

# **Bridging Gaps: Investigating Private Sector Financing of Ecosystem-based Adaptation to Climate Change**

A closer look at the Greater Mekong Subregion

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*“All these experiments are only examples, but they testify to a new awareness. They lay down markers for a new human adventure based on moderation, intelligence and sharing. It's time to come together. What's important is not what's gone, but what remains. We still have half the world's forests, thousands of rivers, lakes and glaciers and thousands of thriving species. We know that the solutions are there today. We all have the power to change. So what are we waiting for?”*

*Home by Yann Arthus-Bertrand*

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## Abstract

Tackling the challenge of adaptation to climate change in developing countries will require the mobilization of new and additional funding. Like other adaptation approaches, Ecosystem-based Adaptation (EbA) is threatened by a growing adaptation funding gap. Further private sector involvement, for instance in the context of innovative direct financing models for EbA, is one way to help bridge the gap. This study aims to enhance understanding of direct financing models for EbA that involve the private sector by investigating what motivates and enables private sector engagement in the context of the Greater Mekong Subregion (GMS). To do so, the author adopts an inductive approach supported by a literature review, and two case studies, namely: *Microfinance for Ecosystem-based Adaptation (MEbA)* and *Supply Chain Approach for Ecosystem-based Adaptation (SCA for EbA)*. To perform an analysis within and between cases, an analytical framework constituted of eight categories of factors is extracted from the findings of the case studies. These are comprised of three categories for motivational factors: (i) *Climate change risks*; (ii) *Business opportunities*; and (iii) *Societal contribution*; and five categories for enabling factors: (a) *Stakeholders' requirements*; (b) *Market factors*; (c) *Sustainability awareness and integration in the organisation*; (d) *Knowledge and resources*; and (e) *Government support and policy frameworks*. The overall results of the study show that some of the unique characteristics of EbA constitute the basis of what motivates and enables private actors involvement in the EbA financing models. In addition, some of the elements that influence private sector adaptation to climate change in general also play a role in engagement of private actors in the context of EbA. While the study mainly focuses on experiences in Cambodia, Vietnam and Thailand, it draws conclusions and recommendations that are likely to be applicable across the GMS.

**Keywords:** Ecosystem-based Adaptation to Climate Change, Private sector, Greater Mekong Subregion, Microfinance, Supply Chain

## Executive Summary

The relationship between ecosystems and climate change is versatile and fragile. Climate stability relies on healthy ecosystems and biodiversity, which are in turn increasingly vulnerable to climate change impacts. While it is expected that ecosystems will tolerate a certain level of future climate change as they have in the past, uncertainty remains with regard to their level of resilience or “capacity to absorb disturbance and re-organize so as to still retain essentially the same function” (Walker & Salt, 2006). The degradation and ultimate collapse of ecosystems will lead to severe consequences for human economies and societies. As the crucial role of ecosystem services (e.g. provision of food, water, cultural and recreational benefits) in ensuring well-functioning societies is being recognised, increased attention is paid to valuation and integration of these services into the economic system as a way to improve their protection. Nevertheless, ecosystems remain under severe threat, suffering from a range of pressures (e.g. pollution, overexploitation of resources) that are mostly economically driven.

Climate change will most severely impact low-income and rural populations in developing countries. In that regard, ecosystems and their services have a crucial role to play in protecting vulnerable populations as they support their livelihoods, and increase their resilience to climate change related events (IUCN, 2015c). This is an aspect that is particularly relevant to the Greater Mekong Subregion (GMS) comprised of six countries (Cambodia, Laos, Myanmar, Thailand, Vietnam and China, specifically Yunnan Province) bound together by the Mekong River. Countries in the region have experienced rapid economic growth in the last decade, which partly finds its origin in the often-unsustainable exploitation and export of natural resources. The livelihoods of rural populations in the GMS heavily depend on farming and subsistence products that are inherently linked to ecosystems services, which are increasingly affected by climate change. As a result, adaptation efforts in the region are accelerating.

Among adaptation approaches, the ecosystem approach and in particular Ecosystem-based Adaptation (EbA) has gained attention over the world, including in the GMS. EbA entails a range of ecosystem management activities and approaches aiming at increasing resilience and reducing vulnerability of people and the environment, such as conservation, sustainable management, and restoration of ecosystems (CBD, 2010). However, despite its multiple benefits, EbA like other adaptation measures is facing a lack of funding. Olhoff et al. (2014) stress that without new and additional finance made available, after 2020 there will be a major funding gap. According to the Global landscape of Climate Finance in 2014, out of USD 331 billion of climate finance only around USD 25 billion of this were directed towards adaptation uses, almost all of which originated from public sources (Climate Policy Initiative, 2014b). In contrast, a majority of funds directed to climate mitigation came from the private sector. This lack of adaptation finance from private sector sources reflects a more general lack of involvement of the sector in adaptation to climate change. While there is an emerging body of literature on the current status, drivers and barriers of private sector involvement and investments in adaptation in general, very little is known on factors that underpin private sector involvement and direct investments in EbA specifically (no study was found). Only a few EbA initiatives implemented in collaboration with the private sector are found around the world and only one in the GMS.

Therefore, this study aims to enhance understanding of direct financing models for EbA involving the private sector in the context of the GMS and the factors that underpin them, with the objective of helping to foster additional engagement and financing for EbA initiatives in the region. To fulfil this aim, the research question and sub questions were formulated as follows:

- *Main RQ:* What motivates and enables private sector’s involvement and financing in EbA initiatives in the Greater Mekong Subregion?

*RQ1*: Which characteristics of EbA are significant for direct financing by the private sector?

*RQ2*: What general factors influence private sector adaptation to climate change?

*RQ3*: What direct financing models for EbA involving private actors exist and what characterizes them?

In this thesis, the author adopts an inductive approach that relies on two components: a literature review and two case studies. The literature review provides an overview of EbA (Chapter 3), and private sector and adaptation to climate change (Chapter 4). The case studies are delimited by type of private sector financing model for EbA: *Microfinance for Ecosystem-based Adaptation (MEbA)* and *Supply Chain Approach for Ecosystem-based Adaptation (SCA for EbA)*.

*MEbA* is based on the design of the project with the same name that takes place in South America (Peru and Colombia). The main objective of the project is to provide technical assistance to MFIs for them to develop climate smart lending methodologies, create and offer EbA-orientated products for small landholders to implement EbA measures. *Supply Chain Approach for Ecosystem-based Adaptation* is based on the Mangroves and Markets (MAM) project implemented by International Union for Conservation of Nature (IUCN) and SNV Netherlands Development Organisation (SNV) in Vietnam and Thailand. It aims to introduce economic incentives to foster sustainable use, management and restoration of mangroves through certification systems and price premium paid companies that source shrimp.

The overall methodological approach adopted in the thesis is pictured in the figure below.

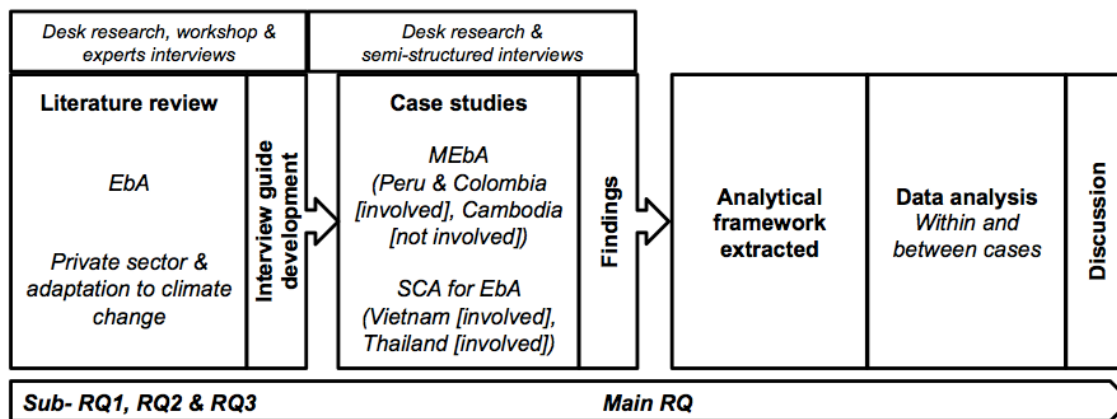


Figure. Overview diagram of the methodological approach

The method for analysis of data followed a three steps structure. The findings of the case studies (motivational and enabling factors) were clustered (*First step*) to extract the framework for analysis. A total of eight categories of factors were delineated, three for motivational factors: (i) *Climate change risks*; (ii) *Business opportunities*; and (iii) *Societal contribution*; and five for enabling factors: (a) *Stakeholders' requirements*; (b) *Market factors*; (c) *Sustainability awareness and integration in the organisation*; (d) *Knowledge and resources*; and (e) *Government support and policy frameworks*. The analytical framework extracted was used to perform a within and between cases analysis where the different cases were compared and discussed (*Second step*), partly answering the main research question (*Main RQ*). Finally, to complement these answers the results of the analysis were linked and discussed with the findings of the literature review chapters and their associated assumptions (*Third step*).

The study found that some of the unique characteristics of EbA constitute the basis of what motivates and enables private actors involvement in the EbA initiatives. These characteristics include: *multiple co-benefits*; *low investment costs*; involvement of *multiple stakeholders* including *local communities*; and level of *knowledge required* for implementation.



The *multiple co-benefits* of EbA take the form of *business opportunities* for private actors, often through *proxy products* for EbA that mitigate the *time scale and time lags* between implementation of EbA and benefits harnessed. They provide almost immediate returns for the private actors, which compensate the *investment costs* and make the cost-benefit ratio of the initiatives more attractive and motivate engagement.

Involvement of *local communities* also motivates private actors to engage in the initiatives as supporting local communities can help them achieve their social responsibility goals, along with their environmental responsibility goals (through the protection or restoration of ecosystems). Therefore, the presence of *sustainability awareness and integration in the organisations* is evidently a significant enabling factor as it allows for the benefits to be visible in their core activities. In broader terms, EbA offers the opportunity for private sector actors to enhance their *societal contribution* on different scales.

The involvement of *multiple stakeholders* was also found to enable engagement. For instance, NGOs help provide the necessary *knowledge and resources*, thereby mitigating private actors' shortcomings in *knowledge required* for the implementation of EbA. Furthermore, the role of national governments was also highlighted. *Government support* is important in the countries, especially in initiatives involving key economic sectors for development such as the ones presented in this study (e.g. microfinance, agriculture, aquaculture, tourism). Existing *policy frameworks* and *market factors* also facilitate the establishment of the models in varying degrees.

In parallel, some of the elements that influence private sector adaptation to climate change in general also underpin some of the results. *Climate change risks* motivate engagement in EbA, but are not the primary motive for private actors. Although they are aware of the risks, the *level of perceived urgency* is rather low and *reactive responses* to climate events (often extreme) that trigger action are more common. Private actors of the study do not conduct formal *climate risks assessments and integration in corporate risk management systems*, and thereby also experience difficulties in distinguishing between general climate risks and risks related to climate change specifically. This is linked to a *lack of access to relevant climate data* that could be used. Finally, as an enabling factor, *stakeholders' requirements* play an important role as requirements can help bolster climate risks assessments, and thereby induce further adoption of adaptation measures. Since in the financing models studied these requirements are heavily linked to the business opportunities mentioned earlier, they favour and enable engagement in EbA.

In conclusion, by deepening the understanding of these innovative direct financing models, the study offers some potential leverage points that can be used to foster further private sector engagement in EbA initiatives in the region. Recommendations to the target audience of the study are manifold and include: awareness raising on climate change risks and adaptation measures; mainstreaming of EbA in policy frameworks; emphasis on the translation and dissemination of EbA knowledge in a usable format; strengthened collaboration with industry associations and certification bodies; exploration of potential market linkages and proxy products for EbA; monitoring of windows of opportunity for adaptation (i.e. following climate events); knowledge sharing among EbA practitioners and research communities.

Since it is an exploratory study, numerous questions that emerged during the development of the thesis could be the basis of further research. Examples include: investigating different financing models for EbA; researching valuation methods for adaptation benefits in the private sector context; investigating the role of existing policy frameworks in supporting the establishment of these direct financing models involving the private sector; and last but not least, investigating the socio-economic impacts on local communities involved.

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## Abbreviations

ADB	Asian Development Bank
AFD	Agence Française de Développement (French Development Agency)
AIGCC	Asia Investor Group on Climate Change
CBD	Convention on Biological Diversity
CO <sub>2</sub>	Carbon Dioxide
CPI	Climate Policy Initiative
CPPs	Client Protection Principles
CSR	Corporate Social Responsibility
DFIs	Development Finance Institutions
EbA	Ecosystem-based Adaptation
EbM	Ecosystem-based Management
FAO	Food and Agriculture Organisation of the United Nations
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GMS	Greater Mekong Subregion
IFC	International Finance Corporation
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LDC	Least Developed Country

MEbA	Microfinance for Ecosystem-based Adaptation
MFIs	Microfinance Institutions
MRC	Mekong River Commission
NAPA	National Adaptation Programme of Action
NGO	Non-governmental Organization
OAPC	Thai Organic Aquaculture Farms and Products Certification Center
OECD	Organisation for Economic Co-operation and Development
PA	Protected Area
PES	Payment for Ecosystems Services
PPP	Public-private partnership
SCA for EbA	Supply Chain Approach for Ecosystem-based Adaptation
SME	Small and Medium Enterprise
SNV	Netherlands Development Organisation
SRI	Socially Responsible Investment
SSCM	Sustainable Supply Chain Management
TEEB	The Economics of Ecosystems and Biodiversity
UNREDD	United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation
UNDP	United Nations Development Programme
UNEP ROLAC	United Nations Environment Programme Regional Office for Latin America
UNEP	United Nations Environment Programme
UNEP-IEMP	United Nations Environment Programme - International Ecosystem Management Partnership
UNFCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	U.S Dollar
VDA	Village Development Association
WWF	World Wildlife Fund

## Glossary

**Adaptation Gap:** the difference between actually implemented adaptation and a societally set goal, determined largely by preferences related to tolerated climate change impacts, and reflecting resource limitations and competing priorities (Olhoff et al., 2014, p. xii).

**Adaptation to climate change:** adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change (United Nations Framework on Climate Change, 2014).

**Adaptive Capacity:** on a country level it refers to the degree to which adjustments in practices, processes, or structures can moderate or offset potential damage or take advantage of opportunities (from climate change); Also written as: Adaptive Capacity =  $f(\text{socio-economic factors, technology, infrastructure})$  (Yusuf & Francisco, 2009).

**Climate change:** any change in climate over time, whether due to natural variability or as a result of human activity (Olhoff et al., 2014, p. vii).

**Direct financing models for EbA (involving the private sector):** models where funds (regardless of their size) from a private actor (in most cases a company) are being directly provided to the implementers of the Ecosystem-based Adaptation measures (often local communities) without going through an intermediary (e.g. financial intermediaries).

**Ecosystem services:** the benefits people obtain from ecosystems, which include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth (Millennium Ecosystem Assessment, 2005, p. v).

**Ecosystem-based Adaptation:** ecosystem-based approaches for adaptation, which may include sustainable management, conservation and restoration of ecosystems, as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for local communities (CBD, COP 10 Decision X/33, 2010, p. 3). For an overview of the approach see Section 3.1.

**Enabling factors:** factors that enabled the involvement of and provision of financing from private sector actors in EbA, or that through their absence could constrain or jeopardize their engagement.

**Greater Mekong Subregion (GMS):** a natural economic area bound together by the Mekong River. It brings together six countries: Cambodia, Laos, Myanmar, Thailand, Vietnam and China (specifically Yunnan Province).

**Microfinance:** encompasses the provision of small loans and other financial services which the poor and low-income clients mostly in the self-employment sector can use to establish or further develop a business, earn income, build assets and manage unpredictable hazards (Adhikary & Papachristou, 2014; Agrawala & Carraro, 2010).

**Microfinance Institution:** financial institutions that specialize in providing microfinance products and services. They can be of various types including NGOs, credit unions, cooperatives, commercial banks, and parts of state-owned banks (Microfinance Information Exchange, 2015).

**Mitigation:** an anthropogenic intervention to reduce the anthropogenic forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks (Olhoff et al., 2014, p. viii).

**Motivational factors:** consist of factors that (would) motivate(d) or lead private actors to engage in EbA; in other words, they are the reasons or internal drivers that underpin the decision.

**Private Sector:** in this study it is defined as the section of the economy that is run by individuals or entities identified as private (as opposed to government run organisations), and who run their operations for-profit. Private sector actors mentioned in the thesis are so-called “formal” as opposed to the actors in the “informal sector”. The informal sector generally refers to a non-regulated part of the economy where labour relations are based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements with formal guarantees (International Labour Organization [ILO], 1993, para. 5).

**Resilience:** the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change (Solomon, Intergovernmental Panel on Climate Change, & Intergovernmental Panel on Climate Change, 2007, p. 37).

**Vulnerability:** the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity (Solomon et al., 2007, p. 6).





# 1 Introduction

## 1.1 Background

### ***Crossing the boundaries***

Over one third of the Earth's land surface has been transformed by human action (Vitousek, Mooney, Lubchenco, & Melillo, 1997). Human-induced carbon dioxide (CO<sub>2</sub>) emissions have increased by more than 30% since the pre-industrial period and over 60% of environmental services studied are being degraded faster than they can recover (Houghton et al., 2001; Millennium Ecosystem Assessment, 2005). This startling human footprint on the Earth's ecosystems and atmosphere has led certain scientists to refer to the current geological era as the "Anthropocene" or when human influence on the earth and atmosphere is regarded as constituting a distinct geological age (Crutzen, 2006). A term dating back to the 1960s, which was revived and popularised by the Nobel Prize-winning scientist Paul Crutzen in the 2000s but remains debated today (Stromberg, 2013). While there is a lack of certainty on whether we live in the Anthropocene or not, the negative impact of human activities on the climate and the ecosystems is undeniable.

The nine planetary boundaries framework developed by Rockström et al. (2009) and Steffen et al. (2015) shows in the form of nine categories<sup>1</sup> the boundaries delimitating the safe operating space for humanity; boundaries that should not be transgressed due to the risk of irreversible consequences on the Earth's living systems and ultimately jeopardizing the safe environment in which human and animal life can thrive. The updated framework of 2015 shows a clear transgression of the biosphere integrity and the climate change boundaries. Causes of the transgression of the biosphere integrity boundary are diverse and include land use changes due to economic development, habitat destruction and climate change (Fischlin et al., 2007; Nelson, 2005). Indeed, as showed in the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC), ecosystems and species are showing increasing vulnerability to climate change (Fischlin et al., 2007). As for climate change, fossil fuel use, overconsumption and political lock-in encouraging further development on existing fossil fuel resources, are some of the main causes that can be observed today. A dangerous path that countries are trying to move away from, as the scientific community increasingly highlights the versatile and fragile relationship between ecosystems and climate change. Indeed, climate and ecosystems maintain a complex relationship where climate stability relies on healthy ecosystems and biodiversity, which are in turn gradually being impacted by a changing climate.

### ***Climate change and ecosystems resilience***

While anthropogenic contributions to greenhouse gases (GHG) are to a large extent caused by the use of fossil fuels, land use change and deforestation also constitute a significant source of GHG, representing about 8-20% of the total global emissions (van der Werf et al., 2009). The non-linear relationship between the sources of climate change and the impacts is a critical aspect. The impacts of climate change caused by some of the biggest GHG emitting countries are expected be felt on the ecosystems of some of the most vulnerable countries who generally have significantly lower levels of GHG emissions.

Although it is expected that ecosystems will tolerate certain level of future climate change as it was the case in the past, uncertainty remains with regard to how much they can tolerate (Fischlin et al., 2007). This refers to their resilience or as Walker & Salt (2006) define it: "The

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<sup>1</sup> Climate change, change in biosphere integrity, stratospheric ozone depletion, ocean acidification, biogeochemical flows, land-system change, freshwater use, atmospheric aerosol loading, introduction of novel entities.

<sup>2</sup> Linked and interconnected systems of human and nature (Walker, 2012).

capacity of a system to absorb disturbance and re-organize while undergoing change so as to still retain essentially the same function, structure, identity and feedback”. A definition that directly relates to the concept of tipping points: “a situation in which an ecosystem experiences a shift to a new state, with significant changes to biodiversity and the services to people it underpins, at a regional or global scale” (Biodiversity Information system for Europe, n.d.). Tipping points have several characteristics such as: self-perpetuating changes that are long-lasting; a lack of predictability and significant time lags between the pressures driving the change and the emergence of impacts (Biodiversity Information system for Europe, n.d.). They constitute major risks for social-ecological systems<sup>2</sup> as they lead to significant impacts on human economies and societies, are difficult, expensive and sometimes impossible to reverse (Stockholm Resilience Center, 2015). These difficult-to-predict large-scale shifts are a concern for policy-makers as their specificity hinders the design of targeted approaches to avoid or mitigate their impacts (Biodiversity Information system for Europe, n.d.). Paradoxically, the economic threat posed by the collapse of ecosystems often finds its origins in the economic drivers that pressure them. The contribution of ecosystems beneficial to societies tends not to be integrated or valued in economic terms. In many parts of the world, and especially in the developing world, ecosystems and biodiversity remain under severe threat due to growing economic and demographic pressures.

### ***The economics of ecosystems***

Nature’s values that are generally not included in societies economic systems come in the form of ecosystems services or benefits that people obtain from ecosystems, which include: “provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth” (Alcamo, 2003). Ecosystems and their services play a crucial role in protecting vulnerable populations as they increase their resilience to extreme climate change related events through supporting their livelihoods (IUCN, 2015c). Nevertheless, rapid socio-economic development and agricultural intensification in countries is often associated with partial or complete destruction of certain ecosystems as research on the economics of land degradation shows (Andersson, Brogaard, & Olsson, 2011; Lestrelin, 2010; Yang, Zhou, & Liu, 2009).

In 1997, Costanza et al. (1998) estimated the value of ecosystem services on a global scale to an average of USD 33 trillion per year. In 2014, the same authors published an update that estimated their value at USD 125 trillion per year, with a loss of ecosystem services of about USD 4.3-20.2 trillion annually between the year 1997 and 2011 (Costanza et al., 2014). Improving the presence of ecosystem services in economic terms across all sectors would allow for improved ecosystems management and preservation. Consequently, the governance of ecosystems worldwide is moving towards the next step: valuation and integration.

Numerous initiatives and methodologies aiming to improve ecosystems services valuation and accounting exists (ESE Valuation, n.d.; Natural Capital Project, n.d.; United Nations Statistics Division, 2015a; Wealth Accounting and the Valuation of Ecosystem Services, 2015). The most famous initiative probably being the one launched by The United Nations Environment Programme called The Economics of Ecosystems and Biodiversity (TEEB), whose overall aim is to make “nature’s values visible” in the global economic system (The Economics of Ecosystems and Biodiversity, n.d.). As the value of ecosystems services is increasingly being recognised, researchers start to uncover the magnitude of the impacts of ecosystems conversion or degradation in terms of carbon emissions; especially vegetated coastal

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<sup>2</sup> Linked and interconnected systems of human and nature (Walker, 2012).

ecosystems (e.g. mangroves, marshes, sea grasses), which are important carbon sinks often referred to as “blue carbon”. Pendleton et al. (2012) estimate that the emissions of carbon dioxide<sup>3</sup> are equivalent to 3-19% of those of deforestation globally and cause economic damages of USD 6 to 42 billion per year.

### ***Ecosystems and climate change in the Greater Mekong Subregion***

The Greater Mekong Subregion (GMS) is a natural economic area located in Asia bound together by the Mekong River, with a combined population of 326 million (Asian Development Bank, 2015b). It is constituted of six countries: Cambodia, Laos, Myanmar, Thailand, Vietnam and China (specifically Yunnan Province) (see Figure 1-1). Since the 1990s, the region has been undergoing significant economic and political changes. It has experienced rapid economic expansion with an averaged 6.5% GDP growth in the last decade; an economic growth that partly finds its origin in the often-unsustainable exploitation and export of natural resources (World-Wide Fund for Nature, 2012). The contribution of the Greater Mekong Subregion (GMS) to annual global CO<sub>2</sub> emissions is approximately 4.5%, which originates mainly from deforestation and forest degradation (Asian Development Bank, 2015a). According to the World Resources Institute (2015), in 2011 land use change and forestry contributed to 55% of Laos’s greenhouse gases emissions, 46% in Cambodia and 32% in Myanmar. Between 1973 and 2009, countries of the GMS lost around one third of their forest cover (WWF, 2013).



*Figure 1-1. Map of the GMS showing the Mekong River (Wiki.smu.edu.sg, 2009)*

These alarming facts are not limited to the forest ecosystems. Indeed, the growing need for energy in the region (7% per year between 2010 and 2030) triggers the multiplication of dams’ construction for hydropower generation on the Mekong River Basin, which is also the biggest inland fishery in the world (Mekong River Commission, 2010). The economic value of the basin’s ecosystem services in terms of capture fisheries alone was estimated at USD 1.4 billion- 3.9 billion per year (World-Wide Fund for Nature, 2012). The prognosis for the impacts of future dams on the river’s ecosystems, fish migration and stocks has been qualified as “grim” and even “catastrophic” (Dugan et al., 2010; Ziv, Baran, Nam, Rodriguez-Iturbe, & Levin, 2012). A Strategic Environmental Assessment study by the International Center for Environmental Management (2010) estimates a potential loss of 26% and 42% of fishes.

Conservation measures of different nature have been put in place in many of the GMS countries, mainly Protected Area (PA) systems, which have expanded dramatically in the GMS since 1970, to reach levels close to 20% of total area in Cambodia, Laos and Thailand, and less than 10 per cent in Myanmar and Vietnam (WWF, 2013). But these efforts still appear to be insufficient or rather undermined by diverse factors such as weak governance of natural resources and poor enforcement in some countries (Chong, 2014); thereby, unsustainable development continues in the region and under the current scenario an additional 34% of GMS forests (excluding China) will be lost and fragmented by 2030 (WWF, 2013).

Despite rapid economic growth, the region remains relatively poor with poverty levels as high as 30.3%<sup>4</sup> in Laos in 2012 for instance (The World Bank, 2015e). In the Mekong River Basin,

<sup>3</sup> 0.15–1.02 Pg (billion tons) released annually

<sup>4</sup> Poverty headcount ratio at USD 1.25 a day (PPP) (% of population)

agriculture is the dominant economic sector and according to the Mekong River Commission (MRC): “inland fish and other aquatic animals provide 47-80% (country range) of animal protein” (Hortle, 2007, p. 2). The GMS is a rather exposed region with varying adaptive capacity<sup>5</sup> levels (low in Cambodia and Laos, high in Thailand and Vietnam) (Yusuf & Francisco, 2009). Rural populations are particularly vulnerable to climate change impacts, especially on their livelihoods due to their high level of dependency on farming and subsistence products. A study by Furuya, Kobayashi, & Yamauchi (2014) shows through a simulation the expected deteriorating effect of climate change on the livelihood of rural populations for whom rice constitutes a major part of their diets, especially in GMS countries. As the effects of changing weather patterns on ecosystems and rice production are felt, farm prices of rice will rise and rural population will have to decrease their food consumption leading to greater food insecurity.

Along impacts on food provisioning ecosystems services, other climate change related hazards such as exacerbation of climate related disasters (e.g. Thai floods of 2011, droughts in Cambodia), increased migration and exacerbated water related health effects are threatening populations of the GMS (Davies et al., 2014; Phung et al., 2015; Warner, Ehrhart, de Sherbinin, Adamo, & Chai-Onn, 2009). These startling consequences of climate change in the GMS have triggered a gradual shift towards measures that now not only involve mitigation but also adaptation.

### ***Climate change adaptation and the ecosystem-based approach***

As defined by the United Nations Framework on Climate Change (2014), adaptation to climate change entails “adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change”. A number of classification or categories for adaptation measures exist. As literature shows, adaptations can be distinguished based on their timing (anticipatory or reactive), on their degree of spontaneity (autonomous or planned), their geographic scope and their form (e.g. behavioural, technological, institutional, financial) (Fankhauser, Smith, & Tol, 1999; Smit, Burton, Klein, & Wandel, 2000; Smit & Skinner, 2002). The overview of the landscape of climate finance and the mobilisation of funds for adaptation measures is a valid illustration of financial adaptation (see Section 3.3.1).

Despite the numerous overlaps between adaptation types, a growing distinction is being made between two forms of adaptation in particular: the technical or so-called “hard engineered” solutions and the nature-based solutions. The latter refers to a situation where ecosystems can be used as natural safeguards against climate change impacts, while hard engineered solutions would entail climate-resilient infrastructure for example (McIvor, Spencer, Möller, & Spalding, 2012; UNCCD, n.d.). Among adaptation approaches, the ecosystem approach and in particular Ecosystem-based Adaptation (EbA) as a nature-based solution has gained increasing attention over the past few years (for an overview of EbA see Section 3.1), especially in developing countries. As discussed further in Section 3.1-3.2, being very different from hard engineered solutions, EbA measures can be implemented alone, when proven to be better adapted to the situation, or as complement to other adaptation measures. In addition, in contrast with hard engineered solutions, which can sometimes be costly and technically complex, EbA is often perceived as more accessible to the rural poor population in developing economies (IUCN, 2015c). EbA encompasses a range of ecosystem management

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<sup>5</sup> The authors define it as “The degree to which adjustments in practices, processes, or structures can moderate or offset potential damage or take advantage of opportunities” (from climate change). Also written as: Adaptive Capacity = f(socio-economic factors, technology, infrastructure)

activities and approaches aiming at increasing resilience<sup>6</sup> and reducing vulnerability<sup>7</sup> of people and the environment. These activities can take the form of “conservation, sustainable management, and restoration of ecosystems with the objective of helping people adapt to the impacts of climate change” (IUCN, 2015c).

### ***The case for Ecosystem-based Adaptation***

The role of ecosystems in adaptation has been recognized internationally under different frameworks and conventions such as the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD) (IUCN, 2015c). The benefits of EbA are manifold, providing both a way to protect ecosystems and biodiversity that underpin climate stability, while supporting people in adapting to the already visible impacts of climate change through bolstering their livelihoods. For an overview of EbA, refer to section 3.1-3.2.

A number of reports relate the cost-effectiveness of EbA approaches and their accessibility to vulnerable low-income population (Andrade et al., 2011; Munang et al., 2013; Rizvi, Baig, & Verdone, 2015). EbA requires an adaptive, collaborative and inclusive approach. This is one of the many opportunities that EbA entails; greater involvement and collaboration of local institutions and stakeholders such as rural communities that can often be left out (Andrade et al., 2011). Indeed, the reliance of the approach on nature allows for the integration of traditional knowledge and practices. EbA is qualified as “no-regret” as it helps avoiding maladaptation. An aspect that constitutes an important part of EbA and refers to the focus on “maximizing positive and minimizing negative aspects of nature based adaptation strategies and options” (IUCN, 2014). In other words, EbA measures are not likely to cause harm (Asian Development Bank, 2015a). A study by Rao, Carruthers, et al. (2012), compared EbA options with engineering options for the case of Lami Town in the Fiji Island. Using a cost-benefit assessment of four adaptation scenarios to reduce vulnerability to storms, the authors found that the benefit-to-cost ratio<sup>8</sup> of scenarios emphasizing EbA measures was as much as twice higher as the ones emphasizing engineering options. Another study by Brown, Crawford, & Hammill (2006), found that in Vietnam for an investment of USD 1.1 million in mangrove restoration, the country saved approximately USD 7.3 million per year in sea dyke maintenance, and benefited from effective protection during typhoon.

EbA finds itself at the nexus of environmental and social responsibility while providing opportunities for climate change mitigation and adaptation. It is a soft adaptation option that does not require heavy upfront investments and is not irreversible. The growing number of EbA projects in the GMS is evidence to its prioritisation by both governmental and non-governmental actors in the region (Cambodian Ministry of Environment, 2014; GIZ, n.d.-a, n.d.-b; IUCN, n.d.-a).

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<sup>6</sup> Resilience is defined as the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change (Solomon, Intergovernmental Panel on Climate Change, & Intergovernmental Panel on Climate Change, 2007, p. 37).

<sup>7</sup> Vulnerability is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity (Solomon et al., 2007, p. 6).

<sup>8</sup> Benefits in dollars for every dollar spent.

## 1.2 Problem definition

### ***A growing adaptation funding gap***

Despite the fact that EbA's potential is increasingly recognised, to be able to sustain its development and expansion, additional funding will need to be mobilized. Olhoff et al. (2014) define the adaptation gap as “the difference between actually implemented adaptation and a societally set goal, determined largely by preferences related to tolerated climate change impacts, and reflecting resource limitations and competing priorities” (p. xii). According to their recent report, this gap is growing and this situation partly finds its origins in the growing funding gap for adaptation, reflecting both a lack of funding commitments (most climate funds focus on mitigation) and uncertainty in adaptations costs estimates.

The United States Agency for International Development (USAID) finds that by 2050, climate change impacts could cost the Lower Mekong Basin (Laos, Cambodia, Thailand, Vietnam) at least USD 16 billion per year in damage to natural resource assets and infrastructure services, and an additional USD 18 billion annually in potential infrastructure damage or loss from flooding and other extreme weather events (Talberth & Reyntar, 2014). And according to a study by UNEP (2014), the cost of adapting to climate change for developing countries is “likely to reach two to three times the previous estimates” of USD 70 billion to 100 billion annually for a 2 degrees Celsius increase in global surface temperature. To put this number in context, a cost of USD 300 billion annually would correspond to more than three fourth of the Gross Domestic Product (GDP) of Thailand or as much as 18 times the GDP of Cambodia of the year 2014 (The World Bank, 2015b, 2015h).

Furthermore, it is highlighted that despite significant level of funding for adaptation and increased financial commitment from public sources, after 2020 there will be a major funding gap (Olhoff et al., 2014). The costs of adaptation are expected to be far greater than what the public sectors in developing countries can cover. Despite its multiple attractive attributes EbA, as with other adaptation initiatives in the GMS, will face a lack of funding. Therefore, there is a growing need for greater collaboration worldwide, specifically increased private sector participation in adaptation to climate change in developing countries (Dougherty-Choux, 2015). A review of the current landscape of climate and adaptation finance and the associated funding needs presented in Section 3.3.1 of this thesis, provides a good overview of the gap.

### ***Ecosystem-based Adaptation: what role for the private sector?***

As Olhoff et al. (2014) highlight, adaptation to climate change is often needed most in non-market sectors or is focused on public goods making difficult for private actors to involve. However, in light of the uncertainties surrounding the future of adaptation finance, it is deemed valuable to consider alternative way of financing, such as more localised financing models, particularly in the context of developing countries; and this is also particularly relevant for the case of EbA. Although the approach is increasingly being implemented, associated projects are heavily dependent on funds that are getting more and more difficult to access. For an overview of the financial sustainability of EbA initiatives see Section 3.3.2.

In that respect, the private sector could play a key role in fostering the adoption of the approach through direct financing, especially in developing countries such as the GMS where companies are facing significant climate change related risks (see Section 4.1). As a soft adaptation measure with a strong community focus and generally low investments required, EbA represents an opportunity for private actors to achieve their social and environmental responsibility goals while reducing climate change related risks in their activity. Consequently, a few EbA initiatives around the world and in the GMS already involve or have involved private actors; for instance in the microfinance (agricultural lending), aquaculture (shrimp

production) or tourism sectors. Financing types in these models also have diverse characteristics (i.e. small, large, one-time or continuous) and carry different expectations. For a complete overview of financing models for EbA involving the private sector, along with characteristics of the funds see Section 4.3.

However, as discussed further in Chapter 3, EbA as an approach has several unique characteristics that can constitute important influencing factors for direct financing by the private sector such as the long-term lags between impacts, adaptation and benefits, and the involvement of multiple stakeholders. These characteristics can be perceived as problematic and even exacerbated in the case of vulnerable countries that lack institutional capacity. While drivers, barriers and knowledge gaps for fostering private sector investments in adaptation in general are increasingly being researched (Agrawala et al., 2011; Biagini & Miller, 2013; CSR Asia, 2011; IFC, 2010; Naumann et al., 2011), very little is known on motivational and supporting factors underpinning private sector involvement and direct investments in EbA specifically (no study was found). Without further research, a lack of understanding of the underlying factors and their role will not allow effective decision-making that supports private sector involvement, and ultimately threaten the viability of EbA initiatives over time due to the growing lack of funding.

### 1.3 Objective and Research questions

This study aims to enhance understanding of direct financing models for EbA involving the private sector in the context of the Greater Mekong Subregion (GMS) and the critical factors that underpin them. The purpose is to help foster additional private sector involvement and direct financing of future EbA initiatives, as a way to help bridge the growing adaptation (funding) gap. EbA is increasingly being integrated in adaptation strategies in the GMS but only one initiative that is implemented in collaboration with the private sector was found. To achieve the aim of the study, the author intends to answer the following research question and sub questions:

- *Main RQ:* What motivates and enables private sector's involvement and financing in EbA initiatives in the Greater Mekong Subregion?
  - RQ1:* Which characteristics of EbA are significant for direct financing by the private sector?
  - RQ2:* What general factors influence private sector adaptation to climate change?
  - RQ3:* What direct financing models for EbA involving private actors exist and what characterizes them?

To provide answers to the main research question, the study builds upon a Case-Based Research (CBR) design with two case studies of existing direct financing models, namely: *Microfinance for Ecosystem-based Adaptation (MEbA)* and *Supply Chain Approach for Ecosystem-based Adaptation (SCA for EbA)*.

### 1.4 Limitations and scope

This section intends to expose the limitations placed upon the research as well as the author's choices that together constitute the scope of this thesis.

The relative novelty of EbA as an approach means that a large number of EbA projects are still ongoing. As for projects that include private actors (i.e. businesses), the numbers are even lower and the projects even more recent. In that respect, the choice of project and associated financing models for the case studies resulted from both the very limited number of projects and their relevance with regard to the objective and research questions. *MEbA* and *SCA* for

EbA were perceived as more relevant due to their specific features, which seemed to be the most complex for private sector engagement (i.e. high level of community involvement, long-term type of financing, low potential for immediate profitability).

Time budget and geographical location of the author (based in Phnom Penh) did not allow for the design of both case studies to be identical with regards to the type and number of interviews; more interviews were conducted in Cambodia than in the other two countries of the GMS. Furthermore, the first case study (*MEbA*) includes interviews findings from both private sector actors involved and not involved in EbA. The second case study (*SCA for EbA*) however, only includes interviews findings with private actors currently involved in EbA.

The geographical choice for the study (GMS) resulted from various factors including a suitable context (i.e. alarming environmental degradation and climate change vulnerability in the region), the presence of numerous EbA projects including one involving the private sector in two of the six GMS countries (Thailand and Vietnam), and more practical factors such as the author's ability to travel to the countries for data collection. The author travelled to three of the six countries of the GMS (Cambodia, Thailand and Vietnam); and while the other three could have been valid choices, given the scope of the thesis, the author chose to focus on these only. Contexts of the six GMS countries differ on a range of aspects (e.g. economic development, adaptive capacity and poverty levels), but they also share significant similarities (e.g. climate, ecosystems, climate change risks, demographic and economic pressures on natural resources, dependence of vulnerable population on agricultural activities). Due to these common characteristics, the author finds that although the cases focus on Cambodia, Vietnam and Thailand, the results of the study are relevant and applicable across the GMS.

To some extent, geographical choices for data collection could have influenced access to data due to language barriers. But ultimately, the type of interviewee targeted and the author's languages abilities largely mitigated the issue as most project managers and decision-making managers have English or French abilities (in which the author is fluent), in addition to their country's official language. All interviews were conducted in English, except two: one interview in Cambodia was conducted in French, and another one in Vietnam that required the presence of a Vietnamese interpreter.

While the paper adopts a generally favourable viewpoint towards EbA, it does not intend to demonstrate the effectiveness or superiority of the approach in any manner. Neither does it intend to provide an evaluation of the potential for such initiatives in the GMS region; for instance through providing a scientific assessment of the vulnerability of populations or the state of the ecosystems in the countries. The aim is mainly to gain understanding of the factors that (could) motivate and enable private sector involvement with the ultimate goal of providing knowledge to the concerned audience on means to foster such financing models where needed. This led to a stronger focus being placed on the project than the country context. Finally, general policy implications emanating from their associated factors can be found but the study does not intend to give targeted policy recommendations.

## 1.5 Ethical considerations

This research topic is the author's own choice and was not influenced by any means. The research was supported by International Ecosystem Management Partnership (IEMP) a collaborating centre of the United Nations Environment Programme (UNEP) and the Chinese Academy of Sciences, located in Beijing, China. The collaboration with the supporting organisation is the result of common research interests and does not entail financial contribution. Throughout the project, the author adopted an observer stance while conducting interviews with as much as possible an objective attitude. The author has no



particular political views with regard to the countries visited. No personal or sensitive information was collected and interviews were recorded when deemed necessary and appropriate (upon approval from the interviewee). Out of eleven interviews in person, six were recorded. Only one interview required the services of an interpreter. The author ensured that information given by all interviewees was reported as is in the thesis and provided the interviewees with a copy of the section relating their interviews.

## 1.6 Audience

This thesis project is supported by UNEP-IEMP, which invited the author to an inception workshop on South-South Capacity Building for Ecosystem Management in the GMS and helped provide relevant contacts and information for the thesis. This study may be of interest to a range of actors such as: EbA practitioners and researchers, policy-makers, non-governmental, intergovernmental and governmental organisations and more generally anyone interested in or working with climate change adaptation or private sector involvement in ecosystems governance.

## 1.7 Disposition

Chapter 1 presents the background that led to the development of the research topic aim and questions. The limitations and the author's choice that delineate the scope of the study along with the audience to which it may be of interest are described herein.

In Chapter 2, the methodological approach, research design and data collection methods are presented. It describes the reasons behind the choice of case studies and countries, such as the low number of cases leading to a case-based research design with few cases using between and within analysis.

Chapter 3 has a crucial role in the thesis as it presents the first part of the literature review and context supporting the case studies. It aims to answer sub question *RQ1*. It focuses on EbA as an approach, describing its main features and its financing model. The findings of this chapter are also supported by findings gathered during a workshop attended by the author, which provided insight in GMS countries' context and critical factors characterizing the development of EbA.

Chapter 4 presents the second part of the literature review, and focuses on private sector's adaptation to climate change in general (*RQ2*); with an emphasis on developing countries and Asia. The findings of this chapter also provide an answer to sub question *RQ3*, through a review of prominent existing financing model for EbA that involve the private sector.

Chapter 5 and Chapter 6 (respectively *MEbA* and *SCA for EbA*) present the results of the case studies, organised by type of financing model and project according to countries. Each country section contains a context description of the country's ecosystems state and the concerned industries to provide the reader with a background before moving into the findings. The descriptive sections of the case studies rely mainly on secondary data. The findings sections are only constituted of data collected from semi-structured interviews.

Chapter 7 entails an analysis of the results of the case studies supported by a discussion. In the first section of this chapter, a framework for analysis is presented, which is then used to perform a within and between cases analysis. This is followed by a discussion of the results and the methodology. Finally, the thesis ends with conclusions presented in Chapter 8, which includes main findings, policy implications, recommendations, and concludes with suggestions for further research.

## 2 Methodology

### 2.1 Overview of the methodological approach

In this study, the author adopted an inductive approach, meaning that she attempted to draw generalizable inferences out of observations, where theory is an outcome of research (Bryman, 2012). This exploratory study relied on two major components: a literature review and two case studies. Both components contributed to provide material (including both primary and secondary data) for the use of triangulation. No existing analytical framework was chosen or defined through the literature review; instead, the author used the findings of the case studies to extract a framework for analysis. The case studies were not delimited by geographic boundaries but by type of private sector financing model for EbA namely: *Microfinance for Ecosystem-based Adaptation (MEbA)* and *Supply Chain Approach for Ecosystem-based Adaptation (SCA for EbA)*. To provide suitable data for the analysis and ultimately allow for the fulfilment of the aim of the study, the case studies presented relied on data from semi-structured interviews with both actors involved and not involved for the case of *MEbA*, and only actors involved for *SCA for EbA*. Overall, it allowed the author to perform a within case and between case analysis. The overall approach is pictured in

Figure 2-1 below.

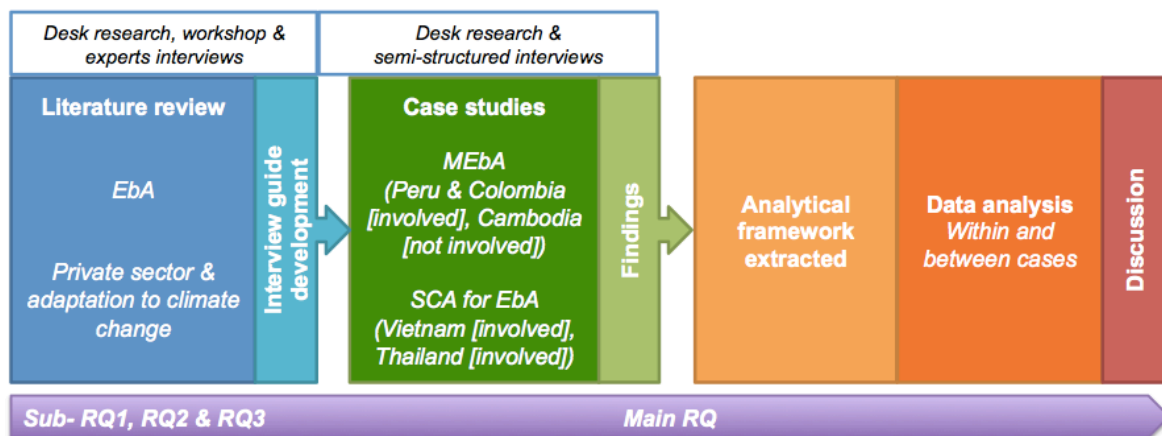


Figure 2-1. Overview diagram of the methodological approach

Source: Author's own

### 2.2 Research design

In line with the inductive approach, this study followed a Case-Based Research (CBR) design where a small number of cases (two) are studied in considerable depth by using a variety of methods to capture and analyse a wide range of data (6 & Bellamy, 2012). This design is heavily supported by a literature review as presented in Section 2.2.2. Prior to that, Section 2.2.1 provides the definitions used in this study.

#### 2.2.1 Definitions used in this thesis

Two key terms delineate the topic of this thesis, namely: Private sector and Ecosystem-based Adaptation. To provide the reader with a clear scope of research, definitions of the two terms that are used in the study are provided in this section.

Private Sector in this study is defined as the section of the economy that is run by individuals or entities identified as private (as opposed to government run organisations), and who run

their operations for-profit. Private sector actors mentioned in the thesis are so-called “formal” as opposed to the actors in the “informal sector”, which generally refers to a non-regulated part of the economy where labour relations are “based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements with formal guarantees” (International Labour Organization (ILO), 1993, para. 5).

In the thesis the author uses the abbreviation EbA for Ecosystem-based Adaptation; and in this context, she refers to adaptation *to climate change*. As for Ecosystem-based Adaptation, the definition used is the one provided by the Secretariat of the Convention on Biological Diversity:

*[...] Ecosystems can be managed to limit climate change impacts on biodiversity and to help people adapt to the adverse effects of climate change; implement where appropriate, ecosystem-based approaches for adaptation, that may include sustainable management, conservation and restoration of ecosystems, as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for local communities; [...]. (COP 10 Decision X/33, 2010, p. 3)*

In addition to these two terms, the author mentions *direct* financing models for EbA involving the private sector. This refers to models where funds (regardless of their size) from a private actor (in most cases a company) are being directly provided to the implementers of the EbA measures (often local communities) without going through an intermediary (e.g. financial intermediaries).

## **2.2.2 Literature review**

A literature review as defined by Blaxter, Hughes, & Tight (2010) is a “critical summary and assessment of the range of existing materials dealing with knowledge and understanding in a given field” with the purpose of locating the research project and to form its context. According to the typology outlined by the same authors, the literature review in this study was performed as a vehicle for learning for the author and played the role of research facilitator as it had an impact and influenced the research project. Consequently, the literature review was performed both prior to the research project as a means to identify a knowledge gap and during the project as a way to define characteristics or conditions that could influence the case studies findings (answering sub research questions *RQ1*, *RQ2* and *RQ3*).

In terms of content, the literature review begins with Chapter 3, an overview of the EbA approach, presenting its origins, development, as well as its core features. This part of the literature review explores in more depth what constitutes EbA, its singularities, and list linkages with other approaches. The purpose is to identify what characteristics could be a source of influence (positive or negative) on private sector actors’ involvement in EbA (*RQ1*). In that regard, assumptions are made, which are then discussed in the discussion presented in Chapter 7. The author also used the findings as a mean to partially delineate the interview guide structure and content.

The second part of the literature review, Chapter 4, relates to factors that influence private sector action with regard to climate change adaptation, such as climate risks and barriers to adaptation (*RQ2*). This chapter builds on existing literature similarly to the previous section intends to help the author in the case studies data collection process; similarly, the assumptions made in this chapter (summarised in Section 4.4) are later discussed in Chapter 7. Finally, Section 4.3 presents the existing financing models for EbA involving the private sector found by the author (*RQ3*). It elaborates briefly on the characteristics of each model and their innovative aspects (detailed descriptions of the two selected models are provided in the case studies Section 2.2.3) The section’s findings helped the author identify the specificities

and evaluate the complexity of each model, based on the type of funds and time scale involved; it supported the author's choice of models that would be used for the case studies.

### 2.2.3 Case studies

#### **Case studies description**

The first case study presented in Chapter 5 called *Microfinance for Ecosystem-based Adaptation* is based on the design of the project with the same name that takes place in South America (Peru and Colombia). The main objective of the project on which the case study is based is to provide technical assistance to Microfinance Institutions (MFIs) in order to develop climate smart lending methodologies and to create and implement marketable EbA-orientated products to small Andean landholders (UNEP-ROLAC / FS-UNEP Centre, 2014).

The second case study presented in Chapter 6 refers to the *Supply Chain Approach for Ecosystem-based Adaptation*, based on the Mangroves and Markets (MAM) project implemented by the International Union for Conservation of Nature (IUCN) and SNV Netherlands Development Organisation (SNV) in Vietnam and Thailand. It aims to introduce economic incentives to foster sustainable use, management and restoration of mangroves through certification systems and price premium paid companies that source shrimp (e.g. processors, final buyer) (SNV, n.d.). The overall objective of both models is to reduce the pressure on ecosystems, as a way to maintain their integrity and ability to deliver ecosystem services in a changing climate, thus enabling them and population dependent upon them to adapt.

Within each case study, a description of the financing model and associated project is given, before the results of data collection are categorized by country. A brief description of each country's context is also provided. In the first case study (*MEbA*), findings from interviews with private actors currently involved in an EbA project indicate factors that supported their involvement and experience in the specific countries (Colombia and Peru). In the same case study, actors that are not currently involved in EbA but operate in the same industry were interviewed in a country of the GMS (Cambodia) in order to identify what would motivate or enable them to engage. In the second case study (*SCA for EbA*), only actors currently involved in EbA were interviewed in two other GMS countries (Thailand and Vietnam).

#### **Selection of case studies and countries**

The novelty of EbA as an approach and the rarity of private sector involvement left the author with a limited choice of cases to pick from but at the same time also helped in delimitating the scope of the study. Based on the results of a preliminary literature review the author chose the models (and associated projects) that seemed to have the most complex features for private sector engagement (i.e. high level of community involvement, long-term type of financing, low potential for immediate profitability). In that process, geographical location did not play a role. For instance, the *MEbA* project that takes place in South America was used as a basis for the first case study. The second case study however, was based on a project that takes place in two countries of the GMS. Overall, the regional focus of the study (GMS) was decided based on both substantive relevance and practical criteria. The latter included: location of the projects associated to the models, ease of access to data, author's location during the thesis period and network of the supporting organisation (UNEP-IEMP).

As for substantive relevance, the GMS region is home to some of the most vast and complex ecosystems. The state of the ecosystems, as highlighted in the introduction of this study, is alarming and conservations efforts of all kind are being undertaken in the region. Furthermore, the number of EbA projects is growing, as the approach appears to be adapted to the socio-economic and environmental conditions of the region. With regards to the private

sector, Cambodia was chosen for the first case study due to its well-developed microfinance sector; private Microfinance Institutions (MFIs) are largely present, and are key economic players in the country, which is not the case in other GMS countries. Furthermore, the gradual commercialisation of the industry that is occurring (many MFIs that started as NGOs have now turned into commercial MFIs) does not seem to preclude the sector from having an important role in supporting vulnerable populations, especially in the agriculture sector which makes up most of the labour force in the country. Similarly, with regard to the supply chain approach, intensive shrimp farming in Thailand and Vietnam is both a key economic sector and a major cause of mangroves degradation; in addition, coastal areas are particularly prone to climate hazards. This provides a sound basis for the involvement of companies that source their shrimp from these countries in the implementation of EbA measures.

### **Selection of interviewees**

For the case studies, semi-structured interviews with private actors targeted individuals that either had decision-making power in the organisation or were involved to some extent in the EbA collaboration (for the organisation that were involved in EbA). As it was reasonable to expect a low level of awareness of EbA in the target countries, especially in the private sector, no particular level of knowledge of EbA or climate change was used as a criterion as this would not only limit access to data, but also, more importantly, influence data and results. Indeed, if the author were to specifically select interviewees that know of EbA this would have either made the study difficult to conduct or provided a skewed perspective on the situation and the level of awareness in the countries. As for semi-structured interviews with project managers of implementing organisations they were selected simply based on their willingness to participate and availability. The same criteria applied for other communications with researchers and practitioners with expertise on the specific issue. The author engaged in discussions on the specific topic in an informal manner with project managers at the supporting organisation (UNEP-IEMP) and attended one of its workshops. A total of 12 semi-structured interviews with 15 interviewees (private sector and implementing organisations) were conducted (11 in person and 1 over the phone). Private actors interviewed included: three large MFIs and one Rural Credit Operator in Cambodia, one global shrimp processing and exporting company in Vietnam, and one upscale hotel resort in Thailand. For a full list of personal communications see Appendix I.

## **2.3 Methods for data collection**

### **Literature review**

Data collection methods for the literature review and context sections of the case studies mainly included Internet searches through databases (EBSCO) and Internet browsers, as well as documentation given by interviewees. The data collected for the literature review originated mainly from secondary sources that include: peer-reviewed articles, books (electronically accessed for the most), reports by research organisations, documentation from governmental, inter-governmental and non-governmental organisations, technical papers and websites. To collect the relevant data, the author used a number of search keywords that include: “Ecosystem-based Adaptation in the Greater Mekong Subregion”; “Climate change in Southeast Asia”; “Cost of Ecosystem-based Adaptation”; “Private sector and climate change adaptation”. A workshop report (unpublished) provided by the supporting organisation (UNEP-IEMP) was also used in the literature review.

### **Concepts delineating the primary data collection process**

Two concepts were used as a structure in the process of collecting primary data and presenting the findings, namely *motivational factors* and *enabling factors*. Although the distinction

between the two concepts can sometimes be blurred as some factors may overlap, the author believed that framing the factors as motivational factors instead of drivers would provide a better insight into factors that are internal to the company.

*Motivational factors* consist of factors that (would) motivate(d) or lead private actors to engage in EbA; in other words they are the reasons or internal drivers that underpin the decision. As for *enabling factors*, they consist of factors that enabled the involvement of private actors in EbA, or that through their absence could constrain or jeopardize their engagement.

### **Semi-structured interviews**

Data of the case studies findings sections was of primary nature, originating from interviews. The diversity in interviewees and the specific issue being investigated in this research required the use of semi-structured interviews, which were more “openly designed” and included both flexible and more standardized components (Flick, 2009).

The interview guide developed contained interview questions that followed a specific but flexible structure that was almost identical in some cases, for instance when interviewing private actors in order to identify motivational and enabling factors (see Appendix II for a template of questions); and differentiated in some others, based on certain criteria such as level of involvement with EbA (involved or not) or industry (i.e. microfinance, agribusiness). The questions were mainly open-ended and aimed to let the interviewees respond freely about what factors played a role in their context. Only one interview with Minh Phu Corporation in Vietnam necessitated the services of an interpreter. As for project managers in implementing organisations, the interviews had an even more flexible structure and really intended to simulate an iterative discussion around key themes rather than following a specific structure (see Appendix III). Interviews duration ranged between 15 minutes and one and a half hour. It should also be mentioned that prior to conducting interviews in the field the author attended the *South-South Capacity Building for Ecosystems Management Greater Mekong Subregion Project Inception Workshop* organised by UNEP-IEMP, which included substantive discussions on ecosystems management and conservation challenges with government representatives of the six GMS countries.

## **2.4 Method for data analysis**

In line with the inductive nature of this study, the author used a framework for analysis that she extracted from the findings of the case studies. The motivations for choosing to extract the framework from the case studies rather than using a pre-existing one from the literature were two-fold: the absence of a suitable framework in the EbA or business and strategic management literature, and simply to ensure that the analysis results would be specific to EbA and reflective of the role of the approach’s unique features in the context of GMS countries. Similarly, with regards to the clustering method used to extract the framework, no previously used method in the literature (e.g. on studies investigating drivers and barriers for private sector adaptation to climate change), was found to fit the design of this study. In other words, the method chosen (clustering and framework extraction) and used in the analysis section appeared more adequate to help the author answering the main research question. This method followed a three steps structure as presented below.

*First step:* all motivational and enabling factors found in the two case studies were gathered and clustered in different categories using a colour-coded method (see Appendix VII). The factors were classified using the motivational and enabling distinction previously used in the case studies, forming a framework for analysis (Figure 7-1). For motivational factors, three categories were extracted: (i) *Climate change risks*; (ii) *Business opportunities*; and (iii) *Societal contribution*. For enabling factors, five categories were found: (a) *Stakeholders’ requirements*; (b)

*Market factors; (c) Sustainability awareness and integration in the organisation; (d) Knowledge and resources; and (e) Government support and policy frameworks.*

*Second step:* the analytical framework extracted was used to perform a within and between cases analysis where the author compared and discussed the different cases to identify differences and similarities, while referring to relevant literature when possible (Section 7.2).

*Third step:* in this final step, to provide answers to the main research question (*Main RQ*), the author linked and discussed the results of the analysis with the findings of the literature review chapters and their associated assumptions (Section 7.3.1). Finally, general observations were drawn from the discussion.

### 3 Ecosystem-based Adaptation: A comprehensive overview

In order to address the main research question presented in the introduction, a comprehensive literature review on the approach of Ecosystem-based Adaptation (EbA) and its implementation is needed. This chapter is divided in three sections that each present essential knowledge on EbA. Section 3.1 looks into EbA as an approach, its historical development, related terms, main features and stakeholders. Section 3.2 presents the unique characteristics of the approach including a comparative analysis in the form of a table (Table 3-3). It is then followed by a description of the current financing model for EbA (Section 3.3), as a way to enhance the understanding of the financing needs and factors that call for private sector participation. Finally, the chapter ends with a summary section (Section 3.5) that entails a number of assumptions, which are used later in the analytical part of the thesis.

#### 3.1 Ecosystem-based Adaptation: origins and features

##### 3.1.1 A few definitions

Prior to addressing the definition of EbA, it is crucial to understand the origins of the approach. To do so, this section presents and differentiates three concepts to which EbA relates and from which, to a large extent, originates from: Ecosystems Management, Ecosystem-based Management and Ecosystem Approach. Finally, a diagram presenting the concepts and approaches in relation to each other is provided.

##### ***Ecosystem Management***

As defined by the United Nations (1992) in the Convention on Biological Diversity: an ecosystem refers to “a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit” (Article 2, p. 3). Examples of ecosystems include wetlands, grassland and desert. The management of such dynamic complex unit is mainly referred to as Ecosystem Management. While this term could seem rather straight forward, a number of definitions can be found in the literature. An analysis of how the definition of Ecosystem Management has evolved over time allows us to understand the elements that later constituted a basis for the development of EbA.

Indeed, in 1987 Clark & Zaunbrecher defined Ecosystem Management as the “Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and that basic ecosystem processes are perpetuated indefinitely” (p. 11). In this definition, the focus is placed on maintaining and perpetuating ecosystems and their processes without referring to human societies. At the time, even if ecosystems services (e.g. food and water provision, flood and disease control, recreational and cultural benefits) had been highlighted in research already, the definition did not refer to them but rather to processes; no mention of their role for human societies is found, indicating an almost purely conservationist perspective. In 1998, Lackey from the US Environmental Protection Agency provides a more straightforward definition of Ecosystem Management, which still does not mention ecosystems services but implicitly highlight their supporting role for societies as follows: “To restore and maintain the health, sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities” (Lackey, 1998). In the continuation of this definition, the one given by United Nations Environment Programme – International Ecosystem Management Partnership (UNEP-IEMP) (2011) includes a broader perspective by stating that Ecosystem Management places a particular emphasis on “integrating needs with conservation practice, and recognizes the inter-connectivity between ecological, social-cultural, economic and



institutional structures when developing solutions” (p. 14). In this recent definition, we can see the clear prominence of a system’s perspective where conservation practice appears to be balanced by needs (no distinction between human, animal or ecosystems needs is made), and inter-connectivity between social, ecological and economic structures is recognized, thus indicating a shared vulnerability.

### **Ecosystem-based Management**

Ecosystem-based Management (EbM) shares both similarities with EbA and differences with Ecosystem Management. In fact, it appears to be at the crossroads between the two concepts. Unlike Ecosystem Management, where it is about finding ways of managing ecological systems regarded as a whole, it focuses on managing the activities “within the ecosystem from an ecosystem perspective” and has an integrative, transdisciplinary focus (Slocombe, 1998, p. 31). As explained by Slocombe (1998), “it seeks to transcend arbitrary political and administrative boundaries, to achieve more effective, integrated management of resources and ecosystems at regional and landscapes scale” (p31). The objective of the approach being to restore and protect ecosystems, their functions and resilience for the benefit of all organisms (Uy & Shaw, 2012). Here we find a few key terms that constitute the basis of EbA such as “restore”, “protect” and more importantly “resilience”. Indeed, the idea of restoring ecosystems in order to ensure their resilience is at the heart of the EbA as the approach relies on the idea that healthy ecosystems will be more resilient to climate change impacts and help people adapt in the process as well. However, it is not surprising that “adaptation” is not mentioned in the definition of EbM as it was at the time a rather novel term that followed the developments in the field of climate change, starting with the second report of the IPCC titled “Impacts, Adaptations and Mitigation of Climate Change” in 1996.

### **Ecosystem Approach**

The term “Ecosystem Approach” emerged more recently; it is an integrated approach that adopts a holistic perspective. During the Fifth Conference of the Parties to the Convention on Biological Diversity (2000), it is referred to as “a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way” (COP 5 Decision V/6, p. 143). It is important to mention that it is one of the rare definitions relating to ecosystems management that mentions equity in such a direct manner; inclusiveness is key. The approach does not preclude other management and conservation approaches but calls for their integration instead. Similarly, a strong focus is placed upon adaptive management in the twelve principles that underpin the approach as it recognizes the changing nature of ecosystems. A number of those principles entail concepts that now constitute the essence of EbA such as: ecosystems resilience (Principle 5), long-term perspective (Principle 8), reliance on all forms of knowledge (Principle 11) and inclusiveness (Principle 12) (Secretariat of the Convention on Biological Diversity, 2000). The recognition of the value of all forms of knowledge and the need for inclusiveness can be considered as the basis of two major characteristics of EbA: the inclusion of a wide range of stakeholders and the use of indigenous knowledge through the involvement of local communities.

### **Overview**

In this section, a diagram (Figure 3-1) depicting different concepts and approaches relating to ecosystems management, is provided. It intends to give an overview as the number of existing concepts can overlap and sometimes cause confusion among policy-makers and practitioners in the GMS countries, as highlighted by Mr. Monyrak during the workshop attended by the author (personal communication, June 25, 2015).

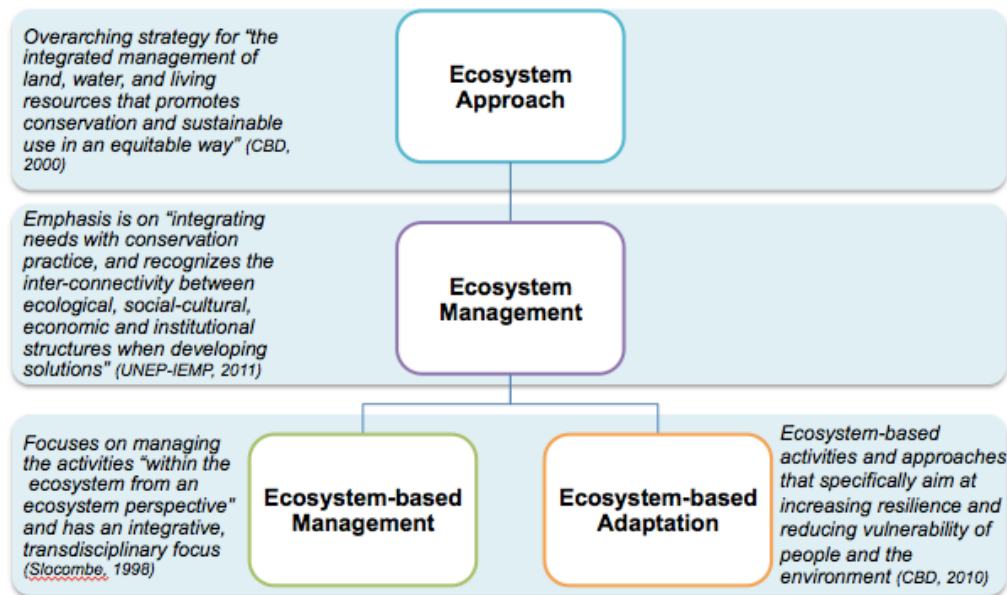


Figure 3-1. Diagram depicting the landscape of ecosystem management approaches and concepts

Source: Developed by the author based on Secretariat of the Convention on Biological Diversity (2000, 2010); Slocumbe (1998); UNEP – IEMP (2011)

### 3.1.2 What is Ecosystem-based Adaptation?

EbA is the result of an increased recognition of the importance of healthy and resilient ecosystems in helping people to adapt to climate change. Building and adding on all concepts presented above, it encompasses a range of ecosystem-based activities and approaches that specifically aim at increasing resilience and reducing vulnerability of people and the environment. As defined by the Secretariat of the Convention on Biological Diversity (2010), these activities can take the form of “conservation, sustainable management, and restoration of ecosystems” and aim to help people adapt to the impacts of climate change “as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for local communities” (COP 10 Decision X/33, p3). EbA often has a strong community focus and is even considered as complementary to community-based adaptation as its action is taking place locally and often allows for direct participation of populations; a participation that can take the form of integration of traditional and indigenous knowledge in the solutions development process (Hale et al., 2009).

To illustrate what EbA entails, researchers and practitioners often put forward the example of “green infrastructures” (e.g. wetlands, mangroves, salt marshes) that when protected or restored constitute natural safeguards for coastal areas that are vulnerable to climate change impacts such as storm surges (Uy & Shaw, 2012). As previously mentioned, EbA initiatives rely on the involvement of a wide range of stakeholders at different scales. In relation to the latter, a perhaps more practical definition of EbA that constitute a good basis for the present study, is the one by Vignola, Locatelli, Martinez, & Imbach (2009) who define EbA as “the adaptation policies and measures that take into account the role of ecosystem services in reducing the vulnerability of society to climate change, in a multi-sectoral and multi-scale approach.” (p. 692). In Table 3-1, a few examples of EbA activities are provided along with their associated benefits.

*Table 3-1. List of examples of EbA activities*

EbA activity	In details	Benefits
Sustainable water management	Sustainable management of river basins, aquifers, flood plains	Sustained provision of water storage and flood regulations services
Disaster risk reduction	Restoration or reduction of pressures on coastal habitats such as mangroves	Protects from storm surges, saline intrusion and coastal erosion
Sustainable management of grasslands and rangelands	Enhance pastoral livelihoods	Increases resilience to drought and flooding
Establishment of diverse agricultural systems	Use of indigenous knowledge to maintain genetic diversity of crops and livestock, conserve diverse agricultural diversity	Secures food provision in changing local climatic conditions
Strategic management of shrub lands and forests	Limit the frequency and size of uncontrolled forest fires	Ensures the continued provision of ecosystem services
Establishment of systems for protected areas	Preservation of ecosystems	Increased resilience to climate change

*Source: Developed by the author based on Colls, Ash, & Ikkala (2009)*

As seen above, a wide range of activities fall under the EbA umbrella; the essential and determining element being by definition the end-use or outcome, namely increasing resilience and helping people and ecosystems in adapting to the impacts of climate change. Consequently, this is often done through changes in people's ecosystems usage patterns, which often involve income generation supporting their livelihoods. Whether it is for direct consumption by local communities or commercial use by larger corporations, all these activities put ecosystems under pressure if not performed in a sustainable manner. Therefore, to be successful in addressing these patterns, EbA will inevitably require the involvement of numerous key stakeholders.

### **3.1.3 Mapping stakeholders**

Developing countries in general, and GMS countries specifically, depend to a large extent on natural resources and ecosystems which are currently under pressure and struggle to provide the services that underpin societies' well being and economy (Baumann, 2002; WWF, 2013). Addressing and managing the different pressures on ecosystems and their services requires the involvement of a range of stakeholders such as: national governments, regional authorities, local communities, private companies, scientific communities, intergovernmental organisations and Non-governmental Organisations. In order to understand the role of each, the following paragraph briefly presents the role of key stakeholders groups in the development and implementation process of EbA, followed by an overview in the form of a mapping diagram ( Figure 3-2). As so far the involvement of the private sector in EbA is almost inexistent, the potential role of private actors is not detailed in this section.

Policy-makers on the national level hold a crucial role in the mainstreaming of EbA as they provide the overarching framework and direction for adaptation planning. They also disseminate information by receiving knowledge from local communities (often through local authorities) and scientific community often in the form of experiences and lessons learned, to then use it for policy design or transferring it to raise awareness. Local communities are often directly involved in EbA as they are often dependent on natural resources and experience climate change impacts first hand. Therefore, they often possess valuable knowledge on the state of ecosystems that is either communicated directly to authorities or indirectly via the scientific community.

The scientific community along with international organisations and NGOs generally act as knowledge developers and brokers as well as implementing agencies of EbA projects. To a

certain extent they are intermediaries between policy makers, local communities and the general public who may not be directly affected but still shows interest in the matter. The science-policy interface is often identified as crucial as it determines the roadmap for practitioners. However, difficulties in establishing a functional interface are found, particularly in developing regions such as the GMS where institutional capacity can be lacking (M. Prachvuthy, personal communication, September 11, 2015). There is sometimes a tendency to work in “silos” (low cross-sectorial collaboration) as Mr. Ung highlights for the case of Cambodia (personal communication, July 27, 2015).

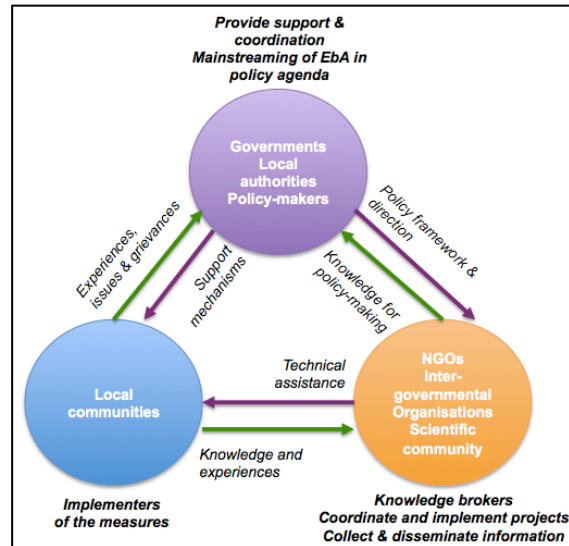


Figure 3-2. EbA stakeholders map

Source: Author's own based on Vignola et al. (2009)

## 3.2 What distinguishes Ecosystem-based Adaptation from other approaches for climate change adaptation?

### 3.2.1 Typology of climate change adaptation measures

In the literature on climate change adaptation, a number of distinctions are found to categorize adaptation types. As mentioned in Section 1.1, adaptation measures can for instance be distinguished based on their timing (i.e. anticipatory or reactive) (Fankhauser et al., 1999). To exemplify this aspect, we can refer to the Thai floods of 2011 that claimed more than 680 lives, affected about 13 million people and caused USD 46.5 billion worth of damages with approximately 90% borne by the private sector. Indeed, following the floods, including climate resilient infrastructures in the reconstruction plans appeared vital (World Bank, 2012). This illustrates how an extreme climatic event can trigger decision-making for reactive adaptation. On the other hand, anticipatory adaptation would entail implementing measures such as insurance schemes, climate resilient infrastructure building or EbA measures (e.g. mangrove restoration) prior to climatic events as prevention for future climate impacts.

Adaptation can also be differentiated based on its degree of spontaneity (i.e. autonomous or planned) (T. Carter, 1996). Autonomous adaptation refers to a response to climatic stimuli that is not conscious but is triggered by ecological changes in natural systems and by market or welfare changes in human systems. Planned adaptation, however, results from “a deliberate policy decision to respond to climate change in order to return to, maintain or achieve a desired state and can help reduce or offset the impacts of climate change” (Kam, Badjeck, Teh, & Tran, 2012). For instance, in the same study by Kam et al. (2012) an investigation of the autonomous adaptation process by shrimp and catfish farmers in Vietnam’s Mekong river delta was conducted. In this case, autonomous adaptation included changes in cultivation type and timing by farmers, while planned adaptation would have entailed investment in research on salinity-resistant crops or changes in land allocation by the local government. Finally, adaptation measures can be differentiated based on their geographic scope (e.g. local, regional, national) and their form (e.g. behavioural, technological, institutional, financial) (Smit et al., 2000; Smit & Skinner, 2002).

## Placing EbA in the adaptation literature

As seen in Section 3.1.2, EbA measures can take many forms; they can come in the shape of financial actions such as investments in restoration projects, behavioural through changes in ecosystems use patterns or even institutional where EbA is integrated in national policy planning and regulatory frameworks. Therefore, the geographical scope can easily extend from local to regional as well as national boundaries. For an overview and comparison with another adaptation option please see Table 3-2 below.

Table 3-2. Comparison placing EbA in the typology of adaptation measures

Characteristic	Timing	Spontaneity	Form	Geographic scope
<b>EbA</b>	Anticipatory & reactive	Planned & autonomous	Behavioural, technological, institutional, financial	National, regional, local
<b>Climate resilient infrastructures</b>	Anticipatory & reactive	Planned	Technological, financial	National, regional, local

Source: Author's own based on: Andrade Pérez et al. (2010); Campbell, Kapos, Scharlemann, & Secretariat of the Convention on Biological Diversity (2009); Colls et al. (2009); IUCN (2014); Rao et al. (2012)

### 3.2.2 Unique characteristics of the approach

At first, EbA might not appear to bring anything fundamentally new in the field as it emerged and built on both developments in the field of ecosystem-based management and climate change. But in fact, the approach possesses a number of unique features from which multiple benefits can emerge; benefits that are often more difficult to harness with other adaptation approaches. A summary of the main singularities and advantages of the approach often brought forward by researchers and practitioners is presented below.

It is a *multi-scale* approach; it can be applied on national, regional or local level but also on one-time basis or longer, continuous time scale. In that sense, EbA shows a certain degree of flexibility (Campbell et al., 2009).

It is an *inclusive* approach; as illustrated in Section 3.1.3, EbA requires collaboration of a wide range of actors at different levels but unlike certain types of adaptation local communities can be engaged through different means (Hale et al., 2009). They can act as providers of traditional knowledge on ecosystems management and information on the state of the ecosystems or as receiver of specific training in climate adaptation techniques.

It is more *accessible*; EbA measures such as sustainable management of ecosystems generally do not entail heavy engineering and the related technical knowledge, unlike infrastructure-based interventions (Campbell et al., 2009).

It is a *low-regret or no regret* approach; as previously mentioned in the introduction, EbA focuses on “maximizing positive and minimizing negative aspects of nature based adaptation strategies and options” (IUCN, 2014). It is unlikely to cause maladaptation or unexpectedly harm ecosystems as it aims to maintain their integrity. However, there is a need for further research on the long-term socio-economic impacts of influencing and changing local communities' livelihood patterns when they are involved.

It provides *mitigation benefits*; indeed, through maintaining integrity of ecosystems such as mangroves and other forests, EbA helps maintaining carbon sinks. These ecosystems with carbon sequestration properties are key components of climate change mitigation strategies.



It has *multiple co-benefits*; based on all the factors presented above, it is possible to discern the multiple benefits that emerge from the approach. EbA brings environmental, social and economic benefits in different forms, such as: ecosystems conservation, climate change mitigation, maintenance of industries dependent on natural resources, livelihood support, awareness raising and capacity building in local communities (Andrade Pérez et al., 2010).

However, it is emphasised that EbA is *not the panacea*; it shall be implemented in the context of broader adaptation strategies. Depending on the situation and objectives, it can work *alone*, as a *complement* or *not be implemented* at all when other options are more appropriate. The approach can be challenging to implement due to the *required knowledge* (e.g. ecological conditions and processes); involvement of local community can also be sensitive. While research shows the approach can have relatively *low investments costs* and be more *cost-effective* than engineering options (Brown et al., 2006; Rao et al., 2012); the *significant time scales involved and time lag* between implementation and benefits harnessing can be a strong deterrent to its adoption.

Countries of the GMS are particularly exposed and show high level of vulnerability to climate hazards related to climate change such as cyclones, droughts, sea level rise and floods (Yusuf & Francisco, 2009, pp. 6–11). Consequently, to illustrate the specific features of the EbA approach, the author chose to compare EbA measures in the context of disaster risk reduction against storm surges, as found in *Table 3-3*.

*Table 3-3. Comparative analysis of adaptation measures for disaster risk reduction from storm surges*

Type of adaptation option and associated measure	EbA Mangrove conservation	Hard engineering option Sea wall construction
Accessibility (low technical complexity)	Moderate-High	Low
Cost	Moderate	High
Ease of implementation (knowledge required & stakeholders involved)	Low	Moderate-High
Low regret aspect	High	Low-Moderate
Local community involvement	High	Low
Number of stakeholders involved	High	Low
Potential governance & capacity building benefits	High	Low
Mitigation benefits (e.g. carbon sinking)	Moderate-High	Low

*Source: Author's own based on: Andrade Pérez et al. (2010); Asian Development Bank (2015a); Colls et al. (2009); Munang et al. (2013); Naumann et al. (2011); Rao et al. (2012)*

### 3.3 The current financing model for Ecosystem-based Adaptation

#### 3.3.1 An overview of adaptation finance in general

##### **Adaptation funding needs**

In 2010, costs of adaptation in developing countries to cope with an increase of global temperatures by 2 degrees Celsius by 2050 were estimated between USD 70 billion to 100 billion a year (Margulis et al., 2010); a number that has now been revised and is said to be “likely to reach two to three times the previous estimates” (UNEP, 2014). Furthermore, it is highlighted that despite adaptation funding by public sources reaching USD 23 to 26 billion in 2012-2013 and increased financial commitment, after 2020 there will be a major funding gap “unless new and additional finance for adaptation becomes available” (Olhoff et al., 2014). According to the USAID, the annual costs of climate change impacts for the Lower Mekong Basin specifically (Laos, Cambodia, Thailand, Vietnam), will amount to USD 18 billion of

damage to infrastructure, USD 2.54 billion to crop production and USD 1.24 billion to ecosystem services by 2050 (Talberth & Reyntar, 2014). In addition to the growing lack of funding that threatens adaptation projects, certain countries of the GMS seem to have low capacity in financial management, which impedes on the implementation process of projects (K. Lamphanh, personal communication, June 25, 2015).

### ***The landscape of climate and adaptation finance***

The landscape of climate finance is complex and suffers from data gaps and methodological harmonization issues. However, a number of institutions are currently in the process of developing an accurate picture of climate finance and its evolution to ensure an improved evaluation of needs. The Climate Policy Initiative (CPI) has since 2012 compiled annual reports on the “global landscape of climate finance”. In the latest diagram (2014 version) showing the actors and flows (see Appendix IV), it is indicated that out of USD 331 billion of climate finance approximately USD 25 billion were directed towards adaptation uses (Climate Policy Initiative, 2014b). From this number, 90% of adaptation finance captured was invested in developing countries among which East Asia and Pacific region was the main recipient (Climate Policy Initiative, 2014a).

In terms of sources, Development Finance Institutions (DFIs) (i.e. national, multilateral, bilateral), such as the World Bank, were the main source of finance for climate resilience projects (88% of adaptation finance) and adaptation activities were mainly financed through low-cost loans (52%) and grants (16%) (Climate Policy Initiative, 2014a). Other sources of finance include governments (9%) and climate funds with public sources (2%); meaning that approximately all of the USD 25 billion originated from public sources (Climate Policy Initiative, 2014b). In contrast, a majority of funds directed to climate mitigation originated from the private sector. It is essential to mention that institutions such as CPI are currently unable to track private investments in adaptation and there is no reliable data source for project-level private adaptation interventions (Climate Policy Initiative, 2014b). One contribution to help filling this knowledge gap, can be found in the initiative launched by the Organisation for Economic Cooperation and Development (OECD) since 2013 that aims to help track private climate finance by developing improved methodologies (OECD, n.d.).

Finally, an important source of information with regards to climate change related investments is the Responsible Investment (RI) or Socially Responsible Investment (SRI) discipline, which can be defined as the “investment discipline that considers environmental, social and corporate governance (ESG) criteria to generate long-term competitive financial returns and positive societal impact” (US SIF, 2015). Indeed, according to Novethic (2015a, 2015b) the key trends show that the number of investor coalitions dedicated to climate solutions is growing significantly in 2015, more than 550 investors having made a commitment to the climate in one way or another. However, this means that no distinctions can currently be made between commitments towards mitigation or adaptation measures.

### **3.3.2 Financial sustainability of Ecosystem-based Adaptation measures**

From the findings of Section 3.3.1 it is clear that EbA initiatives as part of climate change adaptation approaches are also located at the end part of the financing flow. Today, there are no estimates of how much funds (publicly or privately sourced) are or will be directed towards EbA initiatives, but it appears that only five per cent of all projects to fight climate change can be financed with the current international funds available (Palitza, 2011). Thus, EbA initiatives inherently depend on the provision of “faraway” funds by the different entities presented above while facing high competition.

Furthermore, this relation although ultimately beneficial can also create uncertainty in the long-term, as the received funds are often dedicated to the implementation of a project for a defined period of time after which other forms of funding will be required to sustain it. As mentioned by Mrs. Zhang, in conservation efforts that involve the provision of financial incentives to local communities for protecting forests and replace revenues gained through logging, it is often the case that when the initiative ends locals are left with no compensations and therefore no alternative than logging to support their livelihoods (personal communication, June 26, 2015). In other words, the longevity of initiatives is highly dependent on funding that often tends to be short-term based (i.e. 3-5 years). In addition to this, many countries do not manage to get direct access to funds, meaning that an intermediary (e.g. UNEP, Asian Development Bank [ADB], The World Bank) has to receive the funds (UNEP-IEMP, n.d.). The importance of reducing the number of intermediaries, which often leads to undermined effectiveness, and increasing direct access to funds for projects is often highlighted (Fröde & Assmann, 2011). Indeed, a higher number of intermediaries can lead to the “spreading” of the funds due to diverse factors (e.g. administrative costs, corruption) and diminish the actual amount that will directly be provided to the end-recipients (i.e. local communities in the case of EbA) acting as implementers of the measures (Satterthwaite, 2015).

### ***An increasingly recognized potential***

Researchers and practitioners are still in the process of solidifying the evidence base for EbA. Although partially gathered, mostly on a case-to-case basis, evidence of the cost-effectiveness is still being developed and understanding of how EbA works by other stakeholders is still evolving. However, according to Rodgers (2014), EbA has been identified as a key thematic priority by the Green Climate Fund (2015). Municipal governments have also started to show increased interest in the approach in the context of urban issues. A background paper by Laros, Birch, & Clover (2013) investigating the potential for EbA in urban areas, mentions that out of 23 projects of the Asian Cities Climate Change Resilience Network (ACCCRN) four had an element of EbA; a small but encouraging number. Rodgers also mentions that EbA approaches could become of interest to multilateral organisations such as The World Bank or the ADB as their current portfolios tend to focus on hard physical infrastructures (UNEP-IEMP, n.d.). Therefore, increased recognition and expansion of areas for application is expected to open new financing pathways and widen the range of potential sources of climate finance (Rodgers, 2014).

## **3.4 Opportunities for direct financing models involving the private sector**

Overall, through the analysis of the financing model for EbA measures and considering the specific features of EbA (e.g. reliance on community involvement), the author identifies potential for more localised and direct forms of financing. Incentivizing local populations to change their ecosystems use patterns can be done financially, but it is often the case that governments do not have the budget for what could be considered subsidies for sustainable management of ecosystems or loans to support farmers in switching to climate smart agriculture measures. Looking outside the “traditional” climate financing system where funds are mainly disbursed by multilateral organisations in the form of loans, through designing new direct financing models that also involve local private actors is important. Indeed, the market distortions leading to the deterioration of ecosystems, which can be mitigated through EbA measures, often originate from private sector led activities. In addition to the financing benefits, involving private actors can lead to awareness raising in EbA and by extension bolster the mainstreaming of sustainability in the private sector. Therefore, the private sector is identified as a potential key partner in the implementation and direct financing of EbA.



### 3.5 Summary of Findings

The analysis of the landscape of ecosystem management, although underpinned by complexity, highlighted some important elements of the origins and development of EbA. Despite the overlaps between concepts, it is possible to identify EbA as a crossroad between ecosystem-based management and climate change adaptation. In addition, by taking a closer look at the EbA approach and its current financing model, the findings of Chapter 3 provide elements of answers to the sub-research question *RQ1: Which characteristics of EbA are significant for direct financing by the private sector?*

In terms of *financing sustainability of EbA initiatives*, the analysis of the landscape of climate finance clearly shows that EbA finds itself at the end of the climate finance flow chain along with other adaptation measures, which all face a growing funding gap leading to increased competition. Indeed, in 2014 it was found that out of USD 331 billion of climate finance only USD 25 billion were directed towards adaptation activities. As of today, almost all climate finance appears to originate from public sources, in the form of loans, and Development Finance Institutions (DFIs) in particular play important roles in developing countries. However, funding is rather difficult to access and some governments of developing countries can be reluctant to take loans for adaptation activities; this is particularly relevant in the case of EbA, where *time scales and time lags* between implementation and benefits are significant. In addition, uncertainty remains with regards to private climate adaptation finance in general as specialists and researchers are currently unable to track private finance flows. Despite growing commitments of the private sector towards the climate as observed with the rise of the Socially Responsible Investment (SRI) trend, no distinction is made on how much will be directed towards adaptation, leaving significant knowledge gaps regarding the current and future outlook of adaptation financing. Therefore, it is reasonable to state that the financial sustainability of EbA could benefit from further private sector involvement.

Alongside financing related aspects, other unique characteristics of the approach can be significant for private sector financing. The EbA approach is *multi-scale* and generally requires collaboration between *multiple stakeholders* with a strong focus on *local community involvement*. It does not require heavy engineering elements and is also considered as cost-effective as it entails *low investments costs* making it more accessible for local communities. Overall, EbA shows higher potential for harnessing *multiple co-benefits* (i.e. capacity building, mitigation, low regret) than traditional infrastructure-based adaptation measures but requires a certain level of *knowledge* with regards to ecological conditions and processes and needs to be integrated as part of a broader adaptation strategy.

Due to some of the specific aspects of the approach, namely its focus on targeting the impacts of long-standing economic pressures on ecosystems, the need for secured long-term funds and a reduction in the number of intermediaries between the source of the funds and the recipients, the author identifies potential for innovative financing models for EbA that include more direct and localized components. In that respect, the private sector could serve as a potential key partner for such initiatives. While assumptions can reasonably be made with regards to some of EbA's unique features acting as drivers for private sector involvement such as *multiple co-benefits* and *low investments costs*, some can be expected to represent constraints such as *time scales and time lags*, *knowledge required* and *involvement of multiple stakeholders and local communities* in particular. However, to this day no research was found on the role played by these characteristics. Nonetheless, a good basis for enhanced understanding what underpins private sector action can be found in the review of current research on private sector and adaptation to climate change in general (Chapter 4).

## 4 Private sector and climate change adaptation

In this chapter, a review of current knowledge on private sector and climate change adaptation is presented, along with the prominent existing financing models by the private sector for Ecosystem-based Adaptation (EbA). Section 4.1 entails a review of the different factors associated with climate change adaptation by private actors in general, as well as in Asia specifically. It is followed by an analysis of the potential synergies and dichotomies associated with private sector involvement in EbA (Section 4.2), a description of the different existing models of EbA financing by the private sector, and a brief analysis of the characteristics of their financing types (Section 4.3). The chapter concludes with a summary section that relates the different findings (Section 4.4).

### 4.1 Outlook on adaptation to climate change in the private sector

#### 4.1.1 General characteristics and factors

##### ***Climate change risks***

A study by Biagini & Miller (2013) provides a rather comprehensive overview of climate risks for specific economic sectors in developing countries. These include: agriculture, food and beverage, hydropower and steam turbines, ports and shipping, mining, tourism, and disaster preparedness. A brief look at the direct and indirect risks for these key sectors provides a sense of the magnitude of impacts and what is at risk. For instance, in the agriculture, food and beverage sectors, the main impacts would come in the form of reduced production (due to rise in temperatures and droughts), volatile commodity prices, competing demands for water and associated community conflicts. Similarly, the hydropower and steam turbines sector would be affected through water scarcity and competing demands for water, ultimately leading to unreliable provision of energy to societal actors (households in particulars). Finally, the tourism sector (particularly important in the GMS region) would suffer from diverse extreme weather events, inundation of coastal locations due to sea level rise, all of which ultimately lead to higher perceived risks from tourists and severe economic losses.

The key finding highlighted by Biagini & Miller (2013) in their analysis is how climate risks in developing countries will impact key development sectors of their economy; in other words climate risks are likely to jeopardize development in the countries. This link between environment and development is important as it relates the extent to which countries lacking timely and adequate responses, will bear the burden of climate change impacts for extended time periods, and probably even in the aftermaths of effective mitigation or adaptation. For a detailed overview of a matrix showing the risks of climate change for key development sectors, see Appendix V. A report by Oxfam et al. (2012) goes beyond these sectors and shows climate risks on additional industries such as apparel, oil and gas. For those industries, the expected impacts would mainly take the form of damages to infrastructure and manufacturing facilities, and disruptions all along the supply chain due to restricted access to resources and logistics issues. The key part of the report is actually the section relating to the evolution of *guidelines on climate risk disclosure and regulations* in the private sector. Indeed, a number of tools and guidelines have been published in the last ten years. For instance, the Securities and Exchange Commission (SEC) in the United States, responsible for regulations of securities trading, issued guidelines in 2010 on how to address climate change risks in the rules for mandatory financial fillings required of publicly traded companies (Securities and Exchange Commission, 2010). The guidance was surrounded by a lot of controversy and seem to have had a limited impact (Shorter, 2012). However, following the issuance by the US SEC, the Canadian Securities Administrators (CSA) also issued their own guidance on disclosure requirements with regards to environmental aspects, including climate change (Canadian

Securities Administrators, 2010). Along the same lines, in the UK the Climate Change Act of 2008 required certain companies (e.g. transport, water and energy sector) to publish a report relating to their assessment and actions with regards to climate change (Climate Change Act 2008). In parallel, voluntary initiatives exist such as the Carbon Disclosure Project (CDP) created in 2003, which requests companies' information relating not only to greenhouse gas emissions and risks, but also to climate change.

Unfortunately, these types of tools, requirements and initiatives are *mainly found in developed economies* (i.e. United States, Canada and the UK); one exception being the Asia Investor Group on Climate Change (AIGCC), an initiative led by the Association for Sustainable and Responsible Investment in Asia (AIGCC, n.d.), which aims to provide asset owners and investors with capacity and a forum to learn about climate change risks and opportunities. These requirements, however, are perceived as “of limited relevance so far for companies primarily doing business in developing countries” (Biagini & Miller, 2013). And although large corporations are increasingly global and their activities extend to non-OECD countries, the lack of such disclosure tools and associated regulatory framework in Asia and developing countries in general (which act as a driver for climate risks integration in the financial sphere), can reasonably be identified as a source of delay in conducting climate risks assessments and adopting the related adaptation measures.

### ***Barriers to adaptation to climate change in the private sector***

As highlighted by Biagini & Miller (2013), in developing countries, companies are generally *accustomed to uncertainty, and climate variability* has long been an significant factor in their planning. The authors identified this as a barrier due to the fact that it prevents businesses from perceiving the new and significantly different risks associated with climate change, meaning that they tend to postpone the adoption of adaptation strategies. Business planning is usually defined by spatial and time scales that are smaller than the ones involved in climate change and its related science. The private sector struggles to find *climate data in a useable format*; in other words, data that could be transferred and used in identifying industry-specific risks and opportunities. There is a lack of awareness and understanding of adaptation as an approach, which appears to originate from a *lack of involvement in global and national climate change agendas* where formal processes to encourage involvement are almost non-existent in Asian countries (Biagini & Miller, 2013).

There is also a *lack of incentives* to engage with adaptation to climate change, especially market-related incentives, combined with a certain level of *vagueness in regulatory frameworks* related to climate change. *Uncertainty regarding impacts and adaptive measures' effectiveness* add to the problematic situation in which barriers seem greater than incentives. It relates to the *framing of climate change risks versus opportunities*: companies grasp better the idea of investing in adaptation when it provides opportunities (potential profits) rather than avoided costs (caused by future climate impacts) (Agrawala et al., 2011). Another significant barrier to engagement highlighted can be found in the general mind-set of businesses' managers, who often tend to *discount the future* and prioritise short-term benefits.

### ***A perspective from Asia***

A report by CSR Asia (2011) provides a comprehensive overview of the current state of adaptation awareness in businesses in Asia. The barriers identified often echo the factors presented in Section 4.1.1 above.

The findings of the study show that businesses seem to *lack understanding* on the distinction between mitigation and adaptation. A strong *focus on climate change mitigation* has been observed in the last decade and businesses have identified the associated opportunities with mitigation

such as savings related to energy efficiency and carbon risk reduction. On the other hand, opportunities emanating from adaptation are not understood as uncertainty remains with regard to estimates of the impacts and economic damages in the absence of adaptation.

*Reactive responses* are found to be dominant, reflecting the lack of awareness mentioned above. Adaptive responses are mostly adopted on an ad-hoc basis in the period following extreme climatic events such as floods. Adopted measures show low levels of flexibility and include engineering solutions as well as relocation of operations and change of suppliers, which in turn increase the vulnerability of local communities whose livelihoods were dependent on activities in the value chain. Furthermore, it appears that businesses tend to be rather passive due to limited knowledge of adaptation to climate change and an important reliance on government interventions. Finally, without having experienced business disruptions or extreme weather events, companies tend to show a *lower sense of urgency* and difficulties in identifying if and when to engage in adaptation.

While the threat of climate change is increasingly present on the international political scene and the private sector's awareness of climate risks is increasing globally (as suggested by the results of a survey by Agrawala et al. (2011) of the OECD), it appears that a large part of the private sector in Asia is still at an early stage of understanding what adaptation entails (CSR Asia, 2011). This is also suggested for the GMS region where there is a *lack of knowledge and platforms for stakeholder dialogue and capacity building* on adaptation (M. Prachvuthy, personal communication, September 11, 2015). Nevertheless, local population and businesses in Asia, and the GMS in particular, have been increasingly affected by the effects of climate change (e.g. the Thai floods of 2011 stopped a fourth of the country's garment production [Oxfam, Calvert Investments, & Ceres, 2012]). On the political level, regional discussions with regard to building resilience in the agriculture sector (e.g. Climate Smart Agriculture [CSA]) are taking place (FAO, 2015a). These initiatives often target agricultural activities, which are key in supporting the livelihoods of populations (e.g. 40% of labour force in Thailand is engaged in agriculture [ILO Regional Office for Asia & the Pacific, 2013]; and 62.9% of the labour force in Cambodia [National Institute of Statistics, Ministry of Planning, 2013]), but not necessarily other industries that depend on and affect natural resources, which according to Mr. Prachvuthy could benefit from further engagement in Corporate Social Responsibility (CSR) promoted and supported by policy-making (personal communication, September 11, 2015).

#### **4.1.2 Forms of adaptation to climate change in the private sector**

##### ***Adaptation strategies***

A report by Agrawala et al. (2011) published by the OECD investigates the level of adaptation by the private sector using a methodology that is based on a three-tier framework. This framework is composed of risk awareness<sup>9</sup>, risk assessment<sup>10</sup> and risk management<sup>11</sup>. The results presented emanate from survey responses from sixteen large companies (e.g. Unilever, BASF, EDF, Carrefour) mostly based in Western Europe but operating in a wide range of countries on the different continents. It is still quite difficult for research and public institutions to assess the extent to which private actors have been implementing adaptation measures to climate change in specific parts of the world, especially in developing countries. Before moving to the results of the study, one key component to consider is the list of

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<sup>9</sup> Acknowledgement of climate change as a business risk, climate change considered through philanthropic and marketing activities

<sup>10</sup> Identification and potential climate risks, identification of potential adaptation options

<sup>11</sup> Development of adaptation strategy; implementation of climate risk management measures and monitoring and reporting of adaptation/risk management

potential generic adaptation responses presented in Table 4-1. It shows the variety of possible adaptation responses of private actors to climate change impacts, classified in six distinctive strategies that may be adopted alone or in combination.

*Table 4-1. List of potential strategies for climate change adaptation by the private sector*

Adaptation Strategy	Description
<b>Preventing losses</b>	Take action to reduce the exposure to climate impacts
<b>Tolerating losses</b>	Accept losses where it is not possible or cost effective to avoid them
<b>Spreading or sharing losses</b>	Distribute the burden of impacts through insurance
<b>Changing use or activity</b>	Switch of activity or resource use to one better suited to climate change
<b>Changing location</b>	Move operations to an area that is more suitable
<b>Restoration</b>	Restore assets to their original condition following damage

*Source: Agrawala et al. (2011)*

With the use of the three-tier framework, the authors extract a few key conclusions concerning risk management or adaptation responses. So far, companies interviewed that started to implement adaptation measures seemed to favour soft adaptation measures over hard ones that require specific technological and infrastructural changes and entail high investments costs and a high level of irreversibility. Soft adaptation measures adopted mainly pertained to the “preventing losses and changing use or activity” categories and generally addressed issues such as: water scarcity and sustainable agriculture, climate resilience of suppliers and of sources of raw materials for production, and market-driven changes in customer demand. Finally, it is important to mention that besides these adaptation measures focusing on risks management, the potential for climate change related business opportunities is gradually being uncovered. For instance, in the insurance sector companies have been developing climate change risks related products, which seem to be attracting increased interest (Biagini & Miller, 2013). The following section will mainly focus on providing an overview of possible synergies between current private sector trends in sustainability and the features of EbA that could lead to its adoption by private actors.

## 4.2 Private sector and Ecosystem-based Adaptation: mismatch or win-win?

Due to the features particular to EbA (see Section 3.2), for example the high number of stakeholders involved in EbA processes, specifically local communities and the level of context-specific knowledge required, EbA can seem to be incompatible with the traditional business environment. Indeed, from a traditional and purely market-driven perspective businesses’ role should only consist of doing business and generating profit. But this narrow view of private sector and its role in society has dramatically changed. Despite a few exceptions, a paradigm shift seems to be happening in the sector with regard to environmental and social management, with companies increasingly integrating the two components in their core activities. A number of factors seem to provide a sound basis for further engagement of private sector engagement in EbA, such as the rise of Sustainable Supply Chain Management (SSCM) or the rise of initiatives aiming to link businesses and biodiversity as presented below.

Whether it is due to increased scrutiny from customers, regulatory pressure or business opportunities, private actors are increasingly looking outside of the traditional boundaries of their activity. For instance, businesses are increasingly perceiving the opportunities associated with biodiversity; and there is an increasing number of initiatives and platforms aiming to support private sector investment in nature at the national (Convention sur la diversité biologique, 2013; Leaders for Nature, 2014), regional (European Commission, 2015; SINERGIAE Ambiente, n.d.), and global levels (Convention on Biological Diversity, n.d.;

Fauna & Flora International, 2015; IUCN, 2015b). This trend is even becoming visible in the general media; an article published by The Guardian titled “Business can save ecosystems” mentions how “business must be willing to explore investing in nature to protect its bottom line” (Leal & Zeitz, 2014). The integration of biodiversity in corporate policies, risk assessments, and trainings can help creating co-benefits by both supporting industries in reducing their environmental footprint and generating conservation benefits (IUCN, 2015b). Another example is SSCM, an enduring trend in the private sector (C. R. Carter & Liane Easton, 2011) where corporations seek to know and improve their supply chain. Those who fail to do so often expose themselves to significant risks as a growing number of stakeholders (e.g. consumers, government, and media) demand sustainable supply chains (Brammer, Hoejmose, Millington, & NBS, 2011). As a result, companies have been integrating both environmental and social measures, often in the form supplier selection processes, codes of conduct implementation and auditing procedures (Molthan-Hill, Peter, & Lynn, 2014). While in research much of the focus seems to have been either on environmental or social aspects in the past, increased attention is given to the so-called “triple bottom line” (i.e. combination of environment, social, and economic aspects), which can be seen as the core of CSR.

In that regard, EbA appears to be at the *crossroad of social and environmental sustainability*. It offers great opportunities for businesses to simultaneously reduce the risks associated with climate change through adaptation that benefits their activity or the society they operate in, and mitigate or compensate their impact on the environment. It also provides a good way to strengthen their social contribution to local communities. Furthermore, benefits are not strictly limited to the environmental and social sphere. Other *business-related opportunities* could include image and branding gains, customer base expansion and internal capacity building. Indeed, models of EbA financing by private sector would often involve a training element from which both parties (company and local community) can co-benefit, by learning about climate change risks assessment and management.

However, associating EbA and the private sector raises the question of *longevity* previously mentioned with regard to adaptation finance in general. Indeed, models of EbA financing by the private sector would result in an *increased dependence of local communities towards private actors* who may not always have incentives or be in the position to keep the financial flows running over long periods of time. On the other hand, the inability of public institutions to cover alone the costs of adaptation to climate change points towards the need for an increased participation of the private sector as mentioned by researchers and practitioners (Biagini & Miller, 2013; OECD, 2012; Olhoff et al., 2014). Ultimately, one way of addressing the responsibility and dependence issue would be to provide an adequate *legislative framework* aiming to protect both the communities and the businesses engaged.

Finally, it could be expected that larger corporations play the role of “frontrunners” by engaging in adaptation to climate change and EbA specifically at an earlier stage, leaving behind the “wait and see” attitude that characterize a significant part of the sector with regards to climate change action. For instance, companies that are members of the Leaders for Nature initiative include large corporations such as: PwC, Philips, IBM, ING Bank and Arcadis. It is often the case that companies can be seen as policy “surrogates”; in other words they can extend the impact of domestic policies to reach other countries where they generally operate by abiding to the same standards in all countries, even in those that do not have such policies (Dalhammar, 2014). In light of the lack of platforms and formal processes for businesses to discuss industry specific climate change risks in Asia, this concept of policy “surrogates” could play an important role in diffusing climate related policies and regulations, especially with regards to climate risks assessments and disclosure. Ultimately, this could lead to positive outcomes only if followed by adequate adaptation measures. However, the risk and worst case

scenario is that foreign companies and investors “desert” certain economic sectors in the designated countries by displacing their operations to places less vulnerable to climate change to avoid economic losses.

### **4.3 Ecosystem-based Adaptation financing by the private sector**

In this section, the author presents an overview of the predominant financing models involving EbA and the private sector (found in literature or in currently implemented projects). Some models are specifically labelled as EbA, while others are EbA oriented in the sense that their form and objective are in line with the definition of the concept but it is not explicitly labelled as EbA.

#### **4.3.1 Financing models for Ecosystem-based Adaptation involving the private sector**

##### ***Microfinance for Ecosystem-based Adaptation***

Mostly associated with its crucial role in alleviating poverty by providing finance to the poor populations, microfinance is increasingly being recognized as a potential key partner in the fight against climate change (Agrawala & Carraro, 2010; Climate Investment Funds, 2014a, 2014b; Hammill, Matthew, & McCarter, n.d.). While microfinance for climate resilience (or adaptation) is increasingly being researched and few projects are being implemented in different parts of the world, which to some extent can be considered as EbA-oriented, only one project aiming to support EbA measures specifically was found. The *Microfinance for EbA (MEbA)* project, jointly implemented by UNEP Regional Office for Latin America (UNEP ROLAC) and Frankfurt Business School “provides assistance to MFIs to develop climate smart lending methodologies, create and implement marketable EbA-orientated products” (UNEP ROLAC, n.d.). The overall objective is to provide vulnerable rural and peri-urban populations doing small-scale farming (as opposed to intensive or industrial farming) in the Andean region with micro financing and knowledge, to enable them to invest in EbA measures that increase the resilience of ecosystems upon which their livelihoods depend.

One of the key aspects in this initiative is the exploration of business opportunities associated with climate change adaptation. Indeed, by providing financial products and services related to EbA, MFIs can promote their clients’ climate resilience (e.g. reduced vulnerability and risks related to production), differentiate and gain market space by servicing to a part of the population that is generally not targeted by the industry, while helping their investors ensure triple bottom-line (social, environmental and economic) returns (UNEP ROLAC, n.d.). Finally, on a broader scale this can help foster the concept of public-private partnerships and promote MFIs as a key partner in climate adaptation.

##### ***Supply Chain Approach for Ecosystem-based Adaptation***

The second existing model of financing found combines both SSCM aspects and adaptation. As no term designating this approach was found in the literature, in this thesis, the author will refer to it as “Supply Chain Approach for Ecosystem-based Adaptation” or *SCA for EbA*. As mentioned in Section 4.2, businesses are increasingly looking for ways of improving social and environmental aspects throughout their supply chain. The *Mangroves and Markets* project funded by the German government, and implemented by SNV and IUCN in Vietnam and Thailand aims to promote the use of EbA through the creation of incentives for mangrove restoration and sustainable use (IUCN, 2015d). The incentives take the form of certification schemes with financial incentives such as premium paid by companies to local shrimp fishers who engage in sustainable management of the concerned mangroves. Companies involved in the initiative are located in different parts of the value chain. In Vietnam the company

involved is Minh Phu Corporation, one of the world's biggest shrimp processing and exporting company. In Thailand, IUCN is collaborating with Marriott Hotels as part of its business and biodiversity programme, to identify opportunities for sourcing sustainable seafood from organic shrimp-mangroves farms, and for the redistribution of donations from guests towards mangrove restoration activities. In addition to the creation of linkages with private sector, outcomes of the project are intended to be integrated into national policies. For instance in Vietnam, the plan is to draft a policy that provides a legal basis for Payment for Ecosystem Services (PES)<sup>12</sup> systems targeting mangroves specifically (so far they mostly target watersheds) (SNV, 2014c).

### ***Payment for Ecosystem Services and Ecosystem-based Adaptation: a thin line***

Although PES and EbA constitute two distinct approaches, synergies between the two are significant and progressively recognised by researchers and practitioners (Wertz-Kanounnikoff, Locatelli, Wunder, & Brockhaus, 2011). Since the emergence of market-based conservationism in the 1980s and the creation of PES, the instrument has been implemented increasingly in developing countries (Gomez-Baggethun & Ruiz-Perez, 2011). Costa Rica quickly became a pioneer in the realm of PES due to the country's implementation of what is perceived as a successful portfolio (Zanzanaini & Declerck, 2014). A paper by Wertz-Kanounnikoff et al. (2011) investigates the potential for the use of PES to support EbA and mentions how the instrument is "seen as relevant policy instrument for EbA because of its effect on ecosystem conservation". Indeed, as an instrument PES aims to restore or maintain ecosystems services provision functions. In other words, it helps maintain or increase ecosystems' resilience, which can be crucial in the context of adaptation to climate change. However, the main difference with EbA is that it does not specifically target ecosystems and environmental services that are assessed as relevant for adaptation. It is a thin line that distinguishes the two approaches but it also uncovers their significant potential for synergy.

From an economic point of view, PES for EbA with funds originating from the private sector would be similar to the currently existing user-financed schemes in PES, in which the buyers of the services are the users (generally companies). On larger scales (i.e. province, national), traditional PES schemes would generally involve a public sector agency or international organization acting on behalf of service users (Engel, Pagiola, & Wunder, 2008). Overall, PES for EbA would be a model with rather high potential as it could build on laws, regulatory frameworks and stakeholders dialog mechanisms that are already in place in the context of PES to expand towards the specific objective of adaptation to climate change.

### ***Sustainable tourism***

The tourism industry is often a key economic sector of developing economies; and companies engaged in tourism (primarily hotels) could constitute key partners in the promotion of sustainability and the importance of ecosystems' resilience. Sustainable tourism is a rising trend in the sector; more and more companies have sustainability focus as a unique selling point, catering to customers who are increasingly aware of sustainability issues. Tourism businesses inherently depend on the recreational and spiritual services provided by ecosystems and thus are expected to bear the effects of climate change on their economic activity first-hand. Therefore, sustainable tourism could constitute an excellent potential basis for EbA financing and implementation. One example of it can be seen in the work done by Constance Hotel in the Seychelles, which has been contributing financially (but not only) to various

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<sup>12</sup> PES is a market-based instrument through which economic incentives are provided in exchange for ecosystems services such as water provision, soil erosion prevention or scenic beauty among others.



environmental activities in the community (Seychelles Sustainable Tourism Label (SSTL), 2014). The hotel also organizes its own activities where guests, staff and local community help to clean, restore and plant new seedling in the mangroves habitat surrounding the hotel. Although not labelled as EbA or adaptation related activities, it is reasonable to refer to them as EbA-oriented. As islands the Seychelles are particularly threatened by the impacts of climate change (such as sea level rise, extreme climatic events). Mangroves restoration and maintenance are EbA approaches that can help protecting coastal habitats and populations. Whether it is with the objective of maintaining recreational services or adapting to climate change, tourism businesses are expected to play a crucial role in the climate change agenda (Simpson, Gössling, Scott, Hall, & Gladin, 2008).

### **Public-Private Partnership**

While most of the models presented in this section can often involve collaboration of both public and private actors, the author chose to distinguish in a separate section the so-called Public-Private Partnerships (PPP). One example of PPP for EbA is the Wallasea Island Wild Coast Project in the United Kingdom, jointly implemented and funded by the UK Environment Agency and Crossrail (a joint company set up by Transport London and Strategic Rail Authority in the UK). The project aims to restore ancient wetland landscape with the objective of combating the threats of coastal flooding caused by climate change (Naumann et al., 2011). The joint company invested approximately USD 27 million for the physical implementation of the project while remaining costs were covered by the UK Environment Agency. In this case, Crossrail had significant economic incentive to engage in the project as the company was in the process of constructing a new railway connection under London, and was looking for a place where its clean spoil from the tunnelling (i.e. clay, chalk and gravel) could be disposed and reused (RSPB, n.d.). This project is based on mutual benefits originating from an overlap between economic and conservationist interests, with an overall objective of adaptation based on ecosystems.

### **4.3.2 Characterizing financing types**

Through a review of the existing models of EbA financing by the private sector it is possible to identify different characteristics for the types of financing needed to initiate or sustain the measures. For instance, some initiatives require *large upfront investments* of *one-time* nature, for example in the case of a restoration project targeting a severely degraded ecosystem requiring complete restoration. This was the case of the Wallasea Island Wild Coast Project presented in Section 4.3.1 above. In this case, financial commitment of the company is expected to end with the completion of the restoration, to be then relayed by the implementation of adequate policies by the public sector aiming to protect and maintain the recently renovated ecosystem; in this case the island will be turned into a nature reserve (RSPB, n.d.).

The majority of initiatives, however, require *small and continuous* investments over *longer period of time*. They often come in the form of payments to local communities who act as implementers of the restoration or sustainable management measures aiming at maintaining the integrity of the ecosystems concerned. For example, in the case of *SCA for EbA* and the Mangroves and Markets project, companies incentivize local shrimp fishers to sustainably manage the mangroves from which their supplies originate, through certification and the payment of premiums (SNV, n.d.). The *profitability* of the investments is another important aspect; regardless of their size, some financing types carry expectations of *financial return on investment* higher than others. This is for instance the case of *MEbA* where interest rates are involved, in comparison to PES for EbA where the benefits come in the form of ecosystems services (which as of now, are not valued and integrated in monetary terms in the business context). It is reasonable to think that some financing types suit certain private actors better, depending

on their activity, needs and financing potential. In addition to financing types, as mentioned earlier, the level of community involvement and need for awareness raising or training, significantly higher in some cases than others, may constitute a decisive factor for companies that are to engage in EbA. In that respect, the *MEbA* and *SCA for EbA* models, due to their features and potential, both constitute a good basis for the case studies in this thesis. Indeed, both models require the involvement of local communities, involve a long-term type of financing and are characterized by a rather low potential for immediate profitability.

#### 4.4 Summary of findings

The review of current knowledge on adaptation to climate change by the private sector provided a number of key findings that answer sub-research question *RQ2: What general factors influence private sector adaptation to climate change?* Section 4.1.1 highlighted that in developing economies, key sectors face a number of climate related risks that can affect countries' development in the long run. *Tools and initiatives for disclosing climate risks* although increasingly present in developed economies are almost non-existent in developing countries, and there is a general *vagueness in regulatory frameworks* relating to adaptation to climate change. Concerning adaptation to climate change, research suggests that companies in developing countries tend to be *accustomed to climate variability*, which can lead to a *lower sense of urgency* for action, this is combined with a relatively *low level of knowledge of the magnitude of impacts* generated by climate change, partly due to a *lack of access to climate data* in useable format. Furthermore, there is a *lack of incentives*, especially market-based incentives, and the uncertainty surrounding adaptation measures effectiveness is particularly problematic given that companies are ran by managers who often tend to *discount the future* and prioritise short-term benefits.

In Asia specifically, literature indicates that *reactive responses* are more common, with extreme weather events acting as triggers for adaptive measures. A *low level of integration of climate change risks in corporate risk management* was also found; and on the national level, adaptation tend to be mainly focused on key sectors such as agriculture. More generally, there is a *lack of involvement in global and national climate change agendas* of the private sector. In addition to these findings, the analysis of private sector trends that could favour the adoption of EbA measures (Section 4.2) highlighted some key factors and areas for synergy such as the search for “*triple bottom line*” *sustainability* in the supply chain by companies and the *rise of business and biodiversity* initiatives. However, issues that could potentially emerge from direct financing models for EbA involving the private sector were also mentioned such as *longevity of the initiatives* and *increased dependency of local communities towards the private actors*.

Finally, through the description of different existing financing models by private sector for EbA (Section 4.3), answers were provided to sub-research question *RQ3: What direct financing models for EbA involving private actors exist and what characterizes them?* The review showed that while most models build on pre-existing channels (e.g. Microfinance for EbA, PES for EbA), some have more complex characteristics (e.g. *SCA for EbA*). In terms of costs, some models appear to have a higher profitability potential and can carry heavier *return on investments* expectations. For instance, PPP might be driven by stronger economic incentives due to the presence of large-scale investments. Overall, the review emphasised the need for further research on the motivational and enabling factors that characterize the involvement of private actors in EbA financing models that are more “complex”. Such complexity can for example take the form of commitment to financing on a *long-term basis* with regular amounts (often smaller), and higher level of involvement of stakeholders; characteristics that both *MEbA* and *SCA for EbA*, two relatively new financing models, possess. This led the author to select them as basis for the case studies.

## **5 Case study – Microfinance for Ecosystem-based Adaptation**

In this chapter, Section 5.1 presents the key features of the Microfinance for Ecosystem-based Adaptation financing model and is mostly based on the documentation associated with the project provided by the implementing organisation specifically the publication *Andean agriculture in the face of climate change. Microfinance for Ecosystem-based Adaptation (MEbA)* (UNEP-ROLAC / FS-UNEP Centre, 2014). The subsequent sections describe the context (i.e. state of ecosystems and characteristics of industry involved) and present the respective findings for Colombia and Peru in Section 5.2, Cambodia in Section 5.3. As Peru and Colombia are not part of the geographical scope of this study (GMS), their context sections are relatively limited.

### **5.1 The model**

The *MEbA* financing model originates from a project with the same name co-jointly implemented by UNEP Regional Office for Latin America and the Caribbean (Panama office) and Frankfurt Business School based in Germany. It is a five-year project (2012-2017) funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety of Germany, under the framework of the International Climate Initiative (IKI). In the project, technical assistance is provided to Microfinance Institutions (MFIs) in Peru and Colombia (i.e. Bancamia, Edpyme Solidaridad, Crezcamos, Contactar, Fondesurco) on the development of climate-smart lending methodologies that will help create and implement marketable EbA-related products (UNEP ROLAC, n.d.). The overall objective of the project is to provide small landholders in the Andean region (specifically Colombia and Peru) with micro financing that enables them to invest in (EbA) measures increasing the resilience of ecosystems upon which their livelihoods depend.

#### **5.1.1 Background**

##### ***Microfinance***

Pioneered by Mohammad Yunus who founded Grameen Bank in Bangladesh in the 1970s, microfinance offers the possibility to reach the poor and provide them with financial services that they would usually not be able to access through traditional banks. Today, MFIs can be found all over the world (including in developed countries) and count over 100 million of the world's poor among their clients (Agrawala & Carraro, 2010). Microfinance encompasses the provision of small loans and other financial services which the poor and low-income clients mostly in the self-employment sector can use to establish or further develop a business, earn income, build assets and manage unpredictable hazards (Adhikary & Papachristou, 2014; Agrawala & Carraro, 2010). Microfinance developed through a number of innovations such as group lending that takes advantage of peer monitoring and joint liability, very small loan amounts, frequent repayments, and the establishment of compulsory savings accounts by loan recipients. Microfinance models vary across regional and local contexts.

MFIs are financial institutions that specialize in providing these microfinance services. They can be of various types including NGOs, credit unions, cooperatives, commercial banks, and parts of state-owned banks (Microfinance Information Exchange, 2015). The range of financial services that they offer has diversified over the years and now includes credit, savings, insurance, Small and Medium Enterprise (SME) loans, education loans, health loans, and social services. Indeed, when providing credit to the poor some MFIs also provide other complementary services such as skills training, teaching of literacy and numeracy, health nutrition workshops and family planning advice (Agrawala & Carraro, 2010).

## **Risks in the agriculture sector**

Prior to addressing the types of financing solutions needed to support small landholders and farmers of the region to adapt to climate change, it is important to understand the type of risks that they face in their activities. Research shows that small landholders face a number of risks that are all interlinked. A study by the OECD provides a comprehensive overview from which five main sources of risks can be extracted (Antón & Organisation for Economic Co-operation and Development, 2009).

Perhaps the most common risks that farmers face are the ones related to production variability. *Production risks* concern the variations in crop yields and in livestock production due to weather conditions, diseases and pests. This is to some extent linked to the *market risks*, which relate to variations in commodity prices and quantities. These two types of risks (production and market) lead to *financial risk* for the farmers, as they can affect their ability to pay their bills in due time, have the funds to continue their activity and ultimately remain operational and avoid bankruptcy. *Regulatory or institutional risks* also constitute a significant form of risks for farmers; these entail eventual lawsuits initiated by other businesses or individuals, as well as changes in regulation, especially environmental regulation. Finally, *human resources risks* are also weighing on the ability of farmers to sustain their business, as they relate to the possible absence of family members or employees leading to reduced labour or management support to the business.

These different categories of risks are the most standard for the agriculture sector, but *climate change* has emerged as one significant additional risk category in recent years. It could be considered as a source of production related risks but the potential magnitude of impacts and the uncertainty that characterize it, make climate change a category of its own. To address this risk a number of solutions that MFIs could provide were identified by the implementing agencies of the *MEbA* project.

## **Risk in agricultural finance**

Risks in agricultural finance are mostly linked to the risks in agriculture presented in the previous paragraphs. Production and market risks are determinants of the level of risks financial institutions are facing when lending to the agricultural sector. High levels of risks are often cited as the main hindering factor for financial institutions to lend to clients for agricultural purposes. These risks are generally classified in three categories (UNEP-ROLAC / FS-UNEP Centre, 2014):

- a) *Principal credit risks* refer to the ability and the will of the borrower to repay the loan. For small farmers and small enterprises in general, the ability is varying and constitute a risk as these sectors tend to be characterized by a high degree of informality and low levels of education and financial literacy.
- b) *Specific risks related to agriculture* include the high production and market risks that can ultimately affect small farmers' ability to repay their loans.
- c) *Political risks* concern potential government interference in the sector, considering that agriculture is often a strategic priority sector for the countries' governments.

### **5.1.2 Key features**

#### **Types of solutions that address agricultural risks related to climate change**

The solutions identified that aim to help MFIs' clients adapt to climate change include improved market segmentation, newly adapted credit methodologies, awareness raising, training, and verification monitoring.

*Proper market segmentation:* can be achieved through the identification of shared needs of groups of farmers based on shared characteristics such as the type of crops grown, cultivation methods or the climate risks that are faced. Creating an adequate market segmentation would enhance the capacity of MFIs to provide microfinance services that cover common needs, giving customers the possibility to choose the option that suits their needs best from a range of previously approved products.

*New credit methodologies:* these credit methodologies could be developed with the help of increased access to data. The *MEbA* project managers identify both market and climate related data on projections and phenological development of typical crops as essential to the development of improved credit methodologies. The data would be gathered through the use of Information and Communication Technologies (ICTs). Ultimately, this would enhance MFIs' understanding of the market and in turn improve the provision of products and services of value to the customers.

*Awareness raising:* MFIs can play a role in promoting existing feasible strategies for EbA. Increasing awareness can lead to greater demand for solutions allowing MFIs to strengthen their target market.

*Training:* with the support of educational and technical service providers, MFIs can help promote improvements in production practices and build capacity in farmers communities.

*Verification and monitoring:* using climate data, adapted methodologies, and training, MFIs can adequately verify and monitor results. This would enhance transparency and guarantee investors triple bottom line returns (environmental, social and economic benefits).

### **Microfinance Ecosystem-based Adaptation products and services**

*MEbA* products simply designate instruments that aim to promote and support EbA strategies. *MEbA* products aim to support the adoption of adaptation measures in line with the EbA approach. The options that *MEbA* products are helping to finance in the context of the project have to meet the criteria presented in Table 5-1 "either on their own or in synergy with other options". For a detailed list of options and descriptions see the study *Microfinance for ecosystem-based adaptation options, costs and benefits* by UNEP & Frankfurt School-UNEP Collaborating Centre for Climate & Sustainable Energy Finance (2014).

*Table 5-1. List of examples of Microfinance for Ecosystem-based Adaptation criteria and options*

MEbA criteria	Examples of associated options
Reducing pressure on ecosystems and the services they provide	Use of organic fertilizers, soil conditioning
Enhancing the social or economic resilience of human populations vulnerable to climate change	Biodigesters, fog catchers (water storage)
Reducing risks associated with climate events in production activities	Seed banks, windbreaks
In their implementation, protecting, restoring, or using biodiversity and ecosystems in a sustainable manner	Conservation agriculture methods, agroecology, organic agriculture
Having a positive impact on individuals' economy in the short term	Beekeeping, solar dehydrators

*Source: UNEP & Frankfurt School-UNEP Collaborating Centre for Climate & Sustainable Energy Finance (2014)*

Due to their high degree of similarity with conventional agricultural loans already provided by the MFIs, *MEbA* products can be promoted in the same way. Furthermore, *MEbA* products

or options can be integrated in already existing segments of products classified based on loan terms and the type of activity financed. According to UNEP-ROLAC / FS-UNEP Centre (2014), the identified pre-existing categories of products are:

- a) *Working capital loans (short-term)*: these loans help to finance investment in working capital for farmers to continue their activity, for example inputs, seeds and organic fertilizer. Repayment of loans are done on the basis of crop harvest, in other words within a single growing season.
- b) *Fixed asset loans (medium-term)*: these are longer-term loans dedicated to financing investments in fixed assets such as equipment, machinery and tools. These are loans made on the basis of several economic activities, with repayments generally scheduled over several seasons.
- c) *Community loans (short-to-medium-term)*: loans for the purpose of community investments.
- d) *Additional services*: these include training and capacity building activities on sustainable production and EbA solutions for customers or groups of customers, offered by the MFI or its collaborating partners.
- e) *Others*: it is also mentioned that once MFIs accumulate more experience in *MEbA*, other products like micro-insurance and savings plans could be considered, depending on the introduction of the initial products listed above.

## 5.2 Colombia and Peru

### 5.2.1 Country context

#### ***Ecosystems, agriculture and climate change in the Andean region***

Colombia and Peru are both located in South America and share a common border (see Figure 5-1 and Figure 5-2). Both countries are crossed by the tropical Andes located on the western coast of South America (stretching from Venezuela to the northern part of Argentina); a biodiversity hotspot that has undergone significant changes over the past decades, especially forested areas. Most of land area in the Andean region has been increasingly converted for agricultural purposes. In Colombia, between 2005 and 2010, 55.5% of the deforested land was converted to pasture (UNEP-ROLAC / FS-UNEP Centre, 2014). In Peru, like in several other countries in the region, land use changes are the source of approximately 70% of the country's GHG emissions. This is not only due to the destruction of forests that constitute essential carbon sinks, but also the use of the slash-and-burn practice for forest clearing. Other practices that affect ecosystems and the climate of the region are also related to agricultural activities and include single-crop production, intensive fertilizer use and intensive soil tillage.



Figure 5-1. Map of Colombia  
(Central Intelligence Agency, 2015a)

Agriculture is one of the most important traditional economic activities in the region; it accounts for 7% of Peru's GDP in 2012 and 6.7% Colombia's GDP in 2014 (The World Bank, 2015a). Most of the Andean region's agricultural production is geared to the domestic market, but a part of it is exported to international markets. The main agricultural export crops in Peru are mandarin oranges, quinoa and blueberries; in Colombia the main exports are coffee and bananas (UNEP-ROLAC / FS-UNEP Centre, 2014). Andean agriculture is practised at high altitudes (between 1500 metres to over 4000 metres). While it had successfully adapted over centuries to the topography of the land and the particular climatic

conditions of the region, in the recent years certain climate factors (e.g. air temperature and precipitation) in the Tropical Andes have begun to exceed historically documented thresholds (Herzog, Inter-American Institute for Global Change Research, International Council of Scientific Unions, & Scientific Committee on Problems of the Environment, 2011). The most significant risk for agriculture in the region is perhaps posed by the changes in type, frequency and intensity of extremes weather events. It is estimated that 12 000 km<sup>2</sup> of agricultural land in Colombia and 35 000 km<sup>2</sup> in Peru are exposed to flooding caused by intense rainfall (UNEP-ROLAC / FS-UNEP Centre, 2014). Other consequences of climate change on agricultural activities include migration of crops (to higher or lower altitudes) that may lead to competition for resources between new and native species, greater exposure to extreme weather events (e.g. frost, droughts, hailstorms), and diverse impacts on crops yields (positive and negative). At the regional level, the Inter-American Development Bank (IDB) estimated that Andean agricultural output could decline by 12% to 50% as a result of climate change (Ortiz, 2012).



*Figure 5-2. Map of Peru  
(Central Intelligence Agency, 2015a)*

Such decline is expected to impact the livelihood of vulnerable populations involved in agriculture in both Peru and Colombia. In that regard, high degree of vulnerability is often associated with limited availability of economic resources. According to IFAD (2013), there is a positive link between economic resources and adaptive capacity; this indicates the need for measures that aim to increase access to economic resources helping to build adaptive capacity.

### **Microfinance in Colombia and Peru**

In Peru, the microfinance movement was initiated in the 1980s by the municipal savings and credit unions known as Cajas Municipales de Ahorro y Crédito (CMACs), assisted by GIZ (German state-owned development organisation). Today, Peru has 72 MFIs that provide services to 3.7 million borrowers (12.2% of the population), with a total of USD 10.7 billion in loans granted (UNEP-ROLAC / FS-UNEP Centre, 2014). In 2014, it was named (for the sixth consecutive year) the country with the best microfinance environment in the world.

With 42 MFIs that serve 2.4 million borrowers (approximately 5% of the population), who have received USD 6.75 billion in loans and deposits reaching USD 5.5 billion, Colombia is ranked seventh country with the best microfinance environment. In both countries, microfinance has helped marginalized populations to improve their standards of living and reduce levels of poverty; making the sector one of the most effective tool for poverty alleviation. However, in Latin America the microfinance sector has undergone one of the most rapid commercialisation in the world, driving experts to question the potential impact of a mission-drift going from poverty alleviation to profit searching (Christen & Cook, 2001).

### **5.2.2 Findings**

The findings presented in this section are the results of an interview with Mr. Buenfil, MEbA Project Manager from the UNEP ROLAC office in Panama and Mr. Jungfleisch, MEbA Project Director from Frankfurt Business School (implementing organisations).



## **Motivational factors**

In the context of the project, climate risks are mostly evaluated in terms of variations in temperature and precipitations levels. Prior to the project, MFIs in Peru and Colombia did not have access to climate data relevant to their clients' activities. Although, general data on their clients was available, they did not use it for a specific purpose. According to Mr. Buenfil, MFIs perceive and understand the risk posed by climate change (personal communication, August 21, 2015). These risks mostly manifest in the form of delays in payments by their clients engaged in farming activities. However, these are not quantified; MFIs only have general climate maps that are not sufficient to evaluate the potential or actual risks faced by their clients (C. Jungfleisch, personal communication, August 21, 2015). Therefore, one of the main reasons why MFIs in the two countries are involved in the project is to have the possibility to improve their use of climate data and help increasing their clients' resilience to climate change. Improving farmers' resilience would translate in them being less prone to default their loans repayments (J. Buenfil, personal communication, August 21, 2015). Ultimately, it aims to reduce the MFIs portfolios exposure to risks by increasing their preparedness to future climate change impacts on the agriculture sector and their activity.

Mr. Buenfil mentioned that most of the MFIs' visions and missions incorporate environmental and social aspects. In a way, the project contributes to their "triple bottom line" goals, but the idea is that the MFIs should acquire the tools and criteria to integrate this into their operations so that it can translate into increased profitability. Originally, MFIs in Colombia and Peru have as a mandate to increase access to finance for the poor populations. Another important aspect that was mentioned is the fact that the market for microfinance at the city level, targeting urban populations, is saturated in Colombia and Peru. Consequently, the initiative opens up the possibility for MFIs to expand their customer segments to the peri-urban and rural populations. Mr. Jungfleisch added that overall, motivation of MFIs was linked to the alignment of the project objectives and outcomes with their corporate strategy (personal communication, August 21, 2015).

## **Enabling factors**

The MFIs receive technical assistance that covers a wide range of aspects. UNEP and Frankfurt Business School assist the MFIs in improving their risk management, partly through the improvement of data quality on their clients, collection and integration of relevant climate data into their credit methodologies. The organisations also provide them with awareness-raising materials. Mr. Buenfil mentioned that the presence of sustainability in the vision and mission, and senior management commitment were facilitating factors for collaboration with the MFIs (personal communication, August 21, 2015). Although competing priorities can be an issue with regards to time resources of the MFIs, top management commitment helps ensuring the level of involvement of the MFIs throughout the project.

Another important component in the project is the involvement of multiple stakeholders, including government institutions of the respective countries, specifically the Ministries of Environment in Peru and the National Planning Department in Colombia, and NGOs. Collaboration with third parties aims to help MFIs develop capacity in providing technical assistance to the farmers. Very few MFIs provide technical assistance to their clients in the two countries. This is due to the fact that it is often been perceived as bad business for MFIs as it constitutes a risk; if training provided to clients is not producing results, then it could be attributed to the quality of the training and affect the MFI's credibility. Finally, the presence of sound policies in relation to climate change in Peru and Colombia provides a good basis for collaboration with government institutions as the project outcomes can fit into their policy agenda. It was in fact one of the criteria that led to their selection for the project (J. Buenfil, personal communication, August 21, 2015).



## 5.3 Cambodia

While the *MEbA* model is based on the microfinance industry in Peru and Colombia, the author considered the potential application in the Cambodian context where most pre-existing microfinance products listed in Section 5.1.2 are found.

### 5.3.1 Country context

Located in the lower part of the Greater Mekong Subregion (GMS), Cambodia shares borders with Thailand, Vietnam and Laos (see Figure 5-3). It is the smallest country of the GMS in surface with about 181 000 km<sup>2</sup> and has a population of 14.9 million people (UNDP, 2013). The country gained its independence in 1953, which was then followed by a devastating extended period of civil war (1960-1990s). Since the first general election in 1993, it has been functioning on a multi-party democratic system. Despite rapid economic growth in the last decade, and having dramatically reduced its poverty levels, Cambodia remains classified as a Least Developed Country (LDC) by the United Nations with as much as 41.3% of its population living on less than USD 2 a day in 2011 (The World Bank, 2015d). It is an agrarian country where approximately 80% of the population lives in rural areas, with 49% located in the central lowland part of the country that surrounds the Mekong river (Ministry of Agriculture, Forestry and Fisheries, Cambodia, 2013). Despite having relatively low level of exposure to climate change, Cambodia is listed among the most vulnerable countries to the impacts in Southeast Asia mainly due to its low adaptive capacity (see Appendix VI; Yusuf & Francisco, 2009).



Figure 5-3. Map of Cambodia  
(Central Intelligence Agency, 2015a)

### **Ecosystems, agriculture and climate change in Cambodia**

Cambodia's landscape can be divided into two areas: the lowland regions, which mainly consist of plains around the Tonle Sap Basin and the Mekong River (elevation below 100 meters; and the highland and mountainous regions (above 5000 meters in average). Cambodia used to be heavily forested, but between 1973 and 2014 forest cover dropped from 72% to 48% with dense forest<sup>13</sup> decreasing from 42% to 16% (Open Development Cambodia, 2015). Forest loss and degradation is the source of about 46% of the country's greenhouse gases emissions (World Resources Institute, 2015). Today, forest ecosystems still remain under severe threat, suffering from severe economic pressures linked to large-scale economic land concessions and illegal logging. Forest resources in Cambodia are particularly valuable to forest dwellers and poor communities; they mostly rely on forest products (e.g. timber, wild vegetables) for subsistence and income creation. They also play a critical role in preventing landslides caused by heavy rains and flooding. Although Cambodia has one of the smallest contributions to global greenhouse gases emissions, it will be one of the most affected countries to the impacts of climate change. At the current rate of degradation and loss of ecosystems, rural populations and agricultural activities are expected to be the most affected.

In 2012, agriculture contributed 37% of Cambodia's GDP (FAO, 2014). An estimated 62.9 % of the workforce in the country was working in the sector in 2013 (National Institute of Statistics, Ministry of Planning, 2013). The sector was prioritised by the government as the

<sup>13</sup> Areas classified as dense forest by the authors include "evergreen forest" and "semi-evergreen forest". Dense forest is mostly located at elevations higher than 500 meters; Global Forest Watch approximated that the dense forest classification equated to tree canopy cover greater than 60 percent. Dense forest may also be called old-growth forest.

main sector for poverty alleviation in the country and therefore has been a priority in its development strategy since the 1990s (Thomas et al., 2013). The majority of the farmers are smallholders (owning less than 2 hectares per household) and three fourths of the 3.7 million hectares of cultivated land are dedicated to rice culture (FAO, 2014). Aside from rice, most rural households grow cash crops such as cashew, maize, and beans, as well as agro-industrial crops such as rubber. They also raise poultry and livestock for subsistence and income creation. While mechanisation is progressively reaching the sector, traditional agricultural techniques and seeds are still widely used (Thomas et al., 2013). However, the use of chemical pesticides and fertilisers considered as harmful is rising (Leakhana, 2009). Cambodia does not produce such chemicals and import most of them from Thailand and Vietnam. Low knowledge of proper usage combined with a lack of readable Khmer language labels sometimes leads to severe crop damage and financial losses (Ministry of Environment of Cambodia, 2004). The magnitude of the chemicals' impacts on ecosystems is not known.

Farming remains mostly rainfall dependent and most households grow only one crop per year due to low water availability. Indeed, lack of irrigation methods is an enduring issue that severely constrains productivity. Cambodia is one of the most disaster-prone countries in Southeast Asia, where farming activities are affected by storms, droughts and floods on a seasonal basis, threatening to push farming households into deep poverty (The World Bank, 2015c). In 2009, severe droughts affected 13 provinces; and in 2011, severe floods affected 18 provinces and 350 000 households, damaging 267 000 hectares of rice fields (Heng An, 2014). Other than floods and droughts, sea level rise also constitutes a significant threat to coastal fisheries, another important sector for agricultural development. Marine coastal areas are also affected by storm surges, beach erosion and water intrusion. The effects of a high level of vulnerability to climate change in Cambodia are not limited to the agriculture or fishery sector. The credit agency Standard & Poor ranked the country's economy and creditworthiness as the most vulnerable out of 116 nations evaluated based on the share of population living in areas below five meters of altitude, the share of agriculture contribution to GDP and the results of a precedent study by Notre Dame University in the U.S (Morton, 2014).

### ***The microfinance sector in Cambodia***

The microfinance sector in Cambodia has played a significant role in the country's poverty alleviation. Prior to the 1990s, only banks could provide financial services in Cambodia, and those were mostly provided to the urban and suburban populations while most of the population actually lived in rural areas (Cambodia Microfinance Association, 2013). The only financial services rural populations had access to were informal loans with often high monthly interest rates ranging between 10% and 20%.

In the 1990s, microfinance started to emerge in the country, mainly in the form of non-profit microcredit projects ran by international donors organisations and NGOs. Following the first general election of 1993, the government of Cambodia supported the institutionalisation of the sector, particularly through the creation of the Credit Committee for Rural Development (CCRD) with the financial support of United Nations Development Programme (UNDP) and the French Development Agency (AFD), with the objective of formulating a strategy for rural credit development. In 1997, the National Bank of Cambodia established the Supervision Office of Decentralised Banking System Bureau. In 2000, it was divided into two branches that aimed to provide coordination, supervision, regulation as well as building capacity in the sector. While the sector grew rapidly, risks also became more significant and ultimately called for the creation of an adequate regulatory framework. Consequently, the government decided to adopt a two-tier system for supervision of microfinance and enacted a microfinance regulation in 2000, enabling to license large deposit-taking institutions and register the smaller ones (Banking with the Poor Network, n.d.). From then on, most MFIs started to change

status and turned from NGOs specialised in microfinance, to specialised microfinance banks, with one of them turning into a full commercial bank. The commercialisation of the sector turned microfinance into an industry and an essential economic player in the country. To this day, there are 42 members in the Cambodian Microfinance Association including 37 licensed MFIs and five Rural Credit Operators. In 2013, they possessed a gross loan outstanding portfolio of around USD 2 billion and a borrower base of 1.9 million accounts. (Cambodia Microfinance Association, 2013)

Increased competition in the recent years has led to a decrease in interest rates and improved access to financial services for the poor. In the past, most of the portfolio of borrowers used to be found in Phnom Penh (capital) and large provincial towns. However, it appears that approximately 80% of MFIs' clients live in rural areas. The Cambodia Microfinance Association mentions two major challenges for the sector: the "mission drift" where uncertainty remains with regard to the socioeconomic impact of MFIs on their clients, and the lack of product diversification. Agricultural lending also represents a significant portion of MFIs portfolio and is even the focus customer segment of certain specialised MFIs. But agricultural risks still deter MFIs from scaling up agricultural lending (L. Aun, N. Sokun, personal communication, July 22, 2015; B. Vann, Ly Siven personal communication, July 27, 2015; S. Engchhay, personal communication, July 27, 2015). While banks and MFIs have increased agricultural loan disbursement, and access to loans has become easier for farmers, interest rates are still quite high (Hor, 2013). Despite these issues, the microfinance sector in Cambodia is identified as one of the most developed in the world, especially on the agricultural segment; MFIs have established a wide network in rural areas (G. André, personal communication, August 14, 2015). As the government pushes for increased funding for farming from the banking sector and wishes to bolster the sector resilience to shocks (economic or climatic) (Nguon & Soeun, 2009), MFIs can reasonably be expected to have an important role to play in helping farmers cope with climate change impacts.

### **5.3.2 Findings**

The findings presented below are the results of the interviews conducted by the author in Cambodia. These include three interviews with five employees of three large MFIs (Sathapana Limited, Hattha Kaksekar Limited [HKL], KREDIT), and one interview with a rural credit operator called Village Development Association (VDA). In addition, three interviews were conducted with the Cambodian Microfinance Association (Mr. Techkung), the French Development Agency (AFD) (Mr. André) and an UNDP affiliated policy adviser (Mr. Ung).

#### **Motivational factors**

Interviewees from MFIs had no knowledge of EbA but showed interest in the approach; all mentioned that their organisation would be interested in providing *MEbA* products if provided with adequate support and capacity building (L. Aun, N. Sokun, personal communication, July 22, 2015; D. Luon, personal communication, July 24, 2015; B. Vann, Ly Siven personal communication, July 27, 2015; S. Engchhay, personal communication, July 27, 2015). Motivational factors were more or less interlinked and included: business opportunity, risk mitigation, but also "philanthropic" reasons.

When asked if *MEbA* products would fit with the vision and portfolio of their organisation, all MFIs mentioned that it would fit well, given that their existing portfolio has a wide range of products targeting the agriculture sector. MFIs mentioned that climate change was perceived as a risk for their organisation and their clients, specifically farmers who are already affected. The dependence on rainfall, regular flooding and droughts were mentioned as a cause of variability in yields and destruction of crops. Therefore, *MEbA* would represent a business opportunity if it enhanced farmers' resilience, especially in accessing water during

periods of drought (L. Aun, N. Sokun, personal communication, July 22, 2015; S. Engchhay, personal communication, July 27, 2015), and would be particularly interesting for MFIs if it reduced risks of late payments by their clients whose activity is affected by climatic events. The prospects of added value and contribution to society through increasing agricultural productivity and economic growth also emerged as important motivational factors (L. Aun, N. Sokun, personal communication, July 22, 2015; B. Vann, personal communication, July 27, 2015). Finally, Mr. Luon mentioned the benefits of improving the livelihood of families they provide services to as a motivational factor (personal communication, July 24, 2015).

### **Enabling factors**

All MFIs interviewees indicated that their organisation had agriculture-lending products in their portfolio, which varied in size. However, three out of four organisation indicated that it was risky to lend to the agriculture sector (L. Aun, N. Sokun, personal communication, July 22, 2015; B. Vann, Ly Siven personal communication, July 27, 2015; S. Engchhay, personal communication, July 27, 2015). Consequently, they mentioned the risk exposure limit that prevents them from having more than 30-40% of their portfolio constituted by agriculture lending (B. Vann, Ly Siven personal communication, July 27, 2015; S. Engchhay, personal communication, July 27, 2015). While this reflects a certain level of mistrust in the agriculture sector due to high lending risks, it also expresses the fact that MFIs have experience in this type of lending and are aware of the difficulties farmers can face. Indeed, all interviewees showed good understanding of the challenges farmers face, especially regarding climate events. Mr. Aun and Mr. Sokun (Sathapana Limited) added that so far, no crop insurance is provided in Cambodia (personal communication, July 22, 2015).

Sustainability seems rather well integrated in the operators' activities. Although interviewees mentioned the triple bottom line, they emphasised social aspects in their operations, and mentioned that environmental aspects are only starting to be increasingly present. Mr. Luon indicated that in the case of VDA (smaller operator) some investors were interested in social aspects but not so much on environmental ones (personal communication, July 24, 2015). So far, however, environmental aspects have been present mostly as requirements from the investors. For the case of HKL, the International Finance Corporation (IFC)<sup>14</sup> was specifically mentioned as an investor that had stipulated these requirements and to whom they had to report through their environment and social assessments (B. Vann, personal communication, July 27, 2015). Ms. Vann (HKL) added that the requirements were not very specific. Mr. Engchhay (KREDIT) referred to the company's environmental policy containing the following requirements: checking the purpose of the loans and ban the disbursement of loans whose purpose is environmentally harmful such as logging or fishing with electric fish shockers (personal communication, July 27, 2015). A lack of training on environmental aspects was also mentioned as a hinder to improved sustainability in MFIs (N. Sokun, personal communication, July 22, 2015). Mr. Techkung from the Cambodian Microfinance Association explained that a strong focus is currently put on strengthening transparency in the microfinance industry (personal communication, July 23, 2015); most interviewees mentioned their involvement in the Client Protection Initiative funded by the French Development Agency (AFD) and supported by the Cambodia Microfinance Association. The objective of the initiative is to promote responsible finance through reducing the risk of clients' over-indebtedness, and implementing Client Protection Principles (CPPs).<sup>15</sup>

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<sup>14</sup> Part of World Bank Group, focused on financing and advising private sector ventures and projects in developing countries

<sup>15</sup> CPPs include: appropriate product design and delivery; prevention of over-indebtedness; transparency; responsible pricing; fair and respectful treatment of clients; privacy of client data; and mechanisms for complaint resolution. For further information, see The Smart Campaign, (2014).

Interviewees from MFIs indicated that working with local communities was not problematic. All have experience in local community support, some even started as a small NGO project. They do not perceive collaboration with local communities as a hinder to be involved in a project or develop new products such as *MEbA*. Mr. Engchhay indicated that most of the sustainability work (especially social activities) undertaken by KREDIT is actually managed at the operating level by Vulnerable Special Units (VSUs) (personal communication, July 27, 2015). In collaboration with an NGO they provide training programs to communities on family finance or how to increase agricultural productivity. The VSUs also handle the so-called community bank loans, which are loans to groups of 40 people or more. Mr. Engchhay indicated that both individual and group loans such as the community bank loans are applicable to the agriculture sector. Although, the issue of “mission drift” mentioned earlier and the increasing commercialisation of the industry is present, it was mentioned that accessibility to services for the poor was not affected. Mr. Sokun explained that the increase in the number of operators on the market, especially small ones, had compensated for the rising interest of large MFIs for bigger customers (personal communication, July 22, 2015). Mr. André also confirmed that the MFIs have a very large network in rural areas (personal communication, August 14, 2015). Therefore, the microfinance sector seems to have strong focus on and experience in social responsibility and collaboration with local communities.

Collaboration with diverse stakeholders, which could be seen as challenging (time consuming and risks of conflict), was not perceived as a problem either for MFIs; it was even stated as key factor for them to be able to engage in *MEbA*. Government and NGOs were specifically cited as important stakeholders that could support them in involving in *MEbA*. One interviewee mentioned that in order to take part in a *MEbA* initiative, it would have to be initiated by either one (L. Aun, personal communication, July 22, 2015).

As mentioned earlier, interviewees had no prior knowledge of EbA as a concept. However, all were aware of climate change, its consequences on the agriculture sector and the capacity of farmers to adapt with their own knowledge. One interviewee had been involved in a climate change adaptation workshop (L. Siven, personal communication, July 27, 2015). Another interviewee had been to a workshop on green energy financing (N. Sokun, personal communication, July 22, 2015). Two large MFIs (HKL & KREDIT) and the rural credit operator (VDA) were currently involved in a green loan project aiming to support the purchase of solar panels. Knowledge was a key enabling factor mentioned by the MFIs; all mentioned that training and technical assistance in methodology and agriculture adaptation would be necessary. Furthermore, the need for financial support (either from the government or an agency such as the AFD) specifically for the project was mentioned as well.

Government support was also mentioned as an important factor. Despite the fact that the government seem to have a positive stance towards this type of initiatives, interviewees indicated that no particular incentives or support mechanisms were in place. Mr. Engchhay mentioned that *MEbA* or regular loans could be disbursed to more farmers in other areas of the country, but only if the government was to support it through the improvement of irrigation systems and the strengthening of the export market (personal communication, July 27, 2015). Some mentioned the need for public awareness and education as important factors to enable the promotion of *MEbA* products; and others mentioned the importance of regulation in this context, as a form of push for action in the sector. On the regulatory front, no laws or regulations seemed to represent a hindrance, to the development of *MEbA* products and services.

## 6 Case study - Supply Chain Approach for Ecosystem-based Adaptation

In this chapter, Section 6.1 presents the background and key features of the *Supply Chain for Ecosystem-based Adaptation* model in the two countries (Vietnam and Thailand). It is mostly based on documentation associated with the project provided by the implementing organisations and found on the Internet. The subsequent sections describe the context (i.e. state of ecosystems and characteristics of industry involved) and present the respective findings for Vietnam in Section 6.2, and Thailand in Section 6.3.

### 6.1 The model

The case discussed here on Supply Chain Approach for Ecosystem-based Adaptation (*SCA for EbA*) is mainly based on the design of the Mangroves and Markets project, co-jointly implemented by the International Union for Conservation of Nature (IUCN) in Thailand and SNV Netherlands Development Organisation in Vietnam. This project aims to promote EbA through the restoration and sustainable use of mangroves in both countries. Section 6.3 covers the project in Thailand, and includes elements of another initiative called Mangroves for the Future such as the activities relating to mangroves restoration implemented by IUCN in Thailand. While the activities taking place in Thailand are referred to as *SCA for EbA* in this thesis, they could also fall under the sustainable tourism model described in Section 4.3.1, since the company involved is a large operator in the hotel sector.

#### 6.1.1 Background

Mangroves ecosystems are natural carbon sinks that help mitigate climate change and constitute natural barriers to climate change, such as tropical storms and sea level rise. They provide protection to populations inhabiting the coastlines of Thailand and Vietnam. In addition to their protective function, mangroves are natural habitat for shrimp breeding and support the livelihood of local communities. But over time, the expansion of shrimp farms and especially intensive farms has led to severe mangrove degradation and loss as they were cleared to leave space for the industry. Pollution by intensive shrimp farms is also an enduring issue in the areas (Duke et al., 2014). At the current rate of clearance, UNEP estimated that Southeast Asia would lose 35% of its mangrove forests between the years 2000 and 2050.

The model is designed to link businesses that source shrimp through their supply chain to farmers, which in turn are provided with economic incentives (provided by the businesses) to adopt sustainable shrimp farming practices that better protect the mangroves. By doing so, it aims to reduce the pressure on mangrove ecosystems enabling them to remain healthy, resilient and continue playing their crucial role in climate change adaptation.

#### 6.1.2 Key features

##### **Vietnam**

Over the past two years, SNV has been implementing technical and financial support for building capacities of farmers in sustainable aquaculture and organic shrimp-mangrove systems. Shrimp-mangroves systems integrate both shrimp production and mangroves protection. Mangroves and Markets is working in the 12,500-hectare Nhung Mien Forest Management Unit (FMU) in Ca Mau (Southern province of Vietnam), which is managed by the Forest Management Board (FMB) (government institution), and home to about 2,600 shrimp farmers. Farmers in this area use an integrated mangrove-shrimp model in which each household is allocated 3-5 hectares, 60% of which should be mangrove-covered according to a national regulation issued in 2006 (Brunner, n.d.).

The support provided takes the form of trainings on a wide range of topics such as environmental management planning and monitoring, shrimp raising without industrial feed and chemicals, waste management and certification standards. About 27 farmers groups were also established to help increase farmer-to-farmer learning. The groups are supported in meeting the standards of certification, especially the required 50% mangrove cover rate; SNV helps the farmers close to the threshold in replanting the mangroves (SNV, 2014b). The organisation also conducts intensive training session with the farmers in order to help them develop a good understanding of mangroves' role in climate change adaptation, thereby furthering understanding of the important functions of mangroves (T. Nguyen Thi Bich, personal communication, August 5, 2015). In 2014, 1008 farmers had been trained in organic shrimp certification and mangrove restoration, and 741 shrimp farmers obtained the German Naturland organic certification valid until 2016 (SNV, 2014a).

To incentivize farmers to engage in the certification process, SNV managed to involve one of the largest shrimp processing and exporting companies in the world in the project. Minh Phu Corporation signed an agreement to buy all certified shrimp with a 10% price premium, thereby enhancing the stability of the market. For the farmers this translates into a more stable income and livelihood improvement. It was found that the net income from selected integrated mangrove-shrimp farming in 2013 had increased 2.5 times in comparison with traditional shrimp aquaculture or rice-shrimp without mangroves; from around USD 2760 to 3220 per year to USD 6900 to 9200 (Boles, 2014). In addition, the company also pays for the yearly audit and internal control systems that help ensure the chain of custody (ViệtNam News, 2014). Currently, Minh Phu has an overall shrimp production volume that reaches 54,000 tons per year (N. Van Phong, personal communication, August 5, 2015). For the organic component, about 3000 hectares are certified producing 420 tons per year. In 2015, the company plans to certificate 1150 additional households in organic shrimp farming to reach 5000 hectares and 720 tons per year; followed by a gradual increase over the next few years. Minh Phu trains farmers in certification standards but it is not an in-depth training (T. Nguyen Thi Bich, personal communication, August 5, 2015). SNV help complement these trainings with technical support on different aspects such as budgeting or replanting to reach the 50% mangroves cover rate required by the Naturland certification.

The Department of Agriculture and Rural Development of Ca Mau Province is giving strong support to the project and wishes to expand organic certification from 2700 to 20000 hectares of integrated mangrove-shrimp farms by the year 2020 (SNV Vietnam, n.d.). Together with SNV and Minh Phu they have a vision of establishing “an ‘organic coast’ that produces high-value certified shrimp while increasing coastal resilience to climate change” (SNV, 2014b).

## **Thailand**

In Thailand, similar activities are currently being implemented by IUCN who facilitates connections between shrimp farmers and potential buyers such as the JW Marriott Hotel in Bangkok and the JW Marriott Phuket Resort and Spa located in Phuket. Under the IUCN-Marriott partnership,<sup>16</sup> several initiatives are ongoing: awareness raising and mangrove restoration activities, sourcing of sustainable souvenirs as part of providing alternative livelihoods to local communities, and sustainable seafood sourcing (IUCN, 2015a). IUCN is providing technical support by providing training sessions to staff of the Marriott Hotels and Resorts in Thailand. While mangrove restoration activities and sustainable souvenirs sourcing are implemented in collaboration with the Mangroves for the Future initiative,<sup>17</sup> the

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<sup>16</sup> As part of Marriott's global commitment to sustainability and IUCN's Business and Biodiversity Programme, Marriott Hotels & Resorts Thailand collaborates with IUCN in protecting the environment and supporting local communities.

<sup>17</sup> See IUCN (2015c) and Mangroves for the Future (2015) for more information.

sustainable seafood component is the equivalent of the model in place in Vietnam and falls under the umbrella of the Mangroves and Markets project (A. Jöhl Cadena, personal communication, July 31, 2015). Under this project, IUCN is assisting the Marriott Hotels in Thailand in identifying sustainable seafood sources while also assisting farmers obtain organic certification to help develop the creation of an incentive-based scheme with premium payments for organic shrimp.

In this case, the certification scheme used is local, as the shrimp farmers produce mainly for the local market and not for export, unlike in the case of Minh Phu Corporation in Vietnam (A. Jöhl Cadena, personal communication, July 31, 2015). In that regard, IUCN collaborates with the Department of Fisheries (DOF) of Thailand in providing the training for the local farmers on the Thai Organic Aquaculture Farms and Products Certification Center (OAPC) certification. For the Mangroves and Markets project, IUCN conducted site assessments in Trat, Chanthaburi and Samut Prakan Provinces in order to identify and gather best practices of sustainable aquaculture in mangrove ecosystems (IUCN, n.d.-b). Several dozens of farmers in these provinces have more integrated and natural systems, with 14 farmers in Samut Prakan and 10 farmers in Trat Chanthaburi who took part in OAPC trainings. The objective of the project is to help a larger group of farmers obtain the organic certification (IUCN, n.d.-b).

Finally, the Marriott Hotels in Thailand also help finance mangrove restoration activities by collecting donations from guests and creating and disseminating awareness-raising materials<sup>18</sup>. For restoration and local community support activities, IUCN has identified several target locations, namely Bang Kaeo, Samut Songkhram Province, in the Upper Gulf of Thailand and Thai Muang District, Phang Nga Province, in Southern Thailand, where the project also supports other activities such as turtle conservation (IUCN, 2015a).

### ***Integrated mangrove-shrimp polyculture system: towards more resilience***

The farming system promoted and used in both Thailand and Vietnam is based on a more sustainable approach compared to the intensive shrimp-farming model. Yields are significantly lower but of higher quality. It is an integrated mangrove-shrimp model also referred to as “extensive” as opposed to intensive, where polyculture<sup>19</sup> constitutes a key component. In this system ponds are connected via a system of waterways and sluice gates, and every 15 days, during the spring tide, the gate is opened and fish, post-larvae, and juvenile shrimp are recruited. During the subsequent low tide, the gate is opened for 4-5 nights and shrimp are collected using a bag net (Brunner, n.d.). Other main characteristics of the system as delineated by Brunner (n.d.) are presented below:

- a) *Low stocking densities and yields*: average production is about 300 kg shrimp/hectare compared to 10,000 kg/hectare in intensive shrimp farms.
- b) *Polyculture*: wild shrimp, crab, fish, cockles, and oysters contribute up to 30% of farmer's income while representing only 13% of farmer's costs.
- c) *Low inputs*: the only input is post-larvae bought from local hatcheries; no chemicals, artificial feed, or antibiotics are to be used.
- d) *Low risk of crop failure*: the shrimp farms in Ngoc Hien were untouched by the diseases that devastated shrimp crops elsewhere in the Mekong Delta in the year 2012.

Therefore, this model is more resilient to diseases and associated market shocks, making it more stable and profitable for farmers who engage in it.

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<sup>18</sup> This is a part of Marriott's "Spirit to Serve" initiative, for more information see Marriott (2015)

<sup>19</sup> Production of two or more species in the same space



## 6.2 Vietnam

### 6.2.1 Country context

Located on the eastern side of the GMS, Vietnam shares borders with Cambodia, China, and Laos (see Figure 6-1). With a surface of 330 957 km<sup>2</sup>, the country has a population of approximately 90 million people (United Nations Statistics Division, 2015b). It is classified as a lower middle income country with poverty headcount ratio of 16.8% in 2010<sup>20</sup> (The World Bank, 2015g). Vietnam first gained its independence from French colonial power in 1954, but then entered into a period of prolonged war over nineteen years to become reunified in 1975 under a one-party socialist republic system ruled by the communist party. The Vietnam War or Second Indochina War was fought between North Vietnam supported by communist allies and South Vietnam supported by anti-communist allies led by the United States. Atrocities of the war were not only visible on the human scale but also on the country's environmental resources. The use of chemical warfare (i.e. defoliants and napalm) not only affected thousands of civilians, but also destroyed some of the Mekong region's ecosystems, especially the mangroves (De Lacerda, 2002). On the economic front, since the political and economic reforms (*Doi Moi*) launched in 1986, Vietnam graduated from least-



Figure 6-1. Map of Vietnam (Central Intelligence Agency, 2015b)

developed country status to become a lower middle-income country with a strong export-oriented economy and an average annual GDP growth of 6.4% over the last decade (The World Bank, 2015j).

### **Ecosystems and climate change in Vietnam**

Vietnam is a narrow country that stretches over 1 600 km from China to the Gulf of Thailand. It is endowed with a diversity of landscapes divided into four main regions as follows: the *Annamese* extending from north to south through west-central Vietnam, the Red River delta in the north, the Mekong River delta in the south, and the coastal plain in the east; mountains and hills occupy a large part of Vietnam's territory and have an average height ranging between 1000 and 2000 meters (Mui, 2006).

According to an analysis by the World Wildlife Fund (WWF) (2013), between 1973 and 2009 Vietnam lost approximately 43% of its forest cover as natural forests were replaced with monoculture plantations. WWF's model also indicates that future deforestation in Vietnam will be spread in small pockets across the country, with the greatest losses expected in parts of the Central Highlands and northern provinces. To reverse this trend, afforestation efforts have been undertaken by the government in different areas. As for freshwater systems, the Mekong Delta supports more than 50% of Vietnam's staple food crop production and marine fisheries and aquaculture. But the development of hydropower along the Mekong River has started to affect the river basins ecosystems. Mangrove ecosystems in Vietnam are also under severe threat; clearing rates of mangrove forests are estimated as high as 50% (WWF, 2015). The major cause of mangroves loss and degradation is the rapid expansion of the shrimp

<sup>20</sup> Poverty headcount ratio at USD 2 a day (PPP) (% of population)

farming industry. The industry is facing serious climate change threats without the protection of the mangroves on the coast.

Vietnam's coastlines are particularly vulnerable to tropical storms and sea-level rise and its Mekong Delta has been identified as one of the most vulnerable regions in Southeast Asia (Appendix VI; Yusuf & Francisco, 2009). While the country is quite exposed to climate hazards in its most densely populated areas, in their study Yusuf & Francisco (2009) assessed Vietnam's level of adaptive capacity as rather high.

### ***The shrimp farming industry***

According to Lan (2013), shrimp raising is generally said to have emerged in Ca Mau Province (Southern tip of Vietnam) in the 1980s when farmers spontaneously let saline water enter into rice fields to raise shrimp naturally. But some reports seem to indicate that rice-shrimp rotation farming was used as early as the 1960s. Today, about half of Vietnam's shrimp farming area and about 28% of its aquaculture areas are found in Ca Mau province (Brunner, n.d.; SNV, 2014b). This is also where half of the country's mangroves are found; and over the past two decades, shrimp farms have been identified as a major cause for mangroves degradation and loss (SNV Vietnam, n.d.).

The rising profitability of shrimp exports in the past decade has encouraged numerous farmers in Ca Mau to convert to intensive shrimp from traditional rice farming practices. In the year 2013, the shrimp export industry was worth USD 3.1 billion. But the last past few years, the industry started to be affected by the spread of diseases among the shrimp, affecting both the ecological systems and the livelihood of farming households who depend upon them (Boles, 2014). Upon realising that shrimp deaths were occurring in areas not protected by mangrove forests, farmers started to understand the protection benefits provided by mangrove forests (Boles, 2014). Diseases are believed to have caused a loss of USD 4.7 million for Minh Phu Corporation (largest shrimp processor and exporter) in the year 2012 alone (ViệtNam News, 2013).

As a key sector for the country's economy, shrimp farming is now one of Viet Nam's leading export-oriented activities, it is a key sector for the country (ViệtNam News, 2014). In the past most fishery companies in Vietnam used to be government-owned, now most of them have become private with some listed in stock exchange (N. Van Phong, personal communication, August 5, 2015). However, the industry's negative impact on the mangrove ecosystems of the long densely populated coastlines has caused organisations such as SNV and the Vietnamese Government to explore opportunities for more sustainable industry practices. Therefore, Ca Mau province possesses all the characteristics for the implementation of projects such as the Mangroves and Markets, which aim to increase coastal resilience while involving private actors such as shrimp-exporting companies.

## **6.2.2 Findings**

The findings presented below are the results of two interviews conducted by the author in Vietnam. These include one interview with the Mangroves and Markets Project Manager (Ms. Nguyen) and the Field Coordinator (Mr. Le Dinh) of SNV Netherlands Development Organisation (implementing organisation), and one interview with the organic shrimp production manager of Minh Phu Corporation (Mr. Van Phong) (private actor).

### ***Motivational factors***

A number of factors seem to have motivated the involvement of Minh Phu Corporation in the project, including profitability, risk mitigation and local community support. Mr. Van

Phong indicated that Minh Phu Corporation's involvement in the project resulted from a desire to have high quality products, "greener" shrimp, support farmers' livelihood improvements and raise awareness about climate change (personal communication, August 5, 2015). He mentioned that obtaining the certification for the shrimp raised by the farmers would allow Minh Phu Corporation to sell them at higher prices and expand its customer base. Indeed, Mr. Van Phong indicated that Minh Phu Corporation clearly sees the business opportunity associated with sustainably produced shrimp and intends to gradually expand the production over the next few years to supply to a growing demand for organic products from the company's international customers.

It appears that EbA was not the main focus of the involvement of Minh Phu Corporation, but rather an indirect benefit of producing organic shrimp, which constitutes an important business opportunity for the company. However, Mr. Van Phong mentioned that climate change is perceived as a risk to the company's activities, in particular sea level rise that could destroy the farming areas of the company's suppliers (local farmers). Similarly, he mentioned that Minh Phu Corporation's clients are aware of the risk, which would translate into a reduction in farming areas and product quality, thereby affecting their supply chains.

### **Enabling factors**

Ms. Nguyen emphasized profitability as the predominant enabling factor for Minh Phu Corporation's involvement in the project, followed by reputational benefits and environmental concerns (personal communication, August 5, 2015). The organic shrimp originating from the integrated mangroves-shrimp systems are to be exported to international markets only, as there is currently no domestic market for such products in Vietnam due to a very low demand. The company's clients for organic shrimp increasingly require certification. Mr. Le Dinh indicated that several projects in Ca Mau province with similar objectives as the Mangroves and Markets project (i.e. organic shrimp farming) but involving different companies failed in the past due to the lack of market prospects and profitability issues (personal communication, August 5, 2015).

The presence of a sustainability mandate within the company encouraged involvement in the project. Mr. Van Phong indicated that sustainability was quite strongly integrated in the company's activities (personal communication, August 5, 2015). In that respect, the decision process with regards to sustainability activities in the company is top-down; the director decides and then asks the opinion of other managers. For the Mangroves and Markets project, it appears that interest came from both sides; SNV was looking for a suitable company to involve in the project and the local government and Minh Phu were interested in investing in organic shrimp production. Minh Phu Corporation does not intend to pursue the unsustainable industrial production methods used in the past but instead wants to expand organic shrimp production and decided to limit shrimp production to 15 shrimp per km<sup>2</sup> per year, with shrimp farming areas of 60% and 40% mangroves cover. When asked if he thinks such a path is the future of shrimp farming, Mr. Van Phong says that he really hopes so but does not think that other competitors would take part in such projects.

He mentioned that prior to occupying his position in Minh Phu Corporation and collaborating with SNV, he had already participated in training sessions on climate change and adaptation in a local organisation but also by the UN-REDD<sup>21</sup> Programme in Vietnam. He indicated that he did not receive in-depth training on EbA but finds the concept rather easy to

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<sup>21</sup> United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries

grasp, specifically the notion of mangroves providing protection against climate change related hazards. He added that the trainings provided by SNV were essential components for Minh Phu Corporation, without which the costs of obtaining training by other means would have constituted an issue. The only difficulties mentioned were that farmers tend to hold on to their own habits and knowledge, which sometimes contradicts the one found in trainings; assimilation of new information takes time and a lot of training. Overall, according to Mr. Van Phong, although the whole cost of the project is a bit high the market prospects with possibility of selling the product at higher prices compensate for the investment costs.

SNV plays a very important intermediary role, coordinating activities and communication between Minh Phu, the farmers and the certification standard organisation, Naturland (T. Nguyen Thi Bich, personal communication, August 5, 2015). For instance with regards to the standards requirements, both Ms. Nguyen and Mr. Le Dinh mentioned that changes in requirements (towards stricter demands) have made the certification very difficult to obtain and afford (personal communication, August 5, 2015). SNV managed to renegotiate the deadline for requirements with the certification organisation to postpone it to the following year in order to provide farmers with more time to reach them. Without this, the project viability would have been probably jeopardised, as certification is an essential component for positive market prospects.

No regulations or laws were stated as problematic, which in other words means that the regulatory framework is rather favourable to the model (N. Van Phong, personal communication, August 5, 2015). This is something that Ms. Nguyen confirmed. In fact, the local government already had the objective of developing organic shrimp farming before the Mangroves and Markets project (personal communication, August 5, 2015). The government provides strong support, created the Nhung Mien Forest Management Board to work with the companies and help provide training for farmers. The government takes the environmental threats in the region, especially climate change, seriously and generally understands the needs of farmers. Both the implementing organisation and Minh Phu Corporation indicated that the involvement of the government and the local authorities of Ca Mau was crucial for the establishment of the collaboration. For SNV, the government's presence plays the role of a safeguard, mitigating the risk of abrupt contract termination from either the company or the farmers.

Finally, although nascent and not designed for this particular model, the legal framework put in place by the Vietnamese government for Payment for Ecosystems Services (PES) also constitutes a sound basis for the project's upcoming component. Indeed, as mentioned earlier SNV recently managed to get an agreement signed by Minh Phu Corporation to pay farmers for the maintenance of mangrove forests (and their provisioning services) of between USD 22 and USD 27 per hectare per year. By targeting the mangroves, this aims to complement the current fluctuating premium payments already in place for the shrimp.

## 6.3 Thailand

### 6.3.1 Country context

Thailand is a long country that stretches out from the eastern part of Laos up to the northern part of Malaysia bordering the Andaman Sea (see Figure 6-2). It has the surface area of 513 120 km<sup>2</sup> with a coastline of 3 219 km, and shares borders with Myanmar, Cambodia, Laos and Malaysia (Central Intelligence Agency, 2015). With a population of about 67 million (2012), Thailand is classified as an upper middle-income country since 2011. The poverty headcount ratio<sup>22</sup> in the country has been significantly reduced to reach 3.5% by 2010 (The World Bank, 2015f). The country's impressive economic growth at 8-9% per year since the late 1980s and up until the "Asian Crisis" of 1997-1998 has contributed to lifting a majority of its population out of poverty, but as emphasized by the The World Bank (2015h), the "benefits of economic success have not been shared equally" and as of 2013, 80% of the country's poor lived in rural areas. Unlike most of its neighbouring countries in the GMS, Thailand has never been colonised. However, the multi-party system has suffered from tensions and uncertainty issues that have had an impact on the economy in the recent years (The World Bank, 2015i).



Figure 6-2. Map of Thailand  
(Central Intelligence Agency, 2015a)

### **Ecosystems and climate change in Thailand**

Agro-ecological zones can be divided in four regions as follows:

the Northern region (lowlands, uplands and highlands); the Northeast region, an elevated plateau where paddy rice and upland field crops such as cassava, sugar cane and maize are cultivated; the Central plains region is also known as the "rice bowl" of Thailand; and the Southern region is dominated by plantation agriculture such as rubber, palm oil, and fruit trees (Shelton & Phaikaew, 2006).

According to WWF (2013), in thirty years Thailand lost approximately 43% of its cover forest. Similarly to Vietnam's situation, the growing demand for electricity in the region and the subsequent construction of dams on the river have been impacting the freshwater systems, harming wild fisheries in both countries. As Chaudhury (2009) highlights, Thailand and Vietnam have also become major importers of timber, which they obtain from Myanmar, Laos and Cambodia. This demand is often supplied by large-scale illegal logging activities in the countries.

In the past 40 years, more than half of Thailand's mangroves have been lost. But in the aftermaths of the 2004 Tsunami, mangroves have received increased attention and determination to replant the mangroves has been growing. As mentioned previously, mangroves play a critical role in protecting coastlines from storms and sea level rise. A study by Sathirathai and Barbier (2001) estimated the coastal protection and stabilisation value<sup>23</sup> of mangroves in Southern Thailand at an average of USD 3679 per hectare. In terms of vulnerability to climate change, Thailand features several times in the list of climate hazards

<sup>22</sup> Percentage of the population living on less than USD 2 per day

<sup>23</sup> Net present value calculations based on a 20 year timeline

hotspots of Southeast Asia (see Appendix VI); flood, sea level rise and droughts constitute some of the main threats. But as for Vietnam, Thailand's adaptive capacity is evaluated as relatively high (Yusuf & Francisco, 2009).

### ***Shrimp farming and tourism industry in Thailand***

Shrimp farming has been practiced in Thailand since the 1970's, but grew very rapidly in the mid-1980s. The Food and Agriculture Organisation of the United Nations (FAO) (2015b) distinguishes three types of shrimp farming in the country: extensive farming, semi-intensive farming and intensive farming. While the semi-intensive system used to be popular, after 1986 a shift occurred towards the intensive farming system. Similarly to Vietnam, conversion to shrimp farms has been a major cause of mangroves destruction in Thailand. And even if the use of mangrove areas for shrimp farming has been restricted to some designated areas by the Thai Government, polluting effluents from intensive farms is a major issue for extensive farms and surrounding ecosystems (FAO, 2015b; A. Jöhl Cadena, personal communication, July 31, 2015). More recently, the industry has been criticised for several cases of serious human rights violations, drawing attention worldwide to the "hidden costs" of cheap shrimp (Hodal, Kelly, & Lawrence, 2014; University of British Columbia Graduate School of Journalism, 2010). This rising interest for high yields producing farming systems has been fueled by a growing demand for shrimp both internationally and domestically. It is reasonable to expect a part of the domestic demand to originate from Thailand's booming tourism sector.

The tourism industry in Thailand accounted for more than 7% of the economy in 2014 (International Labour Organization, 2014); and while the rapid development of the sector brought numerous economic benefits it also entailed a number of issues on sociocultural and environmental dimensions (Muangasame & McKercher, 2015). These include fast urban development, waste management challenges, water pollution, excavation of hills for sand and gravel, and exacerbation of competition over scarce resources. In an effort to improve the situation the Tourism Authority of Thailand has issued a "7 Greens" policy in 2008 with the objective of making all actors in tourism take "individual and collective responsibility to create a more socially and environmentally sustainable sector" (Muangasame & McKercher, 2015, p. 497; Tourism Authority of Thailand, n.d.). So far, it appears that the policy has faced implementation challenges; but it can still be considered as a positive sign on the path to a more sustainable tourism industry in Thailand. Furthermore, considering the sector's vulnerability to economic and natural shocks, it appears reasonable to think that adaptation to climate change will also arise as a key priority in the government's agenda in the near future.

## **6.3.2 Findings**

The findings presented below are based on the results of two interviews conducted by the author with two interviewees based in Thailand. It includes one interview with the Programme Officer of IUCN working on the partnership with Marriott (Ms. Jöhl Cadena), and one interview with the Corporate Social Responsibility (CSR) Director at JW Marriott Phuket Resort and Spa (Mr. Panton).

### ***Motivational factors***

A strong motivational factor for the involvement of the Marriott Hotels in Thailand was the presence of a very engaged CSR Director but also top management commitment. Prior to taking his position at JW Marriott Phuket, Mr. Sean Panton was already involved in different conservation activities since several years in the region. He founded the CSR project named SEEK Phuket, which stands for "Society, Environment Economy and Knowledge – A sustainable Phuket" (S. Panton, personal communication, August 18, 2015), which is a project that aims to support and provide a platform for discussion between different stakeholders on

sustainability related issues. These personal engagements and past positions have provided him with both knowledge and willpower to bring in and further activities related to sustainability and mangrove restoration with the Marriott Hotels in Thailand, activities that falls under the umbrella of Marriott's *Spirit to Serve* initiative.

Many of the Marriott Hotels and Resorts in Thailand are located on the coast, which makes them directly exposed to climate related disasters such as the devastating tsunami of 2004 (S. Panton, personal communication, August 18, 2015; A. Jöhl Cadena, personal communication, July 31, 2015). Therefore, the concept of coastal resilience and the importance of the role of healthy ecosystems in disaster risk reduction, which is put forward and used in trainings provided by IUCN, is a well-understood vivid benefit that is perhaps easier to grasp than the general definition of EbA. However, Mr. Panton explained that for JW Marriott Phuket and the Marriott Group, reducing climate related risks is just one aspect of their involvement in mangrove restoration activities. In fact, it is part of an overall strategy where mangrove forests are the central component, whose role is to provide much more than coastal resilience benefits (e.g. support the livelihood of local communities in different ways and recreational benefits) (personal communication, August 18, 2015).

Finally, another important factor mentioned is the CSR branding and image benefits associated with involvement in the initiative. Both on the environmental and social front, engaging in sustainable handicraft and seafood sourcing, and raising awareness and donations provide an excellent way for the company to achieve its environmental and social responsibility goals contributing to Marriott's "Spirit to Serve" initiative (S. Panton, personal communication, August 18, 2015). These initiatives are integrated in their CSR report, which is communicated to shareholders and investors. On the social aspect, it appears that engaging with local communities, which sometimes can be difficult due to conflicting interests, is not an issue at all but instead a driver. Indeed, it was mentioned that engaging with and supporting local communities through different means helps gain acceptance and in a way provides a "license to operate" in the area (A. Jöhl Cadena, personal communication, July 31, 2015).

### **Enabling factors**

In Thailand, it was found that the absence of specific enabling factors hindered the implementation of a model identical to the one in place in Vietnam. Finding large protected areas where the mangrove cover is high enough and shrimp farms with sustainable production processes are able to produce quantities suitable for supplying Marriott Hotels was a lacking key factor (A. Jöhl Cadena, personal communication, July 31, 2015). To provide access to such areas the implementation of clear rules designating which users can access the mangroves and for which purpose is essential. This refers to the process of zoning, which is often established by national governments, specifically Ministries of Environment or Department of Fisheries in the countries. Zoning often results from regulatory frameworks that aim to establish protected areas for certain ecosystems. In Thailand, mangrove forests are protected by law and usage rights are limited in these areas. On the other hand, where land is privately owned, the Thai government cannot decide what usage should be done. Therefore, intensive farming practices may remain in place unless other incentives for change are provided (personal communication, July 31, 2015).

As mentioned, extensive farms have lower stocking density and harvesting systems that follow the tide, translating into a more sustainable but also lower production capacity than intensive farms. The absence of sufficiently large and (or) sufficient numbers of extensive shrimp farms made the supply unstable. This constituted an important risk factor for high-end operators like the Marriott Hotels, where maintaining high quality service is a key component of their business model.

Pricing is also an important component, especially for businesses such as hotels that work with economies of scale. In this case, in addition to the instability in supply, the absence of sufficiently large quantities coming from extensive farms led to higher prices. All in all it deterred full involvement of the Marriott in a *SCA for EbA* model such as the one in place in Vietnam (contract with regular premium payments for the shrimp). However, the company showed interest and flexibility as it orders small quantities on a more ad-hoc basis.

It appears that certain factors could facilitate their involvement in the long term, namely the integration of sustainable seafood sourcing in the Marriott Hotel Group's CSR policy and the obtaining of organic certification by the shrimp farmers. In that regard, Ms. Jöhl Cadena mentioned that the Thai government was supportive of organic certification expansion in the shrimp-farming sector, which can also constitute a supporting factor to some extent (personal communication, July 31, 2015). Mr. Panton mentioned that the local authorities are very supportive and the presence of an integrated platform where stakeholders can discuss (such as SEEK) is an important enabling factor (personal communication, August 18, 2015).

As for the other activities in which JW Marriott Phuket is involved, such as awareness raising, the support of IUCN is identified as a key factor. This support takes the form of staff training but also facilitation of communication with the local communities with the presence of a coordinator for the activities on site. Finally, the knowledge acquired by the company's CSR Director in his different voluntary engagements in conservation activities is another key facilitating factor; it is actually at the origin of JW Marriott Phuket's involvement in activities supporting community handicraft and alternative livelihoods (A. Jöhl Cadena, personal communication, July 31, 2015). This knowledge and commitment support the dissemination of knowledge in the company while helping to push the engagement forward.



## 7 Analysis and discussion

### 7.1 A framework for analysis

Based on the interview results from the case studies in Chapter 5 and Chapter 6, the author put together a matrix (see Appendix VII) summarising all factors by country, and by type (motivational or enabling). Following a colour coding method, motivational factors were clustered into three categories: (i) *Climate change risks*; (ii) *Business opportunities*; and (iii) *Societal contribution*. Enabling factors were clustered into five categories: (a) *Stakeholders' requirements*; (b) *Market factors*; (c) *Sustainability awareness & integration in the organisation*; (d) *Knowledge and resources*; and (e) *Government support and policy frameworks*. Overall, all factors presented in the case studies could be clustered into the aforementioned categories (highlighted in this chapter in *italic*), regardless of the location and financing model involved. Only one overlap was found in the case of Thailand as top management commitment and CSR Director commitment were respectively enabling and motivational factors, but was an unique occurrence and therefore did not affect the clustering. This method helped to delineate a suitable framework for analysis, as presented in Figure 7-1. This framework is an attempt to provide an analytical tool adapted to the context of private sector involvement in direct financing models for EbA; no previous framework for such analysis was found in the EbA or business and strategic management literature. It is used in Section 7.2 in order to analyse and discuss the case studies' findings in relation to each other, and explain some of the underlying mechanisms behind private sector involvement. Results of the analysis are then discussed in Section 7.3.

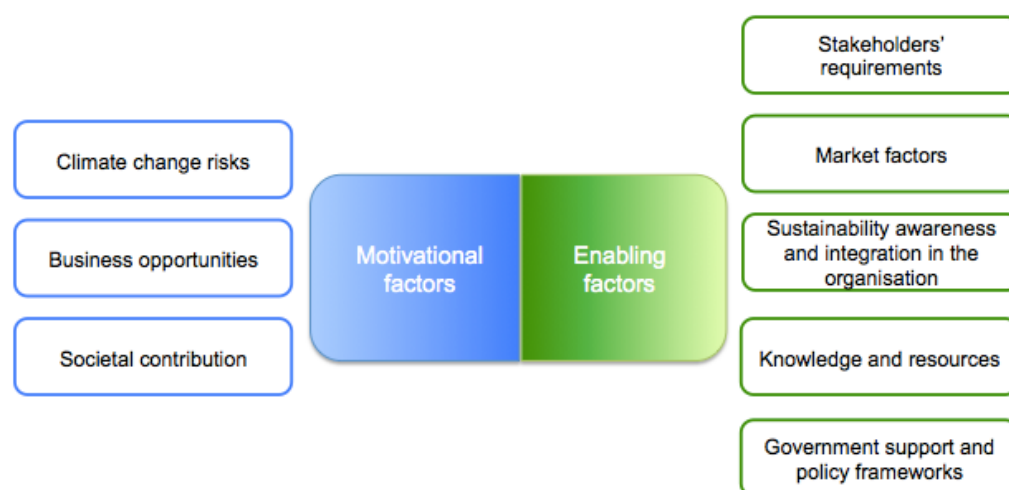


Figure 7-1. Analytical framework extracted for analysing private sector financing of EbA

Source: Author's own

### 7.2 Analysis and results

#### 7.2.1 Motivational factors

##### ***Climate change risks***

Whether it is in their activity or in their clients', climate change is perceived as a risk for all companies and MFIs interviewed. These risks can impact their operations directly such as in the case of Minh Phu Corporation and their supplying shrimp farms or indirectly like in the case of MFIs that receive payments late because their clients' activity is impacted by climatic events. In these two cases, the involvement of the company in financing an EbA initiative intends to bring benefits in terms of climate risk mitigation in areas where they or their clients are conducting activities. However, in the case of JW Marriott Phuket, the involvement of the

company finances activities aiming to restore mangroves that are not necessarily protecting their main operations, but are instead protecting their suppliers' and coastal areas that do not necessarily surround their properties. In that way, the company reduces the risk found in its supply chain, as well as in the community in which it operates. In other words, climate change risks and the risk mitigation benefits can be found at *different levels of the supply chain* of companies and in different locations.

The *level of urgency perceived* varies between cases, and is influenced by different factors in each case. For instance in the case of MFIs and farmers in Cambodia, the fact that the country has been affected by droughts and floods on a seasonal basis lowers the level of urgency perceived by the actors. The regular occurrence of these events and the lack of knowledge of the magnitude of future climate change and its associated impacts can lead the MFIs to prefer a status quo situation where no adaption measures are implemented as if they did not perceive them as a risk but rather an inevitability. In addition, one interviewee mentioned the fact that when the rainy season is late some farmers in Cambodia who cannot pursue farming activities, migrate to neighbouring countries to work and support their livelihood. These so-called livelihood strategies, although beneficial to the farming households' economic viability in the short-term, can constitute a form of mitigating factor that reduces the level of risks perceived by MFIs that provide loans to these households (i.e. late payments due to climate variability). They can delay action with regards to reduction of climate vulnerability in their portfolios.

For MFIs in Peru and Colombia, the fact that climate risks are not quantified creates an incomplete understanding of their magnitude and impacts. However, the project represents an opportunity for the MFIs to improve their preparedness for upcoming climate change impacts. For JW Marriot Phuket and Minh Phu Corporation, both are located in areas that have been affected by either a disastrous climate event (2004 tsunami in Thailand) or the consequences of ecosystems collapsing (death of shrimp vulnerable to diseases due to absence of mangroves). While the impacts on their activity were of different nature and magnitude, in both cases these experiences seemed to have served as a source of motivation for action.

### **Business opportunities**

Business opportunities constitute important factors for the private actors involved, and again, the level of significance of the factor varies. In the case of MFIs in Cambodia, Peru and Colombia, the business opportunity is mainly linked to the potential for increasing the farming sector's resilience and productivity, which in turn would result in reducing the vulnerability of their portfolios and an ability to offer products to a larger part of the population. For MFIs in Cambodia, the possibility of providing new products such as *MEbA* products represents an opportunity because they already have a good reach in the agriculture sector, with a significant part of their portfolio (e.g. 27% for HKL) dedicated to it. Furthermore the product *fits well in their pre-existing portfolio*, indicating that the integration of the product would be less resource intensive and more easily marketed to their customer base. If supported with technical assistance in methodology like in the case of Peru and Colombia, *MEbA* would be a product with relatively low development costs and potentially high returns for the MFIs. In the case of *SCA for EbA*, Minh Phu Corporation was strongly motivated by the prospects of having shrimp of higher quality that could be sold to its international customers. The *rising demand* for organic shrimp on international markets provides great *potential for export* for the company. For JW Marriott Phuket, business opportunities come in the form of *contributions to their CSR goals, as well as image benefits* that are valuable to investors and shareholders.

One key aspect in these different cases is the presence of products (i.e. organic shrimp, *MEbA* loans), which are both a part of the company's portfolio or supply chain and a representation of implementation of EbA measures. These products could be seen as *proxy products for EbA*,

in the sense that they make the link between the EbA adaptation benefits and the market by carrying a certain immediate market value that EbA measures generally do not have. By creating this market link, they help to fill the gap that characterise adaptation to climate change, as it is generally needed in non-market sectors or focused on public goods with no specified market value.

### **Societal contribution**

The notion of societal contribution appeared in different forms in the case studies but most importantly on *different scales (local, regional, and national)*. For the case of large MFIs in Cambodia, Peru and Colombia, it was mainly the idea of contributing to increase agricultural productivity and general economic growth in the country due to the key role of agricultural sector for the economy. For a smaller microfinance operator like Village Development Association (VDA) in Cambodia, the contribution was expressed on a more localised scale, as a way to help families' economic situation in villages of the rural areas. Similarly, Minh Phu Corporation mentioned helping the shrimp farming households by raising awareness in their community. On a larger scale, the involvement of the company contributes to support the vision of the government consisting of creating an "organic" coast in the province of Ca Mau (Vietnam). In the case of JW Marriott Phuket, although the company's engagements with regards to mangroves are part of a bigger CSR commitment on the group level, in Phuket the collaboration with IUCN has a strong community focus. In a way, it is a form of *license to operate*, as finding synergies between interests and building a long-term relationship is a way to reduce the risk of eventual conflicts.

## **7.2.2 Enabling factors**

### **Stakeholders' requirements**

The case studies highlighted the role of *clients' and investors' requirements* in enabling engagement in EbA through diverse means. These requirements targeted either the company's environmental and social responsibility or the proxy products mentioned earlier, and generally originated from clients, investors or shareholders. For instance in Cambodia, while the clients of the MFIs do not inquire about sustainability, their investors do, mainly in the form of requirements on the purpose of loans and social performance assessments. Regardless of the extent to which the investors follow up on these, the demands still provide the ground for *MEbA* development as they entail both environmental and social responsibility, two aspects of EbA. Similarly, in Peru and Colombia, the MFIs' investors have conditions and requirements on loans. However, Mr. Jungfleisch emphasized that most requirements found in the microfinance sector in Colombia and Peru are framed from a negative perspective (e.g. ban on loans for environmentally harmful activities), which is also the case in Cambodia. This is something the project aims to change by exploring possibilities to increase "positive" conditions that would favour, for example, EbA (personal communication, August 21, 2015).

For Minh Phu Corporation, international clients' rising demand for certified organic shrimp is a critical enabling factor. The absence of demand would affect the viability of the project or even make it fail. In *SCA for EbA*, *certification standards* play a crucial role by acting as guarantees for the quality and the market value that is associated with it. Therefore, as mentioned by Ms. Jöhl Cadena, helping shrimp farmers get certified in Thailand is a way to support the establishment of a scheme with premium payments such as the one in Vietnam.

### **Market factors**

A number of enabling factors that were found relate to market conditions, such as market prospects and stability, and stability of supply. Market prospects were an aspect that affected

Minh Phu Corporation and Marriott Hotels' involvement in the Mangroves and Markets project. Minh Phu Corporation estimated the expected return on investment as high due to export prospects, making the payments of premium to local shrimp farmers possible. However, market stability is an essential element for the 10% premium paid by the company; when exports decrease the premium is lowered. On the other hand, for sustainable seafood in Marriott Hotels the supply was too instable, the quantities too small, and the cost of the shrimp estimated to be too high, probably due to expected low direct (monetary) benefits from organic shrimp sourcing. To some extent, this could be linked back to a low demand from the clientele but more importantly to the fact that shrimp farmers involved in the project do not have the organic certification yet. This highlights again the critical role of certification in *SCA for EbA*. In the case of *MEbA*, although the interviewees did not mention specific market factors as enabling factors, it is possible to extract through the business opportunities mentioned that some were present and played a role. Such factors include the saturation of the urban market for microfinance in Peru and Colombia, and a highly competitive market in Cambodia where *MEbA* products could potentially be used by MFIs to differentiate themselves from their competitors in the agricultural lending sector.

### ***Sustainability awareness and integration in the organisation***

The presence of sustainability awareness was observed in all cases; all companies and MFIs had a good understanding of social and environmental aspects in general or specifically relating to their activity. In the case of MFIs in Colombia and Peru, the alignment of the project's objectives with the sustainability components of their vision and mission was important. The presence of sustainability in the companies' (core) activities and MFIs vision and mission, is an important factor as it can be a representation of *top management commitment*; it can create linkages and empower staff to engage in sustainability related initiatives. For instance, without having sustainability integrated in the core values of the global Marriott group, the benefits related to CSR emanating from JW Marriott Phuket's initiatives in Thailand might not be as visible and have as much value to top management or shareholders of the group. On the same token, if sustainable seafood sourcing was integrated in the group's *CSR policies*, it would provide leverage for the establishment of premium payments.

The integration of sustainability in the companies was sometimes represented by the presence of a person appointed specifically to work on either or both environmental and social aspects such as in the case of JW Marriott Phuket (CSR director) and some MFIs (Social Performance Director). The mandate and decision power given to the specific employee might significantly vary between cases but sometimes the person's personal values and interests can play a critical role in pushing sustainability forward in an organisation. In the literature, such individuals are generally referred to as *sustainability champions* (Schaefer, 2004). In the case of JW Marriott Phuket, it is reasonable to say that Mr. Panton's presence was a strong driver for environmental and social responsibility commitment. This awareness of sustainability issues in the companies was not limited to general aspects; it also concerned climate change. Naturally, this constitutes a good basis for them to engage in adaptation to climate change and EbA.

### ***Knowledge and resources***

Knowledge is a critical factor mentioned by all interviewees in one way or another. In most cases the crucial need for support was related to a lack of knowledge. All MFIs in Cambodia expressed the need for *technical assistance and trainings*, with some mentioning the need for *funding*. Funding that would specifically be dedicated to a possible project where *MEbA* products would be developed in collaboration with an external development agency or NGO. In the case of *MEbA* in Peru and Colombia, UNEP and Frankfurt Business School act as knowledge brokers who translate abstract concepts such as EbA into the day-to-day operations of MFIs (C. Jungfleisch, personal communication, August 21, 2015). Along with

other third parties, they provide training and technical assistance to the MFIs. In the case of Minh Phu Corporation and Marriott Hotels, with assistance from SNV and IUCN, it was not only the training sessions and awareness raising activities that were mentioned as crucial, but also the coordinating services provided by the organisations. Additionally, third parties also assist in monitoring of compliance. These knowledge and resources needs highlight the important role of organisations such as SNV or UNEP in the models. They are *intermediaries* who enable the creation and maintenance of linkages between the companies and the local communities. They help addressing the capacity and knowledge shortcomings that private actors express with regards to climate change and adaptation.

### **Government support and policy frameworks**

In all cases, interviewees emphasised the *role of national governments and local authorities* as an enabling factor on different levels. In Cambodia, MFIs mentioned that the involvement of the government, either through a partnership or a regulation, would be necessary or important for the establishment of a *MEbA* initiative. However, interviewees did not detail what type of supportive mechanisms they would need. This could be attributed to the hypothetical nature of the questions that related to it and the fact that they are currently not involved in adaptation to climate change or did not know the concept of EbA. More likely, it relates to the fact that the intervention of the government in the microfinance sector in Cambodia is relatively frequent, as suggested by the historical development of the sector (see Section 5.3.1).

However, Mr. André highlighted that today the government places a *stronger focus on mitigation* to climate change (personal communication, August 14, 2015). He explained that most government-led projects of adaptation to climate change would require the government to request funding from Development Finance Institutions (DFIs), which mostly comes in the form of loans. And as of now, decision makers do not perceive the benefits of adaptation, or at least not enough to engage in taking loans considering the numerous conditions that they entail. On the same token, access to funds is becoming more and more difficult, making competition for funding between projects increasingly intense. In the case of *SCA for EbA* in Vietnam and Thailand, *local authorities* (Forestry or Fisheries Departments) are the main interlocutors of the companies. Their support mainly consists of technical support, training and knowledge sharing, for instance in helping to identify potential sites for restoration. This is also the case in Peru and Colombia with government institutions.

While support from national governments and local authorities can take many forms, *policy frameworks* can be important enabling factors as they facilitate the integration of the initiatives in formal processes and their alignment with national agendas on climate change adaptation. In each country, situations varied on a range of aspects but were mostly influenced by pre-existing legislative and regulatory frameworks that did not integrate EbA specifically. For instance, in Thailand (*SCA for EbA*), the legal framework concerning land tenure and restricted areas has constrained the establishment of a premium payments scheme identical to the one in place in Vietnam, although indirectly. In Vietnam, however, it was favourable and the pre-existing legal basis (Decree 99 issued in 2010) created for Payment for Ecosystem Services (PES) schemes was helpful for the development of the fixed payment for sustainable mangroves management to the farmers by the company. Furthermore, the UNREDD standards provide a sound basis for SNV and Nurland to explore possibilities to incorporate carbon specific standards into the certification process (Boles, 2014). In the case of *MEbA* in Colombia and Peru, the countries were chosen due to their sound policies on climate change. In Cambodia, it is mostly the clearly defined regulatory framework for the microfinance sector, which does not constrains MFIs in their decision-making with regards to what initiatives they can take part in, that would enable their engagement in EbA. In that respect, although not cited by the MFIs, the National Adaptation Programmes of Action (NAPA) (see

Ministry of Environment of Cambodia, 2006) in Cambodia, which constitutes a roadmap for adaptation on the national level, could reasonably constitute an enabling factor for further private sector involvement in EbA.

## 7.3 Discussion

### 7.3.1 Discussion of results

While the analysis results partly answer the study's *Main RQ (What motivates and enables private sector's involvement and financing in EbA initiatives in the Greater Mekong Subregion?)*, the discussion aims to complement those by providing a more nuanced understanding of the answers. To do so, it links the results with the literature review findings and assumptions presented in the summary sections (see 3.5 and 4.4) and highlighted in italic in the discussion as well. Finally, the section also provides general observations on the thesis' contribution to research.

The level of *knowledge required* that characterizes the implementation of EbA was confirmed as a factor that can significantly impact private sector engagement in the financing models. This factor reappeared in the analysis in the form of trainings and technical assistance that constitute enabling factors. It is clear that as EbA is an emerging concept, it is not yet mainstreamed in the GMS. For the companies involved, interpretations of the meaning of EbA differed between sectors. Overall the level of awareness among private actors was rather low, especially for the companies not involved in an EbA project. This is representative of a lack of knowledge with regards to options for adaptation to climate change in the private sector, which is coherent with the general *lack of knowledge and access to climate change data* highlighted in the literature review on private sector and adaptation to climate change in general. Furthermore, the absence of mention of the NAPA in Cambodia by the MFIs can be considered as representative of a *lack of involvement in global and national climate change agendas*.

The description of the role of the *multiple stakeholders* involved in EbA as presented in Section 3.1.3 of the literature review is coherent with the results of the analysis. *Intermediaries*, mainly implementing organisations but also third parties, and industry associations (e.g. Cambodian Microfinance Association), have a significant role in the knowledge component by contributing to information dissemination, capacity building and communication with local communities. The assumption that the involvement of *multiple stakeholders and local communities* might constitute a hindrance was refuted by the findings of this study. In fact, presence of multiple stakeholders is rather perceived as a necessary enabling factor in the context of the financing models. For instance, involvement of *governments and local authorities* is highlighted as enabling. Furthermore, the involvement of *local communities* is perceived as beneficial as benefits sharing with local communities can contribute to social responsibility goals of the companies and MFIs and even provide a form of license to operate.

In addition to this, a new aspect of stakeholders' role in EbA, or more specifically in direct financing models for EbA by the private sector, was highlighted: the stakeholders' requirements, specifically *clients' and investors' requirements*. While in the literature on private sector and adaptation to climate change in general, *tools and initiatives for disclosing climate risks* are the main form of requirements that indirectly relate to adaptation, in the case of EbA they are *certification standards, and investors' conditions* on loans relating to social and environmental aspects. The latter could be linked back to growing trend of Socially Responsible Investment (SRI), which perhaps entail opportunities for integration of climate related conditions that would be positive and favour adaptation measures such as EbA. Overall, these requirements constitute significant enabling factors for private sector involvement as they link back to business opportunities. Certification in the case of *SCA for EbA* represents a quality guarantee that enables exportation, justifies higher pricing and subsequently produces return on investments.

The *low investments costs* of EbA measures mentioned in literature reappeared in the analysis on a different level. Indeed, while investments costs of involving in the initiatives did not seem to constitute an issue for the private actors, they were not specifically mentioned as low. This could be partly explained by the fact that the costs have not been compared to other adaptation measures.

Nonetheless, and more importantly, in the context of these financing models the costs seem to be compensated by the *multiple co-benefits* that EbA entails. These benefits emerged in the analysis in the form of *business opportunities* (e.g. financial returns, expansion of market segments, contribution to CSR goals) that are mostly linked to *proxy products* for EbA (e.g. loans, organic shrimp), and thereby contribute to making the cost-benefit ratios of the initiatives more attractive. While companies are aware of climate risks, in most cases, potential benefits of adaptation to climate change seemed to be secondary with regards to what motivated their involvement in the initiative; the focus was instead on immediate benefits (in line with the general tendency to *discount the future*). In that regard, *sustainability awareness and integration in the organisation* is an important enabling factor by making the benefits of EbA “visible” in business terms. This relates to the potential synergies and opportunities of EbA identified in the analysis of private sector trends in sustainability (see Section 4.2) namely the search for “*triple bottom line*” sustainability in the supply chain by companies and the rise of business and biodiversity initiatives. This is something that is particularly relevant in the case of *SCA for EbA*, as it could offer opportunities for importing companies who aim to increase sustainability and climate change resilience in their supply chains.

Overall, it appears that the *multiple co-benefits* of EbA and their associated *business opportunities* acted as incentives for private actors, the absence of which is mentioned in the literature as a barrier to private sector adaptation. These partly find their source in *market factors* that enable the establishment of the models. Although *market factors* are generally pre-existing or considered uncontrollable (e.g. saturation of urban market for microfinance), it would be possible to influence some of these factors through *policy frameworks*. In the case of *SCA for EbA* in Thailand for instance, *stability of supply* for organic shrimps is positively influenced by the expansion of the organic shrimp farming industry, which could be supported through effective zoning policies and favourable environmental laws targeting aquaculture.

The *time scale* involved in EbA and the *time lags* between implementation and results did not seem to be significant factors, unlike what was expected. This can be explained by the fact that from the perspective of the companies, immediate benefits can already be perceived through the aforementioned *proxy products*, and adaptation benefits are not the primary motivation for their involvement as mentioned earlier. It could also be linked to the fact that the initiatives are too recent for a full evaluation of their impacts and benefits.

The *multi-scale* nature of the approach surfaced in the results through the notion of *societal contribution* as a motivational factor for engaging in EbA. For private actors EbA entails opportunities to support not only local communities but also by extension sectors (aquaculture, agriculture) and even their respective countries economic growth.

The *low level of perceived urgency* as mentioned in the literature review was also present in the analysis and seemed to be affected by a range of factors, for instance the difficulties in quantifying and integrating climate risks and impacts in corporate risk management. While the framework designed by Agrawala et al. (2011)<sup>24</sup> is relevant in the context of companies

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<sup>24</sup> Agrawala et al. (2011) assessed private sector engagement to climate change using a methodology based on a three-tier framework. The framework is composed of risk awareness, risk assessment and risk management

headquartered in OECD countries, it is not necessarily the case for local companies and MFIs of the GMS presented in this study. *Climate change risks or climate risks are not integrated in formal corporate risks management systems*, and private actors do not necessarily distinguish between climate risks and climate change risks. This is perhaps due to the *long-standing presence of climate variability* in their activities, which is coherent with the assumption made in the literature review on private sector adaptation. In line with what previous research suggests on Asia and the timing of adaptation, private actors in the GMS investigated in this study seemed to mostly have *reactive responses* to trigger events. These are extreme and linked to either the climate (Tsunami and floods in Thailand) or ecosystems resilience (shrimp diseases due to mangrove degradation), and cause damages in varying degrees. Formal integration of climate risks in the companies and MFIs' operational activities and policies (as intended in the *MEbA* project in Colombia and Peru) will require a certain amount of trainings and time; time that is increasingly lacking in light of the pressing threats posed by climate change in the GMS.

With regards to the *financial sustainability of EbA* initiatives, results highlight that fostering direct financing from the private sector is a legitimate objective for the region. As adaptation seem to lag behind mitigation in some of the countries, bringing the private sector on board can help multiply the number and expand the scale and impacts of EbA initiatives. This is due to the fact that it helps alleviating a part of the cost that would otherwise be borne by the public sector. This cost is often covered by funds disbursed by DFIs (often loans), which are increasingly difficult to obtain or not necessarily attractive to governments whose action generally tend to have a stronger focus on mitigation so far. However, the need for adequate *policy frameworks* is highlighted, as a way to enable further private sector involvement in EbA and ensure the longevity of the initiatives. In line with the assumption based on the literature review, so far the general *vagueness* that surrounds policy frameworks related to climate change, although not constraining is certainly not conducive of further private sector engagement.

Overall, the present discussion highlights both similarities and differences between the results of the study and the literature on private sector adaptation to climate change in general, indicating that most of the unique characteristics of EbA had an influence on private sector' engagement in the initiatives. Therefore, the framework extracted and used in this study can be considered specific to the context of EbA.

### 7.3.2 Other considerations

#### ***The concept of EbA and its outcomes***

The primary data collection process highlighted that EbA as a concept was either completely unknown or interpreted in different ways by those who knew about it. The concept was rather difficult for MFIs in Cambodia (the only interviewees not involved in EbA) to grasp. This reflects a need to clarify what defines EbA in the context of private sector involvement, in broader and specific terms. For instance, the broader definition could simply designate measures such as sustainable management or restoration of ecosystems, or any measures that aim to improve ecosystems' resilience.

However, if the focus of the measures is the outcome and this intended outcome is to strictly help people adapt to climate change then the situation becomes more complex and links back to the idea of effectiveness. Effectiveness could be evaluated on the basis of a number of criteria and using a range of tools such as valuation tools or vulnerability assessment, although the interviewees in the GMS did not mention either. While at the moment proxy products and other associated benefits seem to be sufficient to motivate private actors' involvement in EbA initiatives, some limitations might emerge in the future. If a stronger focus is put on the effectiveness of the measures in the context of adaptation to climate change, then it will



become necessary for intermediaries, companies and implementers (local communities) to collaborate in conducting adequate assessments and monitoring. These could aid decision-making on the future direction of the initiative and motivate private actors to stay engaged.

### **Who pays and who benefits?**

Benefits are at the centre of the initiatives and financing models for EbA in general; they motivate both private actors and implementers (local communities) to involve but answering the question of “who pays and who benefits?” might not be so simple. While the companies involved provide financing for the implementation of the measures by the concerned local communities, they are generally passing the costs onto someone else. In the case of *SCA for EbA*, certification is a mean to guarantee quality but also a higher price for organic shrimp. This mean that ultimately the costs are mostly passed onto either the final buyer (e.g. importing company in Europe) or the final consumers. In addition, some investment costs for shifting towards organic farming have to be borne by the farmers themselves. In the case of Vietnam, without the establishment of the fixed payments for mangroves conservation, farmers would solely depend on the 10% premium payments for the shrimp, which is affected by market variations.

For MFIs, the situation is more straightforward: they provide financial means to farmers through loans that they will then repay with interests. In that respect, particular attention needs to be given to interests rates in the context of *MEbA*. According to Mr. Buenfil, in Peru and Colombia, paradoxically, loans to the most vulnerable generally have the highest interest rates (personal communication, august 21, 2015). *MEbA* loans with too high interest rates could have severe socio-economic consequences on the farming households and poor evaluation of these risks could deter engagement from communities in the future. Finally, interviewees mentioned that local communities had their own knowledge and had adapted to climate related changes in the past. Therefore, it is not given that communities would want to engage in the first place, and particular attention needs to be given to the implications of changing livelihood patterns of vulnerable communities. Ultimately, to ensure the expansion and stability of the models, benefits need to be perceived by all actors involved. On that note, capacity building of actors involved and survival of the model over time and through changes (e.g. absence of implementing organisations) are also important aspects to consider.

### **The importance of challenges and failure**

In the case of *SCA for EbA*, both projects in Vietnam and Thailand faced certain challenges. The fact that the Mangroves and Markets project in Vietnam was not the first project of this kind in the region but the only one to have succeeded is a significant aspect. Previous models implemented by different organisations and involving a different buyer had several flaws that eventually led to their failure. According to interviewees, these flaws mainly concerned specific factors, namely profitability and access to market. In other words, by succeeding where others have failed, the Mangroves and Markets project in Vietnam highlighted the inherently different influencing potential of the diverse enabling factors identified, with the absence of some being prohibitive. Similarly, the Mangroves and Markets component of the IUCN-Marriott Partnership in Thailand (Sustainable Seafood sourcing) has faced a few challenges in establishing an identical model of premium payments. These challenges were mostly linked to access to suitable mangrove forested areas and stability of supply and pricing with the latter being potentially mitigated by certification. Here again, the influence of factors on involvement of private actors varied showing the complexity that characterizes these models and the need for further research and effective knowledge sharing among EbA practitioners in the GMS and worldwide.

### 7.3.3 Discussion of methodological approach

#### **Research design and data collection methods**

The inductive nature of the study and the very limited amount of information on the specific topic did not leave much room for options in the research design and data collection methods. No quantitative methods could be used, as the number of potential interviewees was too limited. Qualitative methods involving both primary and secondary data proved to be better suited to the aim and research questions of this study.

The lack of literature associating both private sector and EbA led the author to divide the literature review into two separate chapters with only one section bridging the gap by relating them to existing financing models for EbA involving private actors. Inevitably, using the findings of the literature review to structure the interview guide influenced the data collected to some extent. However, to mitigate the impact the author chose to use semi-structured interviews where open-ended questions were predominant, leaving more room for interviewees to express their views. The structure of guides for interviews with private actors was almost identical for each group (i.e. companies involved or not involved in EbA), which provided a good basis for comparison in the analytical section. However, the lack of knowledge of EbA in some cases made it difficult for the author to follow the predefined interview structure. Perhaps a more robust or interesting method would have been to first interview private actors involved in EbA financing models to identify some factors, and then test those with private actors that are not involved.

The concepts that delineated the primary data collection process and structured the case study findings sections, namely motivational and enabling factors, aimed to uncover what underpinned the establishment of the financing model, mainly from the perspective of private actors and the implementing organisations. The author believed that framing the factors as motivational factors instead of drivers would provide a better insight into factors that are internal to the company. Similarly, the author preferred to present the factors that would enable rather than hinder (barriers). This is particularly relevant for the case of MFIs in Cambodia who are not involved in EbA and had never heard about the concept. If asked “what prevents you from involving in *MEbA*?” interviewees might have simply replied: “I do not know about it”. In asking what factors would help them engage, interviewees can share their needs, which are sometimes assessed based on previous experiences of involvement in sustainability related projects. By allowing them to relate to previous experiences, the objective was to lead to a higher probability of obtaining answers that reflect the organisation’s decision-making process. However, this choice of concepts did not leave much room for the identification of hindrances to engagement, which are of crucial importance, especially in the context of policy-making. The distinction between the two concepts was sometimes blurred, making the data collection process complex with some room for interpretation.

The main objective of using Case-based Research (CBR) design was to explore the general involvement of the private sector in EbA and uncover the factors that led (or would lead) to the involvement of the companies and MFIs in the models in the context of the GMS. The author selected the *MEbA* and *SCA for EbA* financing models, which entailed a long-term relationship with continuous investments, as basis for the case studies. By focusing on these two financing models the study obviously provides a rather restricted view of EbA, which can take many forms and be applied in a variety of contexts. Nonetheless, the case studies findings’ provided valuable preliminary answers to the main research question, and helped delineate a framework for analysis.

## **The interviewees**

Collecting primary data with the use of semi-structured interviews carries the risk of misinterpretation of questions and biased or untruthful answers from the interviewees. Considering the topic of the thesis, the risk of interviewees not wanting to admit a lack of knowledge on the particular topic (i.e. EbA) was identified as the most significant one. In fact, interviewees who were not involved in EbA (MFIs in Cambodia) clearly stated that they had never heard of the concept, eliminating this risk. However, this lack of knowledge of interviewees on EbA probably prevented them from referring to specifics when giving their perspective (e.g. content of the training, clients concerned), which could have been interesting for the target audience. The fact that no sensitive (political or confidential) questions were asked also contributed to mitigate the risks of skewed or untruthful answers.

With regards to how representative of the company's standpoint the answers were, there is also a risk that the person interviewed does not give an accurate representation of what the situation is or would be (e.g. "yes, the company would be interested in developing *MEbA* products"). The author believes that the choice of interviewees has played a role in mitigating this. For instance, in the case of MFIs in Cambodia (not involved in EbA), only people with a certain level of decision-making power in the company and knowledge of operations (e.g. Chief Operational Officer, Chief Executive Officer, CSR Director) were interviewed.

Unfortunately, in the case of *MEbA* in Peru and Columbia, the author could only interview the project managers and not the private actors (MFIs), creating a significant discrepancy within the data collected in the *MEbA* case study. Nonetheless, project managers tend to have a good overview of the situation and are able to point towards some of the factors influenced private actors' behaviour. This is due to both their current involvement in the project and past professional experience in collaborating with diverse stakeholders. The author observed that in the case of SCA for EbA, answers from private actors were practically identical to the ones given by the project managers of the implementing organisation (e.g. IUCN and SNV).

## **Generalizability**

The author estimates the generalizability of the research as moderate. The thesis looks at generalizability from different angles (financing model, geographic scope and elements of the thesis). Limitations for generalizability could emerge from within the financing model (*SCA for EbA*), as companies interviewed were either headquartered or operating locally. The results might not be applicable in the case of companies that would be based in Europe and importing instead of exporting organic shrimp for example. This points towards the issue of geographic scope. Overall findings of the study are relevant to the specified countries and by extension to the GMS as similarities on key aspects are found between the countries (e.g. ecosystems, climate change risks, demographic and economic pressures on natural resources.). Thereby, findings are not relevant for other regions, such as Europe for example where some key aspects are significantly different (e.g. climate change risks, institutional arrangements).

However, this limited applicability does not apply for the whole study. Indeed, while analysis results are rather context-specific (e.g. price of shrimp, climate risks and agriculture in Cambodia), the author believes that the analytical framework extracted from the case studies' findings could be applicable in different contexts with the same financing models. This is due to the diversity of countries, industries (aquaculture, microfinance, tourism, agriculture) and ecosystems (agricultural ecosystems and coastal ecosystems) involved in the study. This diversity was also present with regards to both the type and the state of involvement of companies in EbA initiatives and the receiver of the funds. Regardless of these characteristics, factors could be clustered under several categories, which designed the framework for analysis.

## 8 Conclusion

The problem addressed in this study is the growing lack of adaptation funding that threatens the implementation and viability of adaptation measures in general and Ecosystem-based Adaptation (EbA) specifically. Ecosystems in the Greater Mekong Subregion (GMS) are facing a number of threats. These threats are both local, emanating from rapid economic and demographic development, and global such as climate change. EbA as an approach provides the possibility to simultaneously protect ecosystems that are under threat, and aid vulnerable populations whose livelihoods depends on them to adapt to the impacts of climate change.

The growing financing gap for adaptation to climate change, combined with increased difficulties to access the funds and the reluctance of the governments of some developing countries to borrow for adaptation activities are all telling of the need to further involve the private sector. While EbA as an approach provides a number of opportunities for the private sector, a very limited number of initiatives involve private actors. Further engagement could take place in the context of innovative direct financing models such as the ones presented in the case studies: *Microfinance for EbA* and *Supply Chain Approach for EbA*. Therefore, this study aimed to enhance understanding of direct financing models for EbA involving the private sector in the GMS and the factors that underpin them, with the objective of helping to foster additional engagement and direct financing for EbA initiatives in the region. To fulfil this aim, research questions and sub questions were formulated as follows:

- *Main RQ*: What motivates and enables private sector's involvement and financing in EbA initiatives in the Greater Mekong Subregion?
  - RQ1*: Which characteristics of EbA are significant for direct financing by the private sector?
  - RQ2*: What general factors influence private sector adaptation to climate change?
  - RQ3*: What direct financing models for EbA involving private actors exist and what characterizes them?

### 8.1 Main findings

Through the two case studies *Microfinance for EbA* and *Supply Chain Approach for EbA*, the study uncovered a range of factors that motivate and enable private sector involvement in the concerned EbA initiatives. These were clustered into an analytical framework constituting three categories for motivational factors: (i) *Climate change risks*; (ii) *Business opportunities*; and (iii) *Societal contribution*. These were combined with five categories for enabling factors: (a) *Stakeholders requirements*; (b) *Market factors*; (c) *Sustainability awareness and integration in the organisation*; (d) *Knowledge and resources*; (e) *Government support and policy frameworks*.

Overall, the results of the analysis and discussion show that some of the unique characteristics of EbA constitute the basis of what motivates and enables private actors involvement in EbA initiatives in the GMS. These characteristics include: *multiple co-benefits*; *low investment costs*; involvement of *multiple stakeholders* including *local communities*; and level of *knowledge required* for implementation. In parallel, some of the elements that characterize private sector adaptation to climate change in general also resurfaced in the results.

The author argued that the *multiple co-benefits* of EbA take the form of *business opportunities* for private actors, often through *proxy products* for EbA (e.g. loans, organic shrimp). These products play a role in mitigating the significant *time scale and time lags* between implementation of EbA and benefits harnessed by providing almost immediate returns for the private actors. Such returns compensate *investment costs* and make the cost-benefit ratio of the initiatives more attractive and motivate engagement.

Furthermore, involvement of *local communities* to some extent also motivates private actors to engage in the initiatives. Indeed, as one of the main benefits of EbA, supporting local communities can help them achieve their social responsibility goals, along with their environmental responsibility goals (through the protection or restoration of ecosystems). In that regard, the presence of *sustainability awareness and integration in the organisations* is evidently a significant enabling factor for their engagement in EbA as it allows for the benefits to be understood and visible in the core activities of the companies and MFIs. In broader terms, EbA offers the opportunity for private sector actors to enhance their *societal contribution* on different scales (e.g. supporting vulnerable families, increasing productivity in the agriculture sector, increasing economic growth in the country).

The involvement of *multiple stakeholders* was found to enable the engagement of private actors. For instance, NGOs help provide the necessary *knowledge and resources* (mitigating their shortcomings in *knowledge required* for the implementation of EbA), and also facilitate communication with local communities. Furthermore, the role of national governments was also highlighted. In GMS countries, *government support* is important, especially in initiatives involving key economic sectors for development such as the ones presented in this study (e.g. microfinance, agriculture, aquaculture, tourism). Existing *policy frameworks* not necessarily related to climate change also facilitated the establishment of the models in varying degrees. However, to enable further engagement from the private sector, mainstreaming of EbA will be a crucial step, as awareness of adaptation options is low. The role of *market factors* was also highlighted as enabling; in some cases it was favourable (e.g. saturation of urban market for microfinance, international demand for organic shrimp) and in others it was constraining (e.g. instability of supply). Although generally structural, some can be influenced through different means such as government support mechanisms and policy frameworks.

The study found that while the presence of *climate change risks* motivates engagement in EbA, it is not the primary motive. Although awareness is present, the level of perceived urgency is rather low and reactive responses to climate events (often extreme) that trigger action are more common with regards to the timing of adaptation measures. This is linked to the fact that private actors of the study do not conduct formal climate risks assessments and integration in corporate risk management, and thereby also experience difficulties in distinguishing general climate risks and risks related to climate change specifically. This is aggravated by a lack of access to relevant climate data that could be used. In that regard, as an enabling factor, *stakeholders' requirements* (e.g. investors' loans conditions for *MEbA* or clients requiring organic certification for *SCA for EbA*) are found to have an important role to play. Such requirements can help bolster climate risks assessments, and thereby induce further adoption of adaptation measures. In addition, since in the financing models studied these requirements are heavily linked to the business opportunities mentioned earlier, they favour and enable engagement in EbA.

To summarize, this study brought to light motivational and enabling factors that underpin the engagement of private sector in financing models for EbA in the GMS. Although tainted with complexity, the results show that the unique characteristics of EbA are an important part of what motivates and enables private sector actors to engage in these initiatives. By enhancing the understanding of these innovative direct financing models, the study offers some potential leverage points that can be used to foster further private sector engagement in EbA initiatives in the region. However, it also highlights that in adaptation to climate change there is no "one size fits all", and to tackle the growing adaptation (funding) gap the establishment of effective financing models will be crucial. In that respect, additional research bridging existing bodies of knowledge on private sector adaptation to climate change, strategic management, and on the different adaptation options available, is a legitimate first step to support this process.

## 8.2 Policy implications

The overall results of the research entail a number of policy implications. A number of elements could be supported through policy namely, knowledge, support mechanisms and market factors. Mainstreaming of EbA in national policy frameworks is identified as a priority for researchers and practitioners, but before the benefits of mainstreaming extending to the private sector and the general public can materialise, awareness raising on both climate change and adaptation measures is needed in the countries. Policy-makers have an active role to play in bringing in the private sector; for example in the case of MFIs, their vast established network in rural areas represents an opportunity for effective awareness-raising. As for the concerned financing models, specific regulations (e.g. zoning, protected areas and land tenure) in the GMS need to be reviewed or developed to allow for effective adaptation.

Finally, it is emphasized that private sector involvement in EbA carries potential socio-economic impacts on communities that are often vulnerable to financial and climatic shocks. In that respect, there is a need to develop adequate legislative frameworks for the financing models, especially in the case of long-term financing where market linkages are created as these lead to higher exposure of the communities to market related shocks. This would aim to protect both the communities and the businesses, ensuring fair contracting methods and clarity in the definition of responsibilities. The question of whether such financing models should be made mandatory in the future, although outside of the scope of this study, remains an important point. Considering the critical time factor that characterise adaptation to climate change, it is reasonable to expect a regulatory “push” for further implementation of adaptation measures involving the private sector in the future. To what extent and under what circumstances it should be voluntary as opposed to mandatory is another point for discussion and research.

## 8.3 Recommendations

Based on the findings and discussion on policy implications, the author suggests a number of recommendations to the target audience of this thesis. The critical time factor that characterizes adaptation to climate change should not lead to rushed decision-making and implementation, but instead encourage governments of GMS countries to further the mainstreaming of EbA in policy frameworks in a timely manner. This could be done partly through the review and modification of existing policies relating to zoning, land tenure and protected areas that favour the implementation of EbA. Governmental institutions, intergovernmental organisations and NGOs have a crucial role to play in raising awareness on climate change risks, adaptation and EbA options in both vulnerable communities and the private sector. Emphasis should be put on strengthening capacity of local authorities’ in the GMS to ensure effective collaboration with NGOs on facilitating communication between local communities and private actors.

With regards to knowledge, increasing collaboration in the EbA practitioners and research communities not only in the GMS but also worldwide through knowledge and lessons learned sharing is a crucial step towards more effective adaptation and support of private sector involvement in initiatives. The study clearly highlights the fact that both climate risks data and EbA knowledge need to be “broken down” into information and measures that are useable by private actors. Therefore, organisations involved in research on climate change, adaptation, and EbA should put an emphasis on the translation and dissemination of this knowledge. Given that reactive responses appear as more common in the private sector, monitoring for windows of “opportunity” following extreme climate events is also encouraged.

In addition, to support future private sector engagement in EbA initiatives, the approach should increasingly be integrated in the business sustainability agenda, for instance via collaboration with industry associations and the establishment of platforms for discussion such as the business and biodiversity initiatives. These could help promote EbA in dialogues and workshops with the private sector as one of the available options for adaptation to climate change. Since business related opportunities are a predominant source of motivation for private sector involvement in direct financing models for EbA, practitioners are encouraged to search for potential market linkages and proxy products for EbA. Looking at the enabling factors, mainstreaming of EbA in stakeholders requirements is important. For the financing models investigated, engaging in collaboration with certification bodies for the agriculture and aquaculture sectors, as well as with investor initiatives (e.g. AIGCC) is encouraged.

From a regional perspective, the establishment of additional forums and initiatives on ecosystems management and climate change in the GMS would constitute good platforms for discussion and sharing of best practices in adaptation and EbA specifically. Considering the trade relations between the six countries and the fact that some of the economic drivers of ecosystems' degradation are of transboundary nature, it is hoped that financing models involving actors located in different countries of the GMS are implemented in the future.

Finally, it is emphasized that EbA is not a panacea and that private sector adaptation to climate change it is not a "one size fits all". Therefore, while EbA provides ample opportunities for both public and private sector, suitable context and conditions must prevail as criteria for its implementation. Furthermore, critical attention needs to be paid to the design of the models, legislative framework, and aftermaths of the initiatives, especially with regards to local communities involved. While the focus of private actors might be primarily on co-benefits rather than adaptation benefits, the initial objective of limiting climate change impacts on biodiversity and helping populations adapt should remain the central priority.

## **8.4 Further research**

This exploratory study represents the beginning of what could be a larger field of research. Although direct financing models for EbA involving the private sector are nascent and rare, a number of questions that emerged during the development of the thesis could constitute legitimate areas for further research. To begin with, investigating different financing models, which are perhaps based on different ecosystems and sectors of the economy would help complement the findings of this study. From the perspective of private actors, research could focus on the potential for valuation and integration of the eventual adaptation benefits harnessed through their involvement with regards to the climate risks they face.

From the perspective of the beneficiaries, research on the implications of these financing models on local communities as well as motivations for involvement and issues they may face would be necessary. As previously mentioned, further research on the socio-economic consequences of the initiatives for local communities is needed. For instance, this could focus on the actual costs and benefits of their involvement, especially when their livelihood patterns are modified by the adoption of new knowledge relating to EbA. Possible methods for doing so include vulnerability assessments and evaluation of the adaptation benefits over time. Furthermore, research on relevant policy frameworks could provide crucial insights into ways to further the mainstreaming of EbA into national contexts as a way to support private sector involvement. Finally, research on the definition of the meaning of effectiveness and evaluation in the context of these financing models will also be crucial in the future. While time is of essence in the fight against climate change and the inherent uncertainty that characterise adaptation is an undeniable challenge, effective decision-making needs to build upon adequate research and greater collaboration among all societal actors.

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## Appendix I – List of personal communications

Semi-structured interviews for Microfinance for Ecosystem-based Adaptation Peru and Colombia							
	Interviewee	Position	Organisation	Role	Location	Means	Date
1	Jacinto Buenfil	Project Manager	UNEP Regional Office for Latin America and the Caribbean	Implementing organisation	Panama city, Panama	Skype	August 21, 2015
	Christoph Jungfleisch	Senior Project Manager & Project Director	Frankfurt School-UNEP Centre	Implementing organisation	Frankfurt Germany	Skype	
Semi-structured interviews for Microfinance for Ecosystem-based Adaptation Cambodia							
	Interviewee	Position	Organisation	Role	Location	Means	Date
2	Lim Aun	Deputy Chief Executive Officer	Sathapana Limited	Private actor - Microfinance Institution	Phnom Penh, Cambodia	In person	July 22, 2015
	Neav Sokun	Head of Credit				In person	
3	Dok Luon	Chief Executive Officer	Village Development Association (VDA)	Private actor - Microfinance Institution (Rural Credit Operator)	Phnom Penh, Cambodia	In person	July 24, 2015
4	Soung Engchhay	Chief Operational Officer	KREDIT	Private actor - Microfinance Institution	Phnom Penh, Cambodia	In Person	July 27, 2015
5	Bonida Vann	Social Performance Management Director	Hattha Kaksekar Limited (HKL)	Private actor - Microfinance Institution	Phnom Penh, Cambodia	In person	July 27, 2015
	Ly Siven	Credit Director				In person	
6	Ear Techkung	Project Manager Client Protection Initiative	Cambodian Microfinance Association	Other stakeholder	Phnom Penh, Cambodia	In person	July 23, 2015
7	Glenn André	Project Manager	French Development Agency – Agence Française de Développement (AFD)	Other stakeholder	Phnom Penh, Cambodia	In person	August 14, 2015
8	Dara Rat Moni Ung	Policy Advisor Agriculture Portfolio, Environment and Energy Cluster & National Adaptation Programme of Action	UNDP & Ministry of Agriculture and Fisheries	Other stakeholder	Phnom Penh, Cambodia	In person	July 27, 2015

<b><i>Semi-structured interviews for Supply Chain Approach for Ecosystem-based Adaptation Vietnam</i></b>							
	<b>Interviewee</b>	<b>Position</b>	<b>Organisation</b>	<b>Role</b>	<b>Location</b>	<b>Means</b>	<b>Date</b>
9	Thuy Thi Bich Nguyen	Mangroves and Markets Project Manager	SNV Netherlands Development Organisation	Implementing organisation	Hô Chi Minh City, Vietnam	In person	August 5, 2015
	Huynh Le Dinh	Mangroves and Markets Project Field Coordinator			Ca Mau City, Vietnam	In person	
10	Nguyen Van Phong	Organic Shrimp Production Manager	Minh Phu Corporation	Private actor - Shrimp processing and exporting company	Ca Mau City, Vietnam	In person, with interpreter	August 5, 2015
<b><i>Semi-structured interviews for Supply Chain Approach for Ecosystem-based Adaptation Thailand</i></b>							
	<b>Interviewee</b>	<b>Position</b>	<b>Organisation</b>	<b>Role</b>	<b>Location</b>	<b>Means</b>	<b>Date</b>
11	Angela Jöhl Cadena	Programme Officer	International Union for Conservation of Nature (IUCN)	Implementing organisation	Bangkok, Thailand	In person	July 31, 2015
12	Sean Panton	Corporate Social Responsibility Director	JW Marriott Phuket Resort & Spa	Private actor - Hospitality company	Phuket, Thailand	Phone call	August 18, 2015

<b><i>Other personal communications Academic and practitioners experts</i></b>						
	<b>Name</b>	<b>Position</b>	<b>Organisation</b>	<b>Location</b>	<b>Means</b>	<b>Date</b>
1	Men Prachvuthy	Department of Community Development & Faculty of Development Studies	Royal University of Phnom Penh	Phnom Penh, Cambodia	Skype	September 11, 2015
2	Guoqin Wang	EbA South-South Project Manager	UNEP-IEMP	Beijing, China	In person	Various dates in June and July 2015
3	Silvia Cazzetta	EbA Specialist and Communication manager	UNEP-IEMP	Beijing, China	In person	Various dates in March and June 2015
4	Angela Lentisco	Consultant Ecosystem Approach applied to Coastal Ecosystems	UNEP Regional Office for Asia and the Pacific	Bangkok, Thailand	In person	July 30, 2015
5	Jake Brunner	Project Manager	SNV Netherlands Development Organisation	Hô Chi Minh City, Vietnam	Email	August 15, 2015



<b>Other personal communications</b>						
<b>Discussants (workshop)</b>						
	<b>Name</b>	<b>Position</b>	<b>Organisation</b>	<b>Location</b>	<b>Means</b>	<b>Date</b>
6	Meng Monyrak	-	Ministry of Environment of the Royal Government of Cambodia	Phnom Penh, Cambodia	In person	June 25, 2015
7	Linxiu Zhang	Manager & Programme Coordinator	UNEP-IEMP	Beijing, China	In person	June 26, 2015
8	Kommadam Lamphanh	-	Ministry of Environment and Natural Resources of Lao PDR	Vientiane, Lao PDR	In person	June 25, 2015
<b>Interpreter</b>						
	<b>Name</b>	<b>Position</b>	<b>Organisation</b>	<b>Location</b>	<b>Means</b>	<b>Date</b>
9	Nhut Truong	Freelance Interpreter	-	Hô Chi Minh City, Vietnam	In person	August 5, 2015

### ***Workshop attended***

**25<sup>th</sup> - 26<sup>th</sup> June 2015:** South-South Capacity Building for Ecosystems Management Greater Mekong Subregion (GMS) Project Inception Workshop

**Location:** Dongying, Shandong Province, China. Organised by UNEP-IEMP

#### **Programme (main components):**

- ❖ Presentation on the “Landscape Approach”/Ecosystem Management of Productive Landscape
- ❖ Presentations of Ecosystem Management activities in the six GMS countries
- ❖ Presentations of research findings from ICRAF China and the Institute of Geographic Sciences and Natural Resources Research (IGSNRR) of the Chinese Academy of Sciences.
- ❖ Stakeholders and Partners dialogue

#### **Participants:**

- ❖ Cambodia: Mr. Meng Monyrak
- ❖ Lao PDR: Mr. Kommadam Lamphanh
- ❖ Myanmar: Ms. Nyein Nyein Khine
- ❖ Thailand: Mr. Jaiselthum Jeerawat
- ❖ Vietnam: Ms. Phan Binh Minh
- ❖ Mekong River Commission: Mr. Prachvuthy Men
- ❖ UNEP – Division of Environmental Policy Implementation: Mr. Eduardo Zandri and Mr. Nauman Haque
- ❖ Ministry of Environmental Protection of China/China ASEAN Environment Cooperation Center: Dr. Li Xia
- ❖ ICRAF: Prof. Xu JianChu
- ❖ IGSNRR: Prof. Jiang LuGuanq
- ❖ IGSNRR: Prof. Huang HeQing
- ❖ IGSNRR: Prof. Liu Gao Huan
- ❖ UNEP-IEMP: Dr. Liu Jian, Linxiu Zhang, and Dr. Loo MinJet

## Appendix II – Interview guide template (private sector)

Certain sections of this interview guide template are differentiated based on whether private sector actors are involved in a direct financing model or not involved (indicated in brackets)

### **The respondent & the company**

How long have you been working in [Name of the company/MFIs]?

What are you responsible for?

What is the vision of [Name of the company/MFIs]?

### **The industry/sector**

Can you tell me a little bit about the industry/sector in [Country name]?

What kind of changes has been happening in the industry/sector?

Has the portfolio of [Name of the company/MFIs] changed? If yes, how?

### **The organisation & sustainability**

How is sustainability incorporated in [Name of the company/MFIs] activities?

How has it evolved over time?

What (other) collaborations/projects on sustainability is [Name of the company/MFIs] involved in?

How is the decision process regarding sustainability related activities?

### **Climate change**

Is climate change perceived as a risk for your organisation?

Is climate change perceived as a risk for your clients?

Have you been involved in discussion about climate change risks?

If yes: Through what means? What platforms or initiatives exist for business to be informed about climate change in [Country name]?

### **EbA (private actors involved)**

Had you ever heard about Ecosystem-based Adaptation before the project?

Did you get training on Ecosystem-based Adaptation?

Do you think the concept is easy to understand?

### **EbA (private actors not involved)**

Have you ever heard about Ecosystem-based Adaptation?

If yes, in which context?

If not, provide the interviewee with background

*“EbA is a nature-based solution for adaptation to climate change, it includes activities such as sustainable management or restoration of ecosystems with the objective of helping people adapt to the impacts of climate change. For example, shifting towards agriculture practices that are more*

*sustainable and help ecosystems remain healthy. That way people and ecosystems' resilience to climate change impacts is increased"*

**Motivational factors (private actor not involved)**

Do you think it is something [MFI name] would be interested in offering to its clients?

What aspects sound most interesting/attractive in such project/products?

Do you think such products/project would fit well with the vision of [MFI name]?

Would you see it as a business opportunity? If yes, why? If no, why not?

Do you think it is/or will be the role of MFIs to provide products like that in the future?

**Motivational factors (private actor involved)**

What led [Name of the company/MFIs] to take part in the project?

What aspects sounded most interesting/attractive in EbA?

What did [Name of the company/MFIs] expect from it?

What benefits do you see in Ecosystem-based Adaptation?

Do you market the initiative or use it as a way to differentiate yourself from your competitors?

Do your clients inquire about sustainability, climate change or ecosystems?

Do you think it is/or will be the role of companies in industry to participate in such project?

**Enabling factors (private actor involved)**

What factors were necessary for you or helped you to take part in this project?

What has caused issues?

Is cost an issue?

Is the government supportive of such initiatives?

Are there any laws or regulation that were an issue in this context?

What could motivate your organisation to pursue this further over time or get involved in other similar projects?

**Enabling factors (private actor not involved)**

What would help you engage in EbA?

What issue do you foresee in getting involved in an EbA project or offering related products?

How is the decision process regarding such projects/initiatives?

For large MFIs: Do you have a part of research budget allocated for S&E (in Cambodia it is called Social and Environment department)?

Would this kind of project be funded by that budget?

Is the government supportive of such initiatives?

Are there any laws or regulation that could be an issue in this context?

## **Appendix III – Interview questions template (project managers)**

### **Background**

What is the role of IUCN in this project?

What are the expected outcomes?

### **EbA**

What are the advantages of the approach?

Is EbA easy to grasp for private actors?

### **Private sector involvement**

Has it been difficult to find a company willing to take part in the project?

How do you see the role of private sector in EbA?

Do you see potential for further private sector involvement in EbA?

### **Motivational factors**

How is the level of awareness with regards to climate risks?

How is the level of awareness with regards to adaptation?

What benefits [Name of the company/MFIs] perceive in EbA?

What does [Name of the company/MFIs] expect from the project?

### **Enabling factors**

What are the key factors necessary for successful collaboration?

Is government support important for private sector involvement?

### **Hindrances/Issues**

What has caused an issue?

Is community involvement difficult?

Is cost an issue?

What are the main barriers for private sector involvement?

What has been particularly successful?

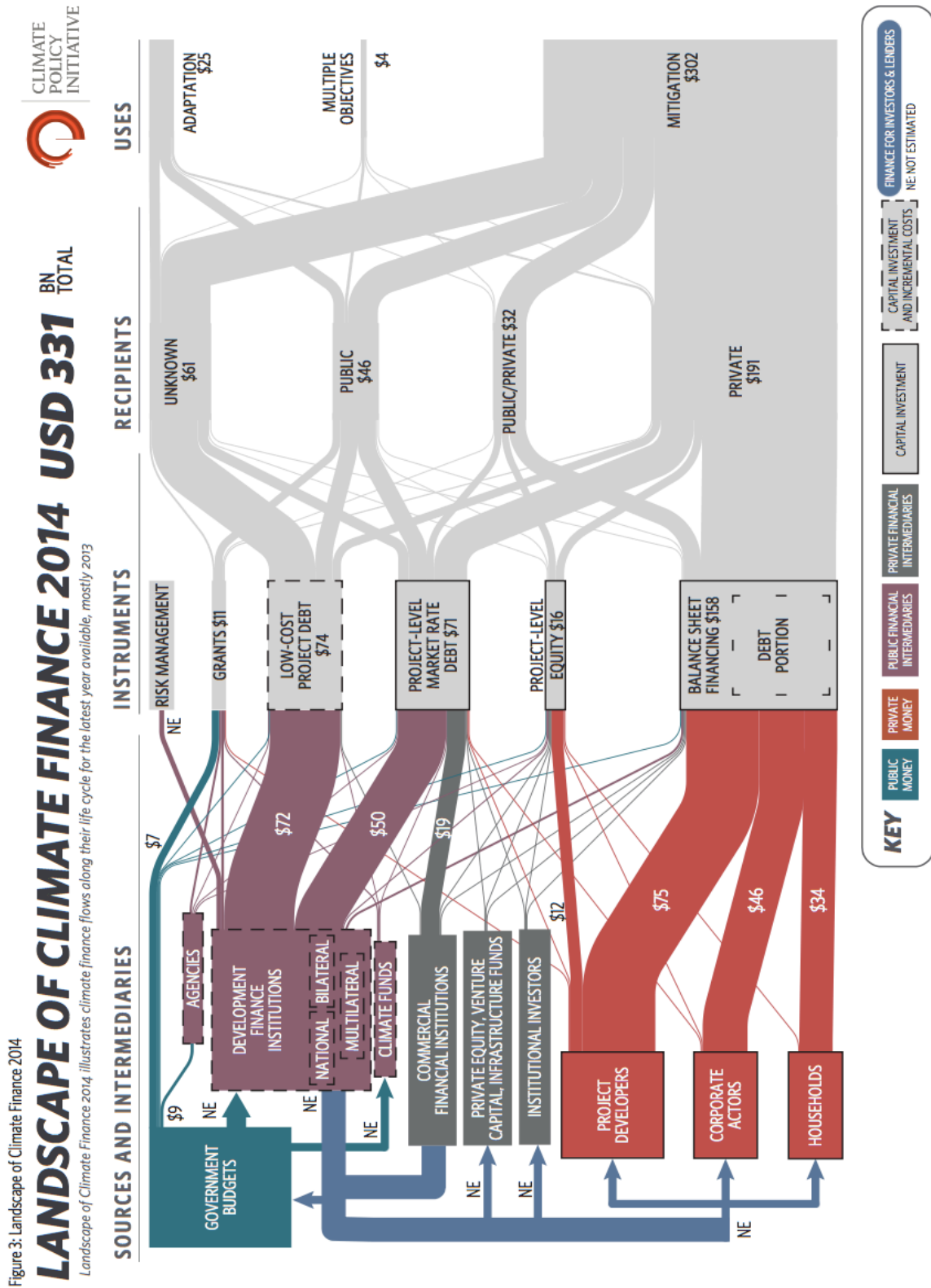
What has been particularly challenging?

### **The regulatory framework around EbA**

What laws and regulations are supporting EbA?

What is the stance of the government towards the project?

## Appendix IV – The landscape of climate finance 2014



Source: Climate Policy Initiative (2014b)

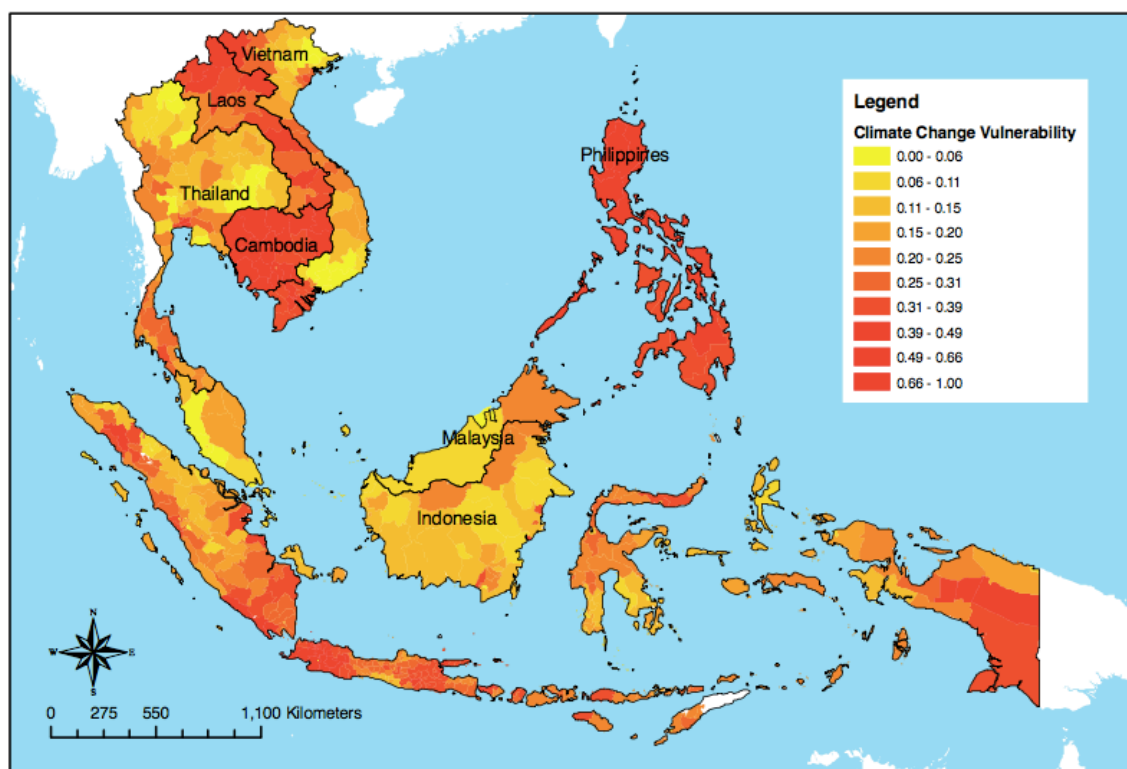
## Appendix V – Risks of climate change for key development sectors

Table 1. Risks of climate change for key development sectors.

Sector	Direct effects/risks	Indirect effects/risks
Agriculture, food and beverage	<ul style="list-style-type: none"> <li>• Higher temperatures, drought, flooding reduce production</li> <li>• Food processing effects due to temperature and water availability</li> <li>• Food safety issues</li> </ul>	<ul style="list-style-type: none"> <li>• Volatile commodity prices</li> <li>• Competing demands for water</li> <li>• Community conflicts</li> <li>• Interference with transport in and out</li> </ul>
Hydropower and steam turbines	<ul style="list-style-type: none"> <li>• Water availability</li> <li>• Cooling water</li> <li>• Thermal efficiency</li> <li>• Flooding of reservoirs</li> <li>• Accelerated evaporation</li> </ul>	<ul style="list-style-type: none"> <li>• Competing demands for water</li> <li>• Increased demand</li> <li>• Lower reliability reduces power value</li> </ul>
Ports and shipping	<ul style="list-style-type: none"> <li>• Sea level rise, coastal flooding</li> <li>• Increased storm intensity</li> <li>• Berthing difficulties</li> <li>• Low water restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• Primary goods disrupted by climate (e.g. crops)</li> <li>• Access disrupted (e.g. roads flooded)</li> <li>• Polar melting creates competitive routes</li> <li>• Increase insurance cost</li> </ul>
Mining	<ul style="list-style-type: none"> <li>• Water availability</li> <li>• Flooding</li> <li>• Tailing pond ruptures</li> </ul>	<ul style="list-style-type: none"> <li>• Power restrictions lead to reduced production</li> <li>• Warm winter melting restricts transport</li> <li>• Shipping restrictions</li> <li>• Community conflicts</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>• Hurricanes and tropical storm disruptions</li> <li>• Sea level rise effects on coastal locations</li> </ul>	<ul style="list-style-type: none"> <li>• Travel disruptions</li> <li>• Perceived risk</li> <li>• Water availability</li> <li>• Change in seasonality</li> </ul>
Disaster preparedness	<ul style="list-style-type: none"> <li>• More frequent extreme weather events</li> </ul>	<ul style="list-style-type: none"> <li>• More severe development effect</li> <li>• Increase in recovery time</li> </ul>

Source: Biagini & Miller (2013)

## Appendix VI – Climate change vulnerability map & climate hazards hotspots of Southeast Asia



Climate hazard hotspots	Dominant hazards
Northwestern Vietnam	Droughts
Eastern coastal areas of Vietnam	Cyclones, droughts
Mekong region of Vietnam	Sea level rise
Bangkok and its surrounding area in Thailand	Sea level rise, floods
Southern regions of Thailand	Droughts, floods
The Philippines	Cyclones, landslides, floods, droughts
Sabah state in Malaysia	Droughts
Western and eastern area of Java Island, Indonesia	Droughts, floods, landslides, sea level rise

*Source: Yusuf & Francisco (2009)*

## Appendix VII – Matrix of factors

MEbA				SCA for EbA			
Colombia and Peru		Cambodia		Vietnam		Thailand	
Motivational factors	Enabling factors	Motivational factors	Enabling factors	Motivational factors	Enabling factors	Motivational factors	Enabling factors
Climate change impacts on clients' activities	Top management commitment	Fits in the vision and portfolio	Good understanding of the agriculture sector and its difficulties	Good quality certified shrimp that can be sold at higher price	Sustainability awareness	CSR Director's commitment	Zoning & access to suitable areas for the project
Increase farmers resilience & their own preparedness	Training and technical assistance from UNEP & Frankfurt School	Climate change is a risk for their activity & their clients	Sustainability awareness	Support farmers	Climate change awareness	Climate change is a risk for their activity	Stable supply
Reduce portfolio risks	Climate Change policies in the country	Reduce risks of late or defaulted payments	Requirements on environment and social aspects from investors	Raise awareness	Training	Understanding of the need for coastal resilience	Suitable pricing
Aligned with vision and mission	Third parties supporting MFIs capacity development	Increase agricultural productivity, contribute to society, help families	Experience in working with local communities	Potential for expansion of customers base due to rising demand from international clients for organic shrimps	Presence of SNV	CSR branding and image benefits	Integration of sustainable seafood in the CSR policies of the group
Expand their offer to peri-urban and rural populations	Presence of sustainability in vision and mission		Government support	Climate change risks	Suitable cost/benefit ratio	Supporting local communities - Licence to operate	Government support
			Presence of NGO or development agency		No regulation issue		Training
			Climate change awareness		Government support		Certification
			Training - knowledge		Certification		Top management commitment
			Funding		Already existing legal basis for pES		Support of IUCN
			Public awareness		Market prospects		
			No regulation that represents an issue nor a support				
Legend							
	Climate change risks		Stakeholders' requirements				
	Business opportunities		Market factors			Knowledge & resources Government support and policy frameworks	
	Societal contribution		Sustainability awareness & integration in the organisation				