricity generation, switching to solar energy or wind power, and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere (UNFCCC 2015a).

Mitigating the impacts of climate change in the forestry sector has received significant interest both in the UNFCCC COP negotiations process and in academic literature over the past decade. In 2005, citing results from the IPCC study in 2000 on the rates of deforestation in developing countries and its resulting carbon emissions, the Governments of Papua New Guinea and Costa Rica, supported by the Government of Bolivia, Central African Republic, Chile, Congo, Democratic Republic of the Congo, Dominican Republic and Nicaragua, requested that the UNFCCC include in its policy dialogue an agenda item to discuss and develop scientific, technical, policy and capacity responses to address emissions from tropical deforestation (IPCC 2000, UNFCCC 2005). This proposal was accepted by the UNFCCC, and has evolved into what is now known as

REDD+, which stands for **R**educing **E**missions from **D**eforestation and forest **D**egradation, and **(+)** the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (UNFCCC 2010b)[ii].

The sustained interests in REDD+ negotiations for Parties to the UNFCCC is largely attributable to the Stern Review on the Economics of Climate Change which found that the most cost-effective way to reduce global GHG emissions is to reduce deforestation since the loss of natural forests around the world contributes more to global emissions each year than the transport sector (Stern 2006). The latest IPCC assessment report still supports Stern's claim by showing that: 1. the average annual emissions from forestry and other land use between 2002 and 2011 were 3.3 ± 2.9 $GtCO_2$ yr^{-1}, and 2. about a third of global mitigation potential in the forestry sector can be achieved at a cost of less than 20 US Dollar per ton of carbon dioxide equivalent emission (IPCC 2014). The assessment report thus recommended that international communities should continue to support development and implementation of national policies on REDD+ as one of the regulatory approaches to address the impacts of climate change within the subset of agriculture, forestry and other land use (AFOLU) sector.

REDD+ overall is based on the simple logic that countries that are willing and able to reduce emissions from deforestation and forest degradation by strengthening or establishing new forest conservation institutions and policies, should be financially compensated for doing so (UN-REDD Programme and UNEP-WCMC 2010). As of December 2015, the UN-REDD Programme (2015d) and the World Bank's Forest Carbon Partnership Facility (FCPF) (2015) together support development and implementation of REDD+ in 65 countries across Africa, Asia-Pacific and Latin America and the Caribbean. The support from the UN-REDD Programme and/or the FCPF focuses mainly on assisting REDD+ participating countries to develop and/or implement REDD+ national strategies or action plans (NRS) in accordance with decisions adopted by the UNFCCC's COP (World Bank's FCPF and UNREDD Programme 2012).

Although there are decisions from the UNFCCC regarding components that shall be considered as part of a NRS, there is no obligatory guideline on how these components should be developed and implemented.

For example, COP16th of the UNFCCC agreed that when developing and implementing NRS, developing country Parties shall address issues such as: drivers of deforestation and forest degradation, national forest monitoring systems, social and environmental safeguards, stakeholder participation, and institutional coordination and arrangements (UNFCCC 2010b)[iii]. How to address these issues, however, is left to be decided by the developing country Parties. Finally, because countries have different starting points in terms of their participation in the UN-REDD Programme's and/or FCPF's REDD+ Readiness Process (Nguon and Kulakowski 2013), some of the more advanced countries have produced policy papers or strategic documents that attempt to address the said issues. It is assumed that these strategic documents will be used in the NRS drafting.

It is absolutely essential to distinguish between REDD+ initiatives that follow the UNFCCC's decisions and are supported through the national REDD+ Readiness funding from the FCPF and/or the UN-REDD Programme from other project-based REDD+ activities that are established by groups such as international development agencies or international conservation organizations, and are funded through voluntary carbon market mechanisms. The next chapter will elaborate on these differences. In short, the UNFCCC or national approach to REDD+ focuses on reforming, developing and implementing policies and measures that aim to reduce national GHG emissions from the AFOLU sector. Voluntary carbon market REDD+ is limited to the development and implementation of project activities within a geographically defined area of a country, usually a province or an aggregate amount of areas within a province. There is in general no formal relation between these two types of REDD+ given their different concerns. Their methodologies and procedural requirements are also vastly different.

1.2. Academic research on REDD+

Given the increasing attention on REDD+ in the international and national policy arena, academic research on REDD+ has proliferated over the last decade. Initially, one of the core debates in academic papers on REDD+ focused on examining the results and recommendations from the Stern Review, in particular its optimism on the potentials of REDD+ as one of the global climate change mitigation options (Nordhaus 2007, Angelsen 2010). As COP to the UNFCCC continues to adopt further decisions on the various specific aspects of REDD+, such as governance arrangements, implementation options and phases, sources of financial support, or activities constituting REDD+ (UNFCCC 2010b, 2011, 2013), academic researchers who have been interested in the social and environmental dimensions of climate change science and policy, conservation and development, natural resources management, and environmental governance have joined in on the REDD+ bandwagon (Liverman 2010, Phelps, Webb and Agrawal 2010, Kanowski, McDermott and Cashore 2011, McDermott, Levin and Cashore 2011, Adger et al. 2013, Sikor 2013).

To comprehensively understand the current status of peer-reviewed publications on REDD+, an exhaustive and careful literature review was conducted. From January 2005 to June 2014, I identified 495 articles from 169 different peer-reviewed journals that claimed to examine the social (Vatn and Vedeld 2013), technical (Gibbs et al. 2007); and/or environmental (Phelps, Webb and Adams 2012) dimensions of REDD+ development and implementation. There are two main observations from this exercise. First, a majority of the articles reviewed did not make clear the distinctions between REDD+ activities under the UNFCCC and those that are developed via voluntary carbon market mechanisms, in particular the Verified Carbon Standard (VCS). For example, these articles would introduce REDD+ as a climate mitigation option from the UNFCCC, while empirically what they analyzed in their countries of interest were carbon market REDD+. This has led to confusions regarding the impacts of UNFCCC REDD+ versus carbon market or VCS REDD+. A general trend in these articles has been to propose how lessons learned from their analyses of VCS REDD+ would be useful or relevant for the UNFCCC REDD+.

This represents a big gap between academic and policy communities because actors involved in developing UNFCCC REDD+ often disregard these lessons learned from VCS REDD+ as being out of context, focusing on the wrong unit of analysis, or making an over-generalized argument about REDD+[iv]. Therefore, these lessons are almost always deemed to be irrelevant for development of the NRS. Second, while there are a few studies that draw from experiences in areas such as earth system governance (Corbera and Schroeder 2011) or conservation and development (Blom, Sunderland and Murdiyarson 2010, Clements 2012) to propose options for the development and governance of the NRS, lacking are empirical studies on how the NRS is produced, factors influencing its production process and most importantly its reception by relevant stakeholders.

In this context, my dissertation research is interested in understanding ***factors that influence the production of a salient, credible and legitimate NRS***. Credibility refers to the scientific adequacy of the technical evidence and arguments presented in the NRS, saliency concerns the relevance of the NRS to the needs of its relevant stakeholders, and legitimacy characterizes the perceived fairness of the NRS development process to its constituencies (Cash et al. 2003, Bebbington and Bury 2009b). The principal justification for exploring this question is that implementation of a national approach to REDD+ is expected to fail if stakeholders do not consider knowledge embedded in the NRS to be salient, credible and/or legitimate.

1.3. Sustainability science and the REDD+ policy-production process

Rooted partly within the human-environment tradition of geography (Clark and Munn 1986, Turner et al. 1990, Kates et al. 2001), sustainability science, as a research tradition, has been gaining visibility in the academy since the late 1980s (Bettencourt and

Kaur 2011). According to Kates and colleagues (2001), sustainability science is a vibrant research arena that promises to bring together scholarship and practice, global and local perspectives from north and south, and disciplines across the natural and social sciences. It is problem-driven, with the goal of creating and applying knowledge in support of implementable policy actions that promote a transition toward sustainability (Clark and Dickson 2003b). One of the main contributions of sustainability science is its adamant assertion that if knowledge, embedded in a complex socio-environmental governance policy, is to be accepted by a range of actors, it needs to be salient, credible and legitimate (Cash et al. 2003, Bebbington and Bury 2009b, Clark et al. 2011).

Producing a salient, credible and legitimate NRS is no easy task. That is, while the logic underpinning REDD+ might be simple, REDD+ itself represents a complex socio-environmental governance policy initiative that spans multiple levels of implementation and involves various groups of stakeholders with different interests and ideas (Angelsen et al. 2012). As Diana Liverman (2004) pointed out, scale or context matters significantly when it comes to producing knowledge aiming at governing the coupled human-environment systems that involve a multitude of actors and interests, in this case REDD+. In addition, a wide range of studies in sustainability science have pointed out that the main difficulties in producing salient, credible and legitimate policy documents involve a complex set of elements that dynamically interact to shape different perceptions of the produced policy documents among actors, who are embedded in different institutions with different interests and ideas (Clark and Majone 1985, Cash 2001, van Kerkhoff and Lebel 2006, Clark et al. 2011). Therefore, drawing from sustainability science, to examine my proposed research question, I need to understand the interactions of this set of factors: **actors, institutions, ideas, and interests,** given a particular **context**, at a particular **scale**.

Sustainability scientists have studied the interactive dynamics of the identified factors through hypotheses derived from a concept known as **boundary work** (Cash et al.

2003, Clark et al. 2011), which could generally be defined as negotiation processes that take place at the interface between relevant actors. The main concern for this literature has been its attempt to understand the processes and factors that would enable scientific findings to be used and useful – that is, salient, credible and legitimate – for the purposes of policymaking and for relevant stakeholders. One of the theoretical and empirical contributions from boundary work has been its emphasis on the importance of understanding the different expectations and interests among the communities of policymakers and those of scientists regarding such topics as what determines trustworthy evidence, substantial argument, procedural fairness, and appropriate characterization of the issues (Cash et al. 2003, Jasanoff 2004, Clark et al. 2011). Thus, contemporary research on boundary work has to a great extent focused on understanding and identifying the different types of institutional arrangements that would effectively facilitate communication, translation and mediation across these different communities (Cash et al. 2003, Clark et al. 2011) while taking into consideration their institutions, interests, and contexts.

Drawing from this line of work, ***this dissertation research hypothesizes that producing a salient, credible and legitimate NRS requires an active boundary work which effectively manages the interfaces among various actors, institutions, ideas, and interests.*** According to the literature (Guston 2001, Clark et al. 2011), determinants of active or effective boundary work include: 1). meaningful participation in agenda setting and knowledge production by relevant actors, 2). governance arrangements that assure accountability for engaged actors, and 3). production of boundary objects that are adaptable to different actors' viewpoints and robust enough to maintain identity across them. There are however two main concerns about these attributes of an effective boundary work. Responding to these concerns is my attempt to contribute to the advancement of effective boundary work literature. The first concern focuses on the increasing popularity and widespread application of the literature in developing countries regardless of their different contextual settings (Pohl et al. 2010). Critics have argued that most of the empirical evidence used to justify the usefulness and appropriateness of effective boundary work application in developing countries so far comes from case studies in a few developed countries (Kristjanson et al. 2009, Kingiri 2010).

The second concern is motivated by the lack of agreement in boundary work literature on the types of institutional or governance arrangements that are most likely to promote effective boundary work given a particular context (Jones, Jones and Walsh 2008, Michaels 2009). To respond to this concern, Clark and colleagues (Clark et al. 2011) proposed six distinct contexts of effective boundary work, as defined by the sources and uses of the knowledge. Their argument was that the types of institutional arrangements that will facilitate effective boundary work need to be tailored to these different contexts. My dissertation research seeks to understand the types of institutional arrangements required for effective boundary work where the context is characterized by multiple sources of knowledge that are coming from and used by multiple actors.

Last but not least, in addition to addressing these two concerns, my dissertation contributes to boundary work, and broadly sustainability science, literature by expanding its scope of analysis. That is, while studies using boundary work have mostly been attending to the question of how to ensure that findings from scientific assessments are used in the formulation of policies in various settings (Clark et al. 2001, Mitchell et al. 2006, Clark et al. 2011), this dissertation focuses its analysis on the processes that produce the scientific assessment that is in itself a policy. In other words, rather than focusing on how a finished assessment/ policy is used by policymakers, this study examines the process through which that policy is produced.

1.4. About this dissertation research

This dissertation research considers two critiques of effective boundary work literature – ***lack of empirical application in developing country contexts and types of institutional arrangements required in a context with multiple sources and uses of***

information by different stakeholders – with respect to the development of Cambodia's NRS. While it would have been possible to conduct this study in any one of the REDD+ participating countries, Cambodia was chosen as the case study for both analytical and logistical reasons. First, the Royal Government of Cambodia (RGC) declared its commitment to implement REDD+ as part of its national approach to address climate change at the COP13, held in Indonesia (Royal Government of Cambodia 2011b). As one of the first countries that decided to implement UNFCCC REDD+, Cambodia is currently one of the few countries that have produced their NRS (Cambodia REDD+ Taskforce Secretariat 2015). The development of the Cambodia NRS as well as the policy documents that constitute its chapters have involved actors from local to international civil society groups, non-governmental organizations, development partners, private sectors, and research institutions. This diverse group of actors thus provides a good justification for selecting Cambodia as a case study to investigate the dynamics proposed under the two themes with regards to the research question and its hypothesis. In short, the development of Cambodia's NRS offers a particular depth of data for this study.

In addition, Cambodia has one of the highest levels of forest cover in Southeast Asia, with approximately 10.7 million hectares of forest in 2006 or 59 percent of Cambodia's land area. Based on the FAO 2005 Forest Resources Assessment, Cambodia has the 30th largest area of tropical forest in the world, but is the 13th most forested country by percentage of land area. Cambodia also has a relatively high rate of land-use change with statistics showing that 379,485 hectares of forest were lost between 2002 and 2005/6, a deforestation rate of 0.8 percent per year (Forestry Administration 2007). A recent study published in *Science* (Hansen et al. 2013) ranked Cambodia at 26th in terms of countries with the largest net forest loss from 2000 to 2012. As a result, Cambodia is classified as a priority "high forest cover, high deforestation" country for the purposes of REDD+ (Griscom et al. 2009). Ten of the 65 REDD+ participating countries qualified for this classification – these include Indonesia where research on REDD+ has been extensive (Angelsen et al. 2012). Cambodia is therefore an especially pertinent case study because (1) lessons learned from Cambodia will be relevant to these other nine REDD+ countries, and (2) there has not been any research on the Cambodia NRS, not to mention its development process. Finally, I am from Cambodia, and my fluency with the language and previous professional experiences working on REDD+ and forestry issues as well as familiarity with the country socio-political settings greatly enhance the efficacy of the proposed activities under the research design, that is, Chapter 4.

To completely examine any NRS, one needs to possess expert knowledge in both social and physical sciences. Given my training as a social scientist, the objective of my dissertation research is limited to assessment of the social aspects of the national strategy. This means that policy documents or thematic sections of the Cambodia NRS that address technical issues such as national forest monitoring systems, measurement, monitoring, reporting and verification of GHG emissions from forestry and other land-use sector would be beyond the scope of my analyses. That said, this dissertation not only examines the institutional arrangements that have produced the Cambodia NRS as a whole, but also its thematic sections that focus on: ***drivers of deforestation and forest degradation, social and environmental safeguards, and allocation of incentives or REDD+ financing.*** Moreover, my justification to assess both the NRS as a whole and some of its thematic sections stems from the knowledge that the composition of stakeholders responsible for production of these policy documents has not necessarily been the same, even though it has been overlapping at times. This offers me an opportunity to assess how the same stakeholder functions given different settings, objects of discussion, and group compositions. Figure i illustrates the dissertation's outline, based on its research questions derived from effective boundary work literature.

Since the hypothesis of this dissertation research states that a salient, credible and legitimate NRS is produced through an effective boundary work, the **main research question** therefore asks: *To what extent does an effective boundary work exist in the process to produce Cambodia NRS and its thematic sections? In particular,*

1. *What are the institutional arrangements (actors, institutions, interests and ideas) that govern the production of Cambodia's NRS and its thematic sections?*
2. *How do different actors participate in setting the agenda and producing the knowledge for the Cambodian NRS and its thematic sections?*
3. *What types of governance arrangements, if any, exist to ensure accountability for engaged actors?*
4. *Do actors engaged in the process make use of any boundary objects or collaborative products to facilitate communication, translation and mediation?*

1.5. Organization of the monograph

The dissertation monograph is presented in four sections. First, in this introductory section, **Chapter 1**, I introduce REDD+ as one of the climate change mitigation options that is currently being implemented in countries across Africa, Asia-Pacific, and Latin America and the Caribbean with the support of the UN-REDD Programme and/ or World Bank's FCPF. I also differentiate this type of REDD+ with those of the voluntary carbon market mechanisms or project-based REDD+ projects. I then provide a brief overview of contemporary research on effective boundary work within sustainability science. The hypothesis and research questions for the dissertation are derived from this literature. In **Chapter 2**, I track the key developments in REDD+ since its formal entrance at the UNFCCC in 2005[v]. The objective of this exercise is to review decisions adopted by the COP to the UNFCCC on the various components of a NRS. This is followed by a detailed discussion of the differences between the national and project-based REDD+ mechanisms. The chapter concludes with Cambodia illustrated as an example of the parallel existence of these two types of REDD+.

In Section II, **Chapter 3**, I discuss in greater detail the literature on the three determinants of an effective boundary work, followed by an attempt to identify the typologies of institutional arrangements that hinder or facilitate effective boundary work in a context where there are multiple sources and uses of information by various actors.

This is where I complement boundary work literature with insights from political ecology, in particular those on power and networks (Bebbington et al. 2007, Rocheleau and Roth 2007, Birkenholtz 2011). I combine sustainability science with political ecology to propose a concept called ***political embeddedness of effective boundary work***. Finally, the chapter draws from this notion to develop propositions that I will be testing in the development of Cambodia NRS and its thematic sections.

Section III of the dissertation is divided into two chapters. While **Chapter 4** describes the research design and methodologies used to collect and analyze data, **Chapter 5** presents the findings from the analysis of the development of Cambodia NRS and its thematic sections based on the propositions derived from the political embeddedness of effective boundary work framework. Results from the analysis are presented in the order of the questions asked. It should be noted that the issues concerning my positionality and biases in this research were discussed in the concluding section of Chapter 4.

In Section IV, **Chapter 6**, I discuss lessons observed from applications of these propositions to my case studies. My main focus here is to present and discuss instances where development of the Cambodia NRS and its thematic sections embody the attributes defining an effective boundary work and the institutional arrangements that facilitate that. I then discuss the institutional and procedural constraints for cases that seem to lack qualify exemplifying an effective boundary work. In both instances, I will make the connection to the roles of power rooted within and from outside the institutional arrangements. Finally, this chapter focuses on the theoretical insights generated from my efforts to infuse sustainability science with political ecology, and the implications of those insights on relevant debates in human-environment geography as well as on other ongoing research on REDD+. Finally, in **Chapter 7**, I draw out insights that might be relevant for countries that are in the process of developing their NRS. These lessons are categorized according to the four case studies.

Figure i. Overview of the dissertation structure

Part I: Introduction and Overview
Chapter 1: Introduction

- Policy and research on REDD+
- Sustainability science in brief
- About the dissertation

Chapter 2: Overview

- Evolution of REDD+
- UNFCCC vs. project-based REDD+
- Cambodia's National REDD+ Strategy (NRS)

Part II: Conceptual Framework
Chapter 3: Sustainability Science and its Applications

- Evolution of sustainability science
- Active/ effective boundary work
- Political Ecology
  - Power and Networks
  - Organizational Culture
- Political embeddedness of effective boundary work

Propositions

1. Effective boundary work requires institutional arrangements that promote participation, transparency, accountability and use of boundary objects

2. The extent to which attributes of effective boundary work can materialize or be suppressed depends on the capabilities of the agency or organization leading the strategy development process:
   A. to understand the power relations rooted in their networks; and
   B. to negotiate rules and practices within their organizational environment while handling external pressures

Part III: Case Studies
Chapter 4: Research Design

- Data collection and analysis
- Positionality, Biases

Chapter 5: Findings

- Findings from the analysis of the development of Cambodia NRS and its thematic sections
- Results from the analysis are presented in the order of the questions asked.

Part IV: Discussion and Conclusions
Chapter 6: Discussion

- Theoretical insights generated from and for literature on effective boundary work
- Implications for debates in human-environment geography
- Implications for REDD+ research

Chapter 7: Conclusions

1. Lessons/ policy implications
2. Reflection on research methods
3. Further research on NRS