

A Challenge for Development or Challenging Development

Ecosystem-based Adaptation to Climate Change in the Hindu Kush Himalayas

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Abstract

Mountains provide a variety of ecosystem services, such as drinking water, which sustains not only mountain communities but also people living further downstream. While climate change threatens most ecosystems, its negative impacts are up to three times greater in high altitudes. As well as changing the water cycle this further accelerates climate change. Although they contribute comparably little to climate change, developing countries are most vulnerable to its negative impacts and in need of adaptation. Ecosystem-based adaptation (EbA) to climate change is promising due to its low implementation costs, climate robustness and sustainability. The aim of this thesis is to investigate the suitability of mainstreaming EbA into current development practices. Thus, this paper researches the success factors and challenges of EbA with a specific focus on the role of participation. Subsequently, the research findings are analysed for their suitability with the current development paradigm. The paper uses a triangulation of research methods, including a policy and literature review, interviews with project facilitators, and field observation. The results of the field research, studying an EbA project in the mid-hills of Nepal, show that EbA has numerous success factors but also poses challenges. Connecting EbA measures to livelihood improvement and providing immediate economic benefits was the main success factor as well as challenge, followed by the need to provide community trainings and to reach a common understanding of the approach. A key challenge is that EbA requires a cross-regional approach as political boundaries differ from ecosystem boundaries. Furthermore, EbA requires community participation, considering the five to 10 year period required for results to show in contrast to the mostly shorter project periods. While EbA scholars aim to mainstream the approach, current development practices and EbA have shown to mismatch on temporal and spatial scales, and to conflict on the requirement for participation. The inherent uncertainty in climate change predictions adds complexity to mainstreaming the approach. Therefore, this thesis suggests there is a need for a shift in perspective towards a view of development that encourages individual capabilities to adapt to climate change. Sen's capabilities approach has been applied to illustrate that an alternative perspective on development work could maximize the potential of EbA; freeing the approach from constantly justifying its effectiveness in terms of economic growth and allowing development to be as dynamic as required by the changing environment.

Keywords: climate change, ecosystem-based adaptation, participation, capabilities approach, development assistance

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List of Abbreviations

CbA	Community-based Adaptation
CBD	Convention on Biological Diversity
DDCs	District Development Committees
EbA	Ecosystem-based Adaptation
GoN	Government of Nepal
HKH	Hindu Kush Himalayas
ICIMOD	International Centre for Integrated Mountain Development
IPCC	International Panel on Climate Change
IUCN	International Union for Conservation of Nature
LAPA	Local Adaptation Programme of Action
MDGs	Millennium Development Goals
MDO	Machhapuchhre Development Organisation
NAPA	National Adaptation Programme of Action
NTFP	Non-Timber Forest Products
OSCE	Organization for Security and Co-operation in Europe
SDGs	Sustainable Development Goals
TIM	The Mountain Institute
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VDCs	Village Development Committees

1 Introduction

Anthropogenic climate change impacts are increasing exponentially and adaptation to its negative impacts is becoming imperative (Adger, Huq, Brown, Conway, & Hulme, 2003; IPCC, 2014b). Developing countries, in particular, are threatened by climate change due to their vulnerability and hence in need for adaptation measures (Adger et al., 2003). Mountain ecosystems are among the most vulnerable to climate change, as climate change impacts are up to three times greater in higher altitudes (Beniston et al., 1996; UNESCO, 2013; Xu et al., 2009). Additionally, many people are directly or indirectly dependent on mountains, as they provide us with freshwater, regulate our climate, and are home to more than 10% of the earth's population (Kohler et al., 2010). Nepal, an entirely mountainous country, is ranked as the fourth-most vulnerable country to climate change impacts, while its emissions account for less than 0,1% (Maplecroft, 2011). Mountain communities in Nepal are already experiencing decreased agricultural outputs due to climate change induced reduction in water availability (Karki & Gurung, 2012). In a development setting where communities directly depend on the natural resources in their environment, climate change directly threatens their livelihood (Adger et al., 2003). UNFCCC has recognized the challenge of climate change adaptation and, within the framework of adaptation efforts, the concept of ecosystem-based adaptation (EbA) has gained popularity (Munang, Liu, & Thiaw, 2009). EbA enables flexible climate change adaptation through preserving our complex and unique ecosystems and their services, which require location specific measures (Munang, Thiaw, Alverson, Mumba, et al., 2013). While there is no blueprint for EbA, adaptation tailored to a specific area provides climate robust, sustainable, and long-term adaptation (Uy & Shaw, 2012). EbA, as a sister approach to community-based adaptation (CbA), has participation at its core (Reid, 2016). While current development is concerned with participatory approaches to enhance effectiveness and efficiency (Chong, 2014), EbA requires a participation to not only ensure effectiveness and efficiency but also sustainability (ICIMOD, 2015; IFRC, 2009; UNDP, 2012).

1.1 Research Problem and Research Gap

I have identified three related research gaps I address in this thesis. Firstly, while there has been a shift from a mitigation focus to adaptation (Paavola & Adger, 2006), mitigation globally still receives more than 93% of the financial resources targeted to combat climate change (Buchner, Falconer, Hervé-Mignucci, & Trabacchi, 2013). Currently, adaptation is primarily concerned with low altitude countries (Gasper, Portocarrero, & St.Clair, 2013). However, it is equally important that research focuses on mountain ecosystems, as we are all directly or indirectly dependent on them (Kohler et al., 2010). Mountains provide drinking water for downstream communities and regulate water

availability as well as climate patterns (Kohler et al., 2010; UNESCO, 2013; Xu et al., 2009). Secondly, the concept of EbA has gained popularity in the past decade and is often applied by international organisations. Nevertheless, there is still much confusion around the approach and little research has been done on its effectiveness (Doswald et al., 2014). Due to this high level of uncertainty, policy makers and development organisations have avoided using the approach (Doswald et al., 2014). Thirdly, there has been little research on the linkage between EbA and development. While both are extensively discussed there is little research on how or if they fit together (Schipper, 2009). The discussion on the level of necessary community participation, in adaptation and development, heightens the importance of this question (Chong, 2014).

1.2 Research Aim and Research Questions

The aim of this thesis is to investigate if EbA is suitable to be mainstreamed into development strategies. In order to understand EbA in a particular context, I analysed the success factors and challenges for EbA in a case study in Nepal. As EbA stresses the importance of a bottom-up approach, I also focused on the relevance of participation. The following research questions will guide the thesis:

RQ 1: What are the success factors and challenges for ecosystem-based adaptation?

RQ 2: How and why is participation in ecosystem-based adaptation relevant?

RQ 3: Is ecosystem-based adaptation a challenge for or challenging the current perspective on development?

RQ 4: Could an alternative perspective on development be more suitable for ecosystem-based adaptation?

1.3 Thesis rationale

In this thesis, I take for granted that anthropogenic climate change is already threatening our livelihood and adaptation is therefore necessary. Hereby, I chose to focus on adaptation measures as (1) adaptation despite the best mitigation targets is and becomes more necessary, and (2) developing countries contribute comparably little to climate change while facing the most severe consequences (Smith & Pilifosova, 2001). When referring to development in this thesis, I understand development, as discussed by Sen (1999), as sustainable development that improves the qualities of an individual's life without harming someone else's opportunity to increase their qualities of life now or in the future.

1.4 Thesis outline

My thesis is structured in six sections. I begin with an introduction on the topic, the research questions, and the thesis rationale. The second section presents background information on climate change and EbA, and an overview of the case study area. The theoretical entry points and the conceptual framework in section three are concerned with an alternative perspective on development and the concepts of resilience, and participation. My methodological approach is presented in section four. Chapter five outlines my research findings and chapter six discusses these findings. In section seven, I draw a conclusion on my research.

2 Climate change and ecosystem-based adaptation

2.1 Climate change adaptation

When discussing climate change adaptation, Adger, Arnell, and Tompkins (2005) highlight the importance of defining who has to adapt to what, why and how. Developing countries in particular need to adapt because, as Adger et al. (2003) writes, they are disproportionately affected and they have the least capabilities, which brings new challenges to development work. Climate science identifies local climate change impacts and informs the design of adaptation measures (Adger et al., 2003). Understanding climate change impacts on a local scale enables a community to target their adaptation efforts and consequently maximise their resilience (Uy & Shaw, 2012). However, adaptation needs to take place across scales (Adger et al., 2003). Climate change adaptation is therefore being mainstreamed into existing development strategies, such as natural resource management or resilience (Janssen & Ostrom, 2006).

While the term adaptation has its roots in evolutionary biology, in an environmental context adaptation refers to “the process of adjustment to actual or expected climate and its effects” (IPCC, 2014, p 5). Adaptation simultaneously avoids negative impacts and exploits opportunities (IPCC, 2014a). All societies are sensitive to a changing climate; however, certain societies or sectors are more vulnerable to its negative impacts (Adger et al., 2003). Vulnerability is “[t]he propensity or predisposition to be adversely affected” depending on the sensitivity of a system and its adaptive capacity (IPCC, 2014: p 5). Adaptive capacity is defined as the “ability or capacity of a system to modify or change its characteristics or behaviour so as to cope better with existing or anticipated external stresses” (Brooks, 2003, p. 8). Adaptive capacity requires resources, access to these resources (Kelly & Adger, 1999) and capabilities to use these resources (Sen, 1999).

Even though there is a high consensus among scientists that climate change impacts our environment and creates a need for adaptation, there is high level of uncertainty about what these

impacts will be (Adger et al., 2003). Considerable efforts are currently being put towards quantifying uncertainty in order to increase the success of adaptation efforts (Adger et al., 2003). Apart from the difficulty in quantifying climate change impacts, additional factors, such as population growth, the development and access to new technologies, and social factors further increase uncertainty (Adger et al., 2003). This creates the danger that the focus lies on existing problems with little effort devoted to adapting to projected changes (Smit & Wandel, 2006).

In the past, human systems have successfully adapted to various changes, primarily by migrating to more suitable landscapes. Current changes, however, are occurring on a scale that has not been experienced before (Adger et al., 2003). Therefore, Adger et al. (2003) question the feasibility of migration, since climate change can cause abrupt transformations that do not give a system enough time to adapt (Brooks, 2003). Smith & Pilifosova (2001) doubt that societies today will be capable of autonomously adapting, due to the magnitude and speed of change; therefore, they highlight the need for international support. While in the past, there has been a focus on mitigation (Paavola & Adger, 2006), since adaptation was first named in the 2001 climate negotiations, it has gained importance as a concept (Adger et al., 2003). Despite the consensus on the need for adaptation, the opinions vary on how we best adapt. EbA strategies have gained importance (Munang et al., 2009) as a climate change adaptation strategy because of how EbA combines leading scientific and indigenous knowledge (Andrade et al., 2011).

2.1.1 Ecosystem-based adaptation

With climate change severely affecting ecosystems, increasing these ecosystems resilience and adaptive capacity is crucial (Munang, Thiaw, Alverson, Mumba, et al., 2013). The use of ecosystem-based management is relatively new as an adaptation strategy to climate change (Uy & Shaw, 2012). Healthy ecosystems have, however, proven to be more effective and less expensive in climate change adaptation (Chong, 2014; Colls, Ash, & Ikkala, 2009). A commonly agreed upon definition of EbA is absent. The most frequently used definition is by the Convention on Biological Diversity (CBD, 2009) defining EbA as the “[...] use of biodiversity and ecosystem services to help people adapt to the adverse impacts of climate change” (p. 41). CBD (2009) further specifies: “[e]cosystem-based adaptation uses the range of opportunities for the sustainable management, conservation, and restoration of ecosystems to provide services that enable people to adapt to the impacts of climate change. It aims to maintain and increase the resilience and reduce the vulnerability of ecosystems and people in the face of the adverse effects of climate change” (p. 41).

The EbA approach, based upon the framework of ecosystem services, preserves nature to ensure its benefits in the form of regulating, supporting, provisioning, and cultural services (MEA, 2005). Intact ecosystems cope better with stress and adapt faster (Munang, Thiaw, Alverson,

Mumba, et al., 2013). Through EbA, the services of an ecosystem are ensured and resources are managed efficiently which contributes to food security, poverty alleviation, and to an increase in livelihood (Munang, Thiaw, Alverson, Mumba, et al., 2013). In this context, it is essential to ensure that ecosystems maintain their ability to provide these services upon which we critically depend (Munang, Thiaw, Alverson, Mumba, et al., 2013). Chong (2014, p.393) states that, “EbA, as an extension of the ecosystem services framework, similarly has the potential to inspire efforts to confront the impacts of climate change and acknowledge the importance of nature to supporting societal adaptation.” EbA initiatives also have the potential to mitigate climate change, by protecting the carbon sequestration capacity of natural ecosystems (Munang, Thiaw, Alverson, Mumba, et al., 2013; Uy & Shaw, 2012).

Similarly, Disaster Risk Reduction (DRR) strategies are highly dependent on the regulating functions of ecosystems, which makes EbA a beneficial approach to reduce natural hazards and to increase environmental and societal resilience (UNISDR, 2011). Climate change impacts lead to the degradation of an ecosystem and therefore can increase the frequency of natural disasters as well as the vulnerability of local communities, thus resulting in higher disaster impacts (Munang, Thiaw, Alverson, Liu, & Han, 2013). The international strategy for DRR (UNISDR, 2011) identifies declining ecosystems and climate change as drivers for disasters.

EbA has participatory methods at its core, as its success depends on the involvement of the community and their willingness to continue the activities after the projects lifecycle (Shaw & Tran, 2012). EbA often forms a complementary approach to more traditional CbA (Munang, Thiaw, Alverson, Mumba, et al., 2013). Reid (2016) describes EbA and CbA as sister approaches and, in fact, a literature review conducted by Doswald et al. (2014) found that all EbA approaches were concerned with stakeholder involvement and more than 60% were combined with CbA.

2.1.2 Climate Change in Mountain Ecosystems

Mountain ecosystems are particularly threatened by climate change, as they are disproportionately vulnerable to global warming (Beniston et al., 1996). Mountain ecosystems are hyper sensitive to climate alterations (Beniston et al., 1996), and species migration possibilities are limited, as the ecosystem is unique (Beniston et al., 1996). Climate change effects, such as temperature increases, can triple in high altitudes (UNESCO, 2013). It is expected that these effects in mountainous areas will subsequently cause changes in temperatures, water availability, and extreme weather events at lower altitudes (Kohler et al., 2010; UNESCO, 2013).

The implementation of adaptation strategies in mountain ecosystems is essential for a variety of reasons (Kohler et al., 2010; UNESCO, 2013). Firstly, we are highly dependent on mountain ecosystems due to their ability to store water and counter water deficits (Kohler et al., 2010;

UNESCO, 2013). Secondly, the loss of permafrost and the melting of glaciers will further accelerate global warming as mountains lose their ability to regulate climate patterns (Kohler et al., 2010; UNESCO, 2013). Thirdly, mountain ecosystems can serve as a mirror into the future, foreshadowing future impacts on lower level regions (Kohler et al., 2010).

The Hindu Kush Himalaya (HKH) region, stretching from Afghanistan in the west to Myanmar in the east, is home to and the source of livelihood for 210 million people. The region also provides fresh water resources for more than 1.3 billion people living further downstream (ICIMOD, 2015). A literature review conducted by Xu et al. (2009) links eight transformations in the Himalayan region to climate change. Mountain regions experience (1) a temperature increase due to climate change that is up to three times greater than on lower levels. (2) Glaciers, ice, and snow cover are decreasing and subsequently, (3) water runoffs have expanded rivers, which has led to (4) water-related hazards such as flooding. While in the short-term, glacier and snow cover melting result in increased water availability, in the long run, water shortages will occur. Additionally, (5) changes in plant phenology due to their dependency on seasonable resources are expected. Also, (6) a significant decline in biodiversity is projected and (7) a shift of the treeline. Lastly, (8) a transformation of ecosystem compositions is predicted. These changes in the HKH will have cascading effects. Xu et al. (2009) expect a change in water availability for the lower altitude areas, related not only to the amount of water but also its seasonable availability.

2.2 Description of the Case Study Area

2.2.1 Nepal

Nepal is a landlocked country that borders China in the North, and India in the South, West, and East. It has a total area of 147,181 Sq. Km. and belongs to the HKH region (GoN, 2013). With a GDP of US \$701 per capita as of 2013, Nepal is one of the least developed countries in the world (World Bank, 2016). 83% of the 26.4 million inhabitants live in rural areas and 25% live below the poverty line (GoN, 2013). In contrast, Nepal is one of the richest countries in terms of cultural, ethnic, and environmental diversity, with over one hundred different languages spoken and 59 indigenous nationalities recognized (Lewis, Simons, & Fennig, 2015). The Government of Nepal (2013) divides the country into three different geographic regions, the Mountains, the Hills, and the Terai, which each stretch from east to west. The mountain region, ranging in altitude from 4'877 meters to 8'848 meters above sea level is the least populated area and home to only 6,73% of the total population (GoN, 2013). The Hill region, beginning at 620 meters above sea level, contains the greatest share of land area and is home to 43,1% of the population (GoN, 2013). The Terai in the south has the most fertile land and thus supports over 50% of the Nepalese population (GoN, 2013).

Changes in temperature and water availability have already had severe impacts on Nepal's agricultural productivity and threatened food security and livelihood (Karki & Gurung, 2012). Temperatures have risen by an annual mean of 0.08°C in the mountainous regions since 1974 (Malla, 2008), which is most likely induced by Climate Change (IPCC, 2013). According the IPCC's Fifth Assessment Report, Asia is likely to face an increase in extreme weather events, higher temperatures, and changes in rain patterns, which will have negative impacts on agricultural productivity (IPCC, 2014a). The agricultural sector is especially sensitive to climate change, which has led to an overall decrease in yields (Nelson et al., 2009). Particularly vulnerable to changes in agricultural output are small-scale farms and subsistence farmers (Karki & Gurung, 2012). In Nepal, 80% of the population are subsistence farmers with limited capacity to adapt to climate change (Karki & Gurung, 2012). Currently, only 60% of Nepal's farmers experience food security all year around with those most at risk living in mountainous areas (Karki & Gurung, 2012).

Nepal has realized this challenge and signed the United Nations Framework Convention on Climate Change (UNFCCC, 1994) in 1994 (GoN, 2011b). Since September 2010, the National Adaptation Programme of Action (NAPA) has been in place (GoN, 2010), which supports least developed countries to adapt to climate change (United Nations Institute for Training and Resources, 2003). Complementary to the NAPA, local adaptation programmes of actions (LAPAs) are currently being developed in Nepal (GoN, 2011b). For diverse countries that have many incomparable ecosystems, LAPAs are essential for specifying adaptation needs and defining region specific actions (United Nations Institute for Training and Resources, 2003). In addition, a national climate change policy has been formulated in 2012, with the aim to uplift livelihoods and foster adaptation and mitigation efforts in line with the NAPA (GoN, 2010).

2.2.2 Panchase Mountain Ecological Region

The study area is the Panchase Mountain Ecological Region situated in the mid hills of Nepal west of Kathmandu (see Figure 1). The 284km² are home to over 60,000 people with altitudes from 1450m to 2580m above sea level. This results in temperatures from sub-tropical to cold and ecosystems that include forest, wetlands, and dry lands (Dixit, Karki, & Shukla, 2015). Due to its high vulnerability to climate impacts, the Panchase area was chosen for the EbA pilot project that took place from 2012 to 2015 (UNDP, 2012). The project was coordinated by the United Nations Environmental Programme (UNEP), and implemented by the United Nations Development Programme (UNDP), the International Union for Conservation of Nature (IUCN) and the Government of Nepal, in collaboration with local NGO's and Tribhuvan University (UNDP, 2012). Local climate change impacts include increased average annual temperatures, more rain during the monsoon period, and less rain during the dry

winter months (Dixit et al., 2015). The start of the monsoon has been delayed by about 10 days since 1977, prolonging the dry period and shifting agricultural calendars (Dixit et al., 2015).

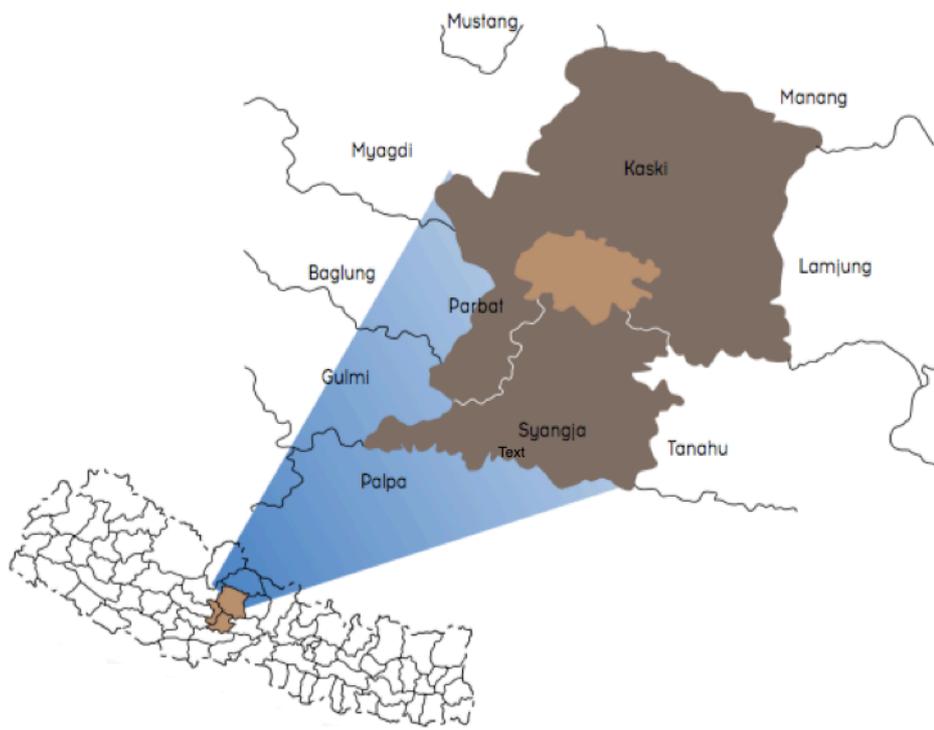


Figure 1: Location of study area within Nepal (Dixit et al., 2015)

The Panchase Mountain Ecological Region includes 17 Village Development Committees (VDCs) in the districts of Kaski, Parbat, and Syangja (see Figure 1 & Figure 2)(Dixit et al., 2015). Nepal's local government structure is formed by 75 District Development Committees (DDCs) and nearly 4000 subordinated VDCs, which are responsible for local development programmes such as infrastructure and livelihoods. The VDCs consist of a chair and vice chairperson as well as nine wards (Inlogos, 2009). The village council functions as supreme authority and is formed by members of the VDC and six nominated people (Inlogos, 2009). The members of a VDC should be elected every five years. Since the 'People's war' (1996 -2006), however, no official local elections have taken place, which has negatively influenced administrative and financial support on a local level (Inlogos, 2009). Nevertheless, the VDCs have been kept in place and still carry out their operations on a voluntary basis (Dixit et al., 2015).

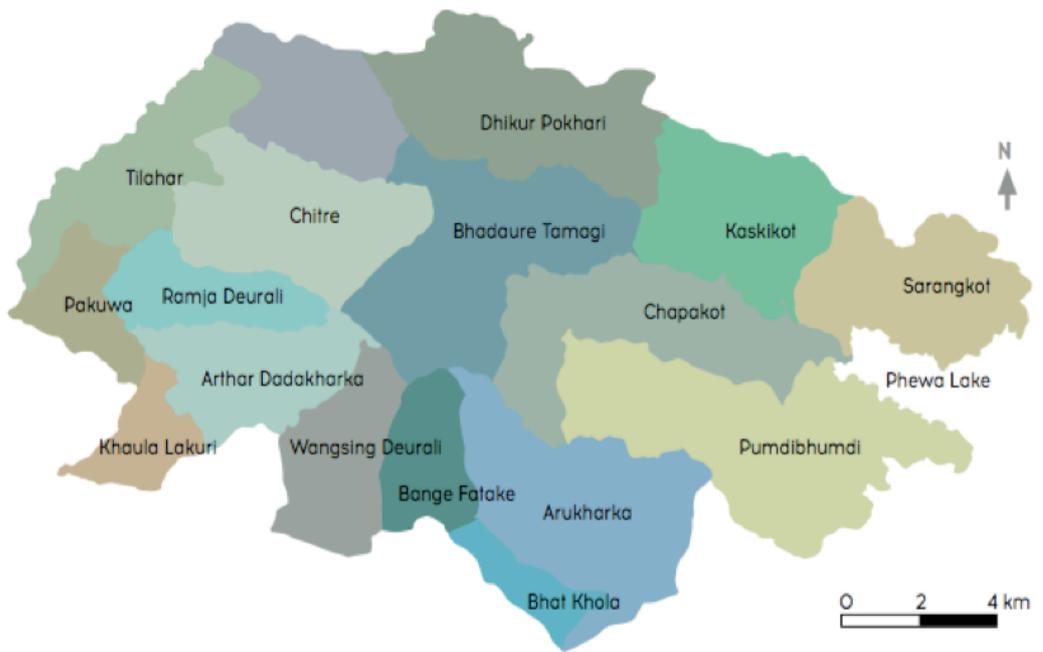


Figure 2: Village Development Committees in the Panchase area (Dixit et al., 2015)

The vulnerability assessment by Dixit et al. (2015) shows that rainfall patterns in the Panchase area are determined by the yearly monsoon in June and July which results in heavy precipitation over a short period of time. A combination of steep slopes and heavy rainfalls makes two thirds of the area prone to landslides. These landslides affect water reservoirs, roads, and agricultural land that 71% of the region's population depends on as their primary source of income. Furthermore, low soil fertility, unequal water distribution and availability year round, and the impacts of climate change have resulted in a relatively high poverty rate of 23,5%. Forty percent of the region's agricultural land has to be irrigated and fresh water availability is especially scarce in the winter months (Dixit et al., 2015).

High rates of male labour migration have caused a feminization in the agricultural sector and further increased vulnerability to a changing climate (Dixit et al., 2015). While young men pursue a career in the gulf states, join the army, or move to the cities in search of employment or education, women remain with significant responsibilities both in the household and on the fields (Dixit et al., 2015).

2.2.3 EbA project description

The activities undertaken within the EbA project included water conservation, soil stabilization, promotion of non-timber forest products (NTFP), and trainings (UNDP, 2014). Thirteen water conservation ponds have been restored or newly constructed (UNDP, 2014). Eighty hectares of open land has been replanted to protect it from soil erosion and walls have been built to protect the plantations and forests from overgrazing (UNDP, 2014). Economic benefits are provided through the

promotion of NTFP, the planting of *Thysanchaena maxima*, better known as broom grass¹, which also contributes to soil stabilization, as well as the establishment of eco-tourism (UNDP, 2014). Trainings were provided for farming, cattle management, and to raise awareness of the benefits of intact ecosystems and the importance of using natural resources sustainably (UNDP, 2014). Moreover, eight students have received grants to conduct research in the Panchase area (UNDP, 2014).

¹ Broom grass is shrub with deep roots that stabilizes the soil. Traditional brooms can be made from broom grass, thus providing environmental and economic benefits.

² I use foreign aid in this thesis as a synonym to development assistance, meaning the financial support given to developing countries

³ Official Development Aid numbers per country are published by OECD (2015)

3 Theoretical and conceptual framework

The EbA approach is concerned with ecological and societal resilience, as well as with vulnerability and adaptive capacity (Uy & Shaw, 2012). Therefore, I will conceptualize the linkages between resilience, vulnerability, and adaptive capacity and provide definitions as these terms are often used in a colloquial manner. Therefore, I will define the use of the terms in this thesis to later connect them to Sen's capabilities approach. I will then frame participation according to Mohan (2014). The levels of participation he describes will help to identify the importance of participation in EbA. Lastly, to understand the linkages between EbA and development assistance, I will introduce Sen's capabilities approach to identify if an alternative perspective on development could be more suitable for EbA.

3.1 Resilience, vulnerability and adaptive capacity

Adaptation to climate change is closely linked to the concepts of resilience, vulnerability, and adaptive capacity (Smit & Wandel, 2006). Resilience originates from various fields connected to environmental science and is now used within several disciplines, because of its adaptability to different contexts (Alexander, 2013). The Stockholm Resilience Centre defines resilience as "the capacity to deal with change and continue to develop" (Folke, 2012, p. 1). Resilience is commonly categorized into social and ecological resilience (Alexander, 2013). Social resilience is defined as, "the ability of human communities to withstand and recover from stresses, such as environmental change or social, economic or political upheaval" and ecological resilience as, "the capacity of a system to both withstand shocks and surprises and to rebuild itself if damaged" (Folke, 2012, p. 1). Pendall, Foster, and Cowell (2010) describe resilience as the ability of a system to constantly adapt to disturbances and develop, and Becker (2014) conceptualizes resilience as a constant process of anticipating, recognizing, adapting, and learning.

While vulnerability and resilience are used at times as opposing concepts and other times interchangeably, the concepts are closely linked (Gallopín, 2006; Smith & Pilifosova, 2001). Adaptive capacity as the ability of a system to cope with stress (Smit & Wandel, 2006) by preparing for a negative event (Lindbom, Tehler, Eriksson, & Aven, 2015) is connected to both resilience and vulnerability (Smit & Wandel, 2006). For this thesis, I will look at resilience from an ecological and societal perspective, where vulnerability, adaptive capacity, and resilience positively and negatively influence each other (Schipper & Pelling, 2006), as illustrated in Figure 3.

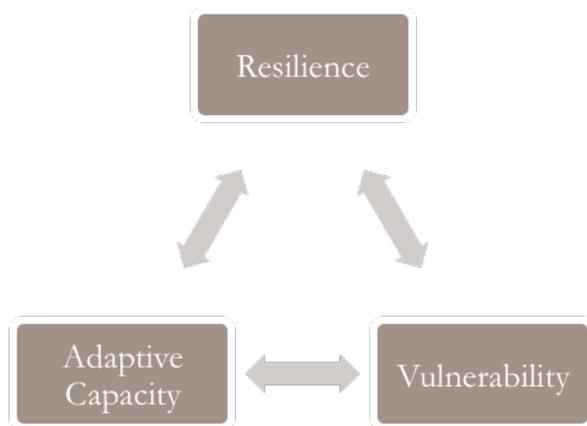


Figure 3: Capabilities, Vulnerability, Resilience (adopted from Gallopin, 2006; Smit & Wandel, 2006)

3.2 Participation

The idea of participation is as old as the idea of democracy (Elster, 1998). Rousseau theorized the concept of participation in the 18th century and Ghandi highly valued the self-reliant village as governance system (Mansuri, 2013). Participatory development has emerged from the criticism of top-down development, providing the development process with more flexibility and the ability to follow several development goals, while giving local communities self-determination (Mohan, 2014). Mohan (2014) argues that in recent years, participatory approaches have become the new “orthodoxy” in development, and are often just used because they are required by donor organisations, without any real empowerment of the local communities.

In EbA practices, the importance of participation is often highlighted (Uy & Shaw, 2012), especially as a higher level of decentralisation requires a participatory approach (Agrawal & Gupta, 2005). Mayoux & Chambers (2005) argue for the importance of making participation an integral part of development projects. While Chambers (2010) writes that it is a common misconception that we underestimate the ability of communities to participate and to take responsibilities in activities. Mansuri (2013) argues that the success of participatory approaches depends on the capability of a community to participate. Cleaver (1999) is critical of the effectiveness of participation in development activities and brought up the question of what participation is and when a project is participatory.

3.2.1 Framing participation

While there is consensus that participation is important, it is necessary to raise the question who participates when and on what level (Agrawal & Gupta, 2005). Therefore, we need to identify the typologies of participation (Cornwall, 2008). Most typologies follows to some extent the ‘ladder of participation’ developed by Arnstein in the late 1960s (Cornwall, 2008). For the purpose of this thesis, I will follow the approach of Mohan (2014), who differentiates between three types of participatory approaches: (1) Participation that aims at increasing efficiency and effectiveness of the

project, (2) participation that strives for mutual learning and that takes local knowledge into consideration, and (3) participation that has a transformative intention (Mohan, 2014). This interpretation of participation goes along with White (1996), who defines four forms of participation and sees transformative participation requiring the empowerment of people. Figure 4 illustrates the three stages of participation according to Mohan (2014), complemented with community empowerment as suggested by White (1996).



Figure 4: levels of participation adapted from Mohan (2014) and White (1996).

3.3 Development assistance

During the 1950s foreign aid² has increased and amounts today for a multi billion dollars business³, mostly under the general assumption that foreign aid is inherently a good thing (Riddell, 2008). While foreign aid has its roots back in colonialism (Craggs, 2014), its numbers have exponentially increased recently, mostly financing debts and disaster relief (Riddell, 2008). Nevertheless, funds provided are still not sufficient, which further reduces its effectiveness (Riddell, 2008). Development assistance, as a reallocation of resources aims to address inequalities between the rich and the poor (Tisch & Wallace, 1994). From this perspective, according to Tisch & Wallace (1994), it seems only fair to redistribute resources

Development assistance, however, has been challenged for its unequal distribution between recipient countries and its volatility (Ramalingam, 2013; Riddell, 2008). Riddell (2008) raises the concern that most development assistance fuels welfare systems that consequently require more and more foreign subsidies, resulting in a dependence of the recipient country. Consequently, development assistance has been questioned for its effectiveness and benefits (Riddell, 2008).

In order to suit the complexity of development challenges, Ramalingam (2013) writes that foreign aid has to be dynamic and open to change. While foreign aid is currently mostly concerned with monitoring its impact (Ramalingam, 2013), it should focus more on how it could improve development (Riddell, 2008). This would relief agencies of the pressure to continuously justify their

² I use foreign aid in this thesis as a synonym to development assistance, meaning the financial support given to developing countries

³ Official Development Aid numbers per country are published by OECD (2015)

work in economic terms, but enable them to show that their work is effective under the conditions they work (Riddell, 2008). Ramalingam (2013) describes current foreign aid at the tipping point to chaos, as recipients often lack the capacity to use the provided funds efficiently. Ramalingam (2013) concludes that aid is “among those things one is more blessed to give than to receive” (p. 4).

3.3.1 Capabilities approach

The capabilities approach was first introduced in the 1980s and involves understanding development as an extension of capabilities (Wells, 2015). Amartya Sen’s book ‘Development as Freedom’ can be understood as an alternative approach to current development practices and to John Rawls’ economic utilitarianism (Wells, 2015). Sen’s approach moves away from a resource focused view in order to develop a framework for a fairness-based view of justice (Wells, 2015). His approach aims to see development as an extension of individuals’ capabilities and he notes that “[d]evelopment consists of the removal of various types of unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency” (Sen, 1999, p. xxii).

The approach is concerned with the quality of life an individual is able to achieve (Sen, 1999). Sen (1999) believes human well-being requires moral considerations and that the freedom to achieve well-being is related to an individual’s *capabilities*. He refers to *functionings* as what an individual values to ‘be or do’ and to capabilities as “a kind of freedom: the substantive freedom to achieve alternative functioning combinations” (Sen, 1999, p. 75). He concludes that “the evaluative focus of this ‘capabilities approach’ can be either on the realized *functionings* (what a person is actually able to do) or on the *capability set* of alternatives she has (her real opportunities)” (Sen, 1999, p. 75). Hence, as illustrated in Figure 5, in order to draw utilities from resources, we need *personal utility functions* and the opportunity to *access capabilities* (Sen, 1999).

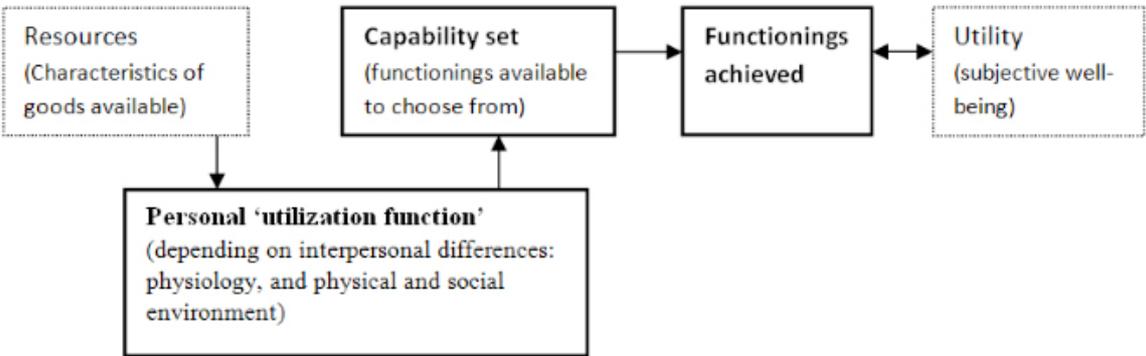


Figure 5: Illustration of the functioning and capabilities relation (Wells, 2015)

Seeing development as an extension of capabilities is a normative and not an explanatory theory. Sen aims to provide an alternative framework for how to see development that allows us to conceptualize poverty, well-being, and justice. Together with Mahbub ul Haq, he developed the

Human Development Index which aims to measure development in a broader sense by capabilities (Wells, 2015). However, the idea of a multi-dimensional capabilities approach is highly simplified in this three-dimensional Index (Wells, 2015).

Theorising the Capabilities Approach

Many philosophers (e.g. Alkire, 2005; Anderson, 1999; Nussbaum, 2009; Robeyns, 2003) critique Sen's approach for its vagueness and aim for a more applicable approach and a theory instead of a framework. Nussbaum (2009) probably gets closest by creating a list of capabilities that she believes contributes to human dignity. While Nussbaum's list of necessary capabilities allows for practical application and measurement, she is critiqued for her aristocrat perspective (Wells, 2015) and Sen (2004) rejects her generalization. Even though Nussbaum's and Sen's approaches differ quite significantly, Nussbaum's work is often seen as an extension of Sen's writings (Wells, 2015). While Nussbaum's theory is grounded in human dignity, Sen's approach provides a framework to enhance individual freedoms (Nussbaum, 2009; Sen, 1999). For this thesis, I will follow Sen's alternative perspective and I will not further engage in the discussion of theorizing this approach.

3.4 Interlinking capabilities and capacity

In chapter 3.1, I describe the linkages between resilience, vulnerability, and adaptive capacity, and its importance for EbA. For the concept of adaptive capacity and Sen's capabilities approach, a definition of the terms is needed in order to interlink them. Unfortunately, a clear definition is missing and the terms capacity and capability are often used interchangeably (Lindbom et al., 2015). For this thesis, I will use adaptive capacity as the ability to prepare, and capability as the ability to respond as conceptualization by Lindbom et al. (2015). Consequently, EbA is equally concerned with increasing capabilities and building capacity for climate change adaptation.

4 Methodology

4.1 Epistemological and Ontological Perspective

In this thesis I combine constructivist epistemology and realist ontology with critical realism as theoretical perspective as described by Maxwell (2012). Reality is seen as a construct of interaction; and truth and meaning do not exist per se (Gray, 2014; Maxwell, 2012). This results in multiple realities that might contradict each other but are, however, equally valid. Myers (2009) writes that “interpretive researchers assume that access to reality (given or socially constructed) is only through social constructions such as language, consciousness, shared meanings, and instruments” (p. 39). Additionally, critical realism aims at discovering underlying mechanisms (Sayer, 2000), to identify the social context. Therefore, I chose a critical realist perspective that acknowledges the inherent subjectivity in qualitative research and the partiality of knowledge (Gray, 2014; Maxwell, 2012).

4.2 Methodological approach

I chose a quantitative research strategy to understand the success factors and challenges of the EbA project and the relevance of participation within EbA. According to Flick (2009), an inductive research approach is more suitable for investigating a social context. Therefore, I interviewed project facilitators and went on narrative walks with beneficiaries. Additionally, I analysed Nepal’s climate change policy documents, examining the role of EbA and participation in these policies (see Appendix I for a list of the analysed policies). For the third research question, I analysed the suitability of mainstreaming EbA into current development practices on the basis of my findings from my first and second research question on the EbA project. The aim is to understand if a change in perspective, as Sen (1999) proposes with the capabilities approach, could facilitate a more suitable paradigm for EbA.

As climate change adaptation is a case specific venture, I chose a case study design (Adger et al., 2003). While case studies are criticized for being inapplicable to the broader context (Bryman, 2008), Burawoy (1998) argues that field observation challenges existing theories and consequently allows for a generalisation on a broader level. By choosing the setting of mountain ecosystems, the research findings are generalizable to other mountainous terrains and also provides a glimpse into future changes at lower altitudes (Kohler et al., 2010).

4.3 Methods of data collection

Critical realism allows for a pluralistic research methodological approach, where research methods can be used according to opportunities and needs (Gray, 2014). I chose a pluralistic approach including a literature and policy review, interviews, and field observations in the form of narrative walks with beneficiaries and a painting workshop with school children. This triangulation serves as a validation and verification of the data, as a single method can never fully explain a phenomenon (Flick, 2009) (see Table 1).

<i>Method</i>	<i>Purpose</i>	<i>Description</i>
1. Literature and policy review	Served to help me understand the contextual background of my thesis and field research.	I used Scopus and LUB search for a literature review on variations of the following terms: <i>“mountain ecosystems”, “adaptation”, “climate change”, “disaster risk”, “vulnerability”, “development”, “Nepal”, “community-based adaptation”, “ecosystem-based adaptation”, “participation”</i> Additionally, I consulted reports on EbA by UN and IUCN. Secondly, I used a summative, qualitative content analysis for four climate adaptation policies in Nepal (NAPA, LAPA, Climate Change Policy, Climate Resilience Planning) using the terms: <i>“EbA”, “ecosystem management”, “CbA”, “participation”</i>
2. Interviews	Interviews provide this thesis with an alternative set of information to the literature. Semi-structured interviews allow a researcher to be as open minded to new ideas and perspectives as possible, giving the interviewee the freedom to express what they subjectively felt to be the most important issues at stake (Bryman, 2008).	Prior to the field research, key interviewees were selected and contacted. As a follow-up, a snowball research method was applied. EbA and CbA project facilitators were interviewed in order to allow for a comparison of success factors and challenges and to identify which of these factors were specific to EbA.
3. Field observations	Field observations allow for investigating the social context of a project (Flick, 2009). Narrative walks, especially, reduce the pressure on the project beneficiaries and the researcher is able to experience the field (Jerneck & Olsson, 2013).	For the field observation, I used narrative walks as described by Jerneck and Olsson (2013). Data was collected during fieldwork, mealtimes, or in resting hours. With children, I chose a painting workshop in order to investigate their understanding of climate change impacts in their village (Literat, 2013).

Table 1: A Triangulation of Research Methods

4.3.1 Literature and policy review

In order to situate the case study in current development and climate change adaptation practices, I conducted a literature review. Scopus and LUB search were used to identify relevant scientific literature and reports of organisations involved in EbA (UN, IUCN) were considered. Furthermore, I analysed Nepal's 'National Adaptation Programme of Action (NAPA)', their guideline for 'Local Adaptation Programmes of Action (LAPA's)', Nepal's 'Climate Change Policy', and their 'Climate Resilience Planning' document. For the policy review, I used a summative content analysis quantifying the usage of the terms ecosystem-based adaptation, ecosystem management, community-based adaptation, and participation in the form of beneficiary participation. The content analysis was a qualitative approach, as I interpreted the meaning of the terms and only counted them if mentioned in the context of adaptation strategies.

4.3.2 Interviews

For the interviews, I used a semi-structured method, which allows for comparison between interview but was also adaptable to interviewee's answers (Bryman, 2008). Semi-structured interviews in combination with observations can provide a researcher with a more profound understanding of the topic than completely structured interviews allow (Bernard, 1988). This is because preconceptions are kept to a minimum which provides a more accurate picture (Bryman, 2008). In preparation of the field research, I selected and contacted key interviewees. In the field, I continued with a snowball research method, asking interviewees to recommend additional, suitable interviewees. In order to better understand the success factors and challenges for EbA, I chose to additionally interview project facilitators of CbA projects, which allows for a comparison.

Description of Interviewees

In total 14 project facilitators were interviewed and eleven beneficiaries taken on a narrative walk. Out of the 14 project facilitators, four were directly working on the EbA project in the Panchase area as either a project coordinator or implementing partner, one interviewee was working on the out-scaling of the pilot project, two were governmental representatives directly working with the investigated project, and two were university representatives. One university had contributed with studies to the vulnerability assessment conducted for the project. In addition, five other project facilitators have been interviewed that work on CbA in Nepal. All eleven beneficiaries are from the Panchase area. A full list of all interviewees can be found in Appendix IV and V.

4.3.3 Field observations

To observe the project, I stayed ten days with a family in Chittre to learn about the social context and have a glimpse into their reality (Flick, 2009). I chose to do narrative walks with beneficiaries and a

painting workshop with school children instead of conducting sit-down interviews. Narrative walks, as designed by Jerneck and Olsson (2013) to “explore spatial, physical, temporal and social conditions” (Jerneck & Olsson, 2013, p. 118), have several advantages. Firstly, narrative walks replace a traditional interview setting and provide a more relaxed environment where the interviewee takes the role of the knower or teacher (Jerneck & Olsson, 2013). Additionally, it allows the researcher to experience the field, while taking notes and pictures (Jerneck & Olsson, 2013). Using participatory art as described by Literat (2013), I engaged school children in the discourse on climate change impacts. Participatory drawing included the youth voices into my qualitative research, which would not be possible through interviews (Literat, 2013)

4.4 Data processing and analysis technique

The interviews with project facilitators and field notes were transcribed and analysed using the qualitative data analysis software MAXQDA. I also used MAXQDA to sum and interpret the terms EbA, ecosystem management, CbA and participation in all policy documents.

4.4.1 Limitations

The chosen research methods have several limitations. Firstly, I have only a limited understanding of the culture and social context of Nepal and the project area. This might have lead to misunderstandings and a research bias or to a lack of trust by project facilitators or beneficiaries to share information with me. However, I did find facilitators and beneficiaries were open to talk. Due to time constraints, only a limited number of people could be interviewed, which might have limited the research results. Similarly, ten days in the field was not enough time to develop a profound understand of the social context of a village. Additionally, only beneficiaries from the EbA project were interviewed which does not allow for a full comparison with CbA. As a project outsider, my identification of interviewees might have led to missing key persons. However, by asking all interviewees for recommendations for further contacts this risk could be limited. Because Nepal has 122 spoken languages, and English is not widely spoken, (Lewis et al., 2015), this meant interviewees needed to be either to English speakers or the interview required a translator.

5 Results from the field research

In the following section, I present my research findings. Facilitators are divided into EbA project facilitators, including core project facilitators (UNDP, IUCN, the Government of Nepal), an executing partner NGO, as well as the involved Tribhuvan University. Projects by other facilitators focus on CbA allowing for a comparison between ecosystem- and community-based adaptation strategies.

5.1 Success factors and Challenges

Three main success factors dominated the interviews with project facilitators (see Figure 6). Awareness and knowledge at a local, as well as organisational level, and consequent training needs were identified as the main success factor for the projects. Secondly, a connection to the improvement of livelihoods and the provision of economic benefits were mentioned. Thirdly, community participation or local ownership was named as essential for project success.

For EbA project facilitators a connection to livelihood and the provision of economic benefits were mentioned to be most important. This was followed by the level of awareness and knowledge, and the importance to provide trainings. A common understanding of the EbA approach was named as a success factor by professors of both universities.

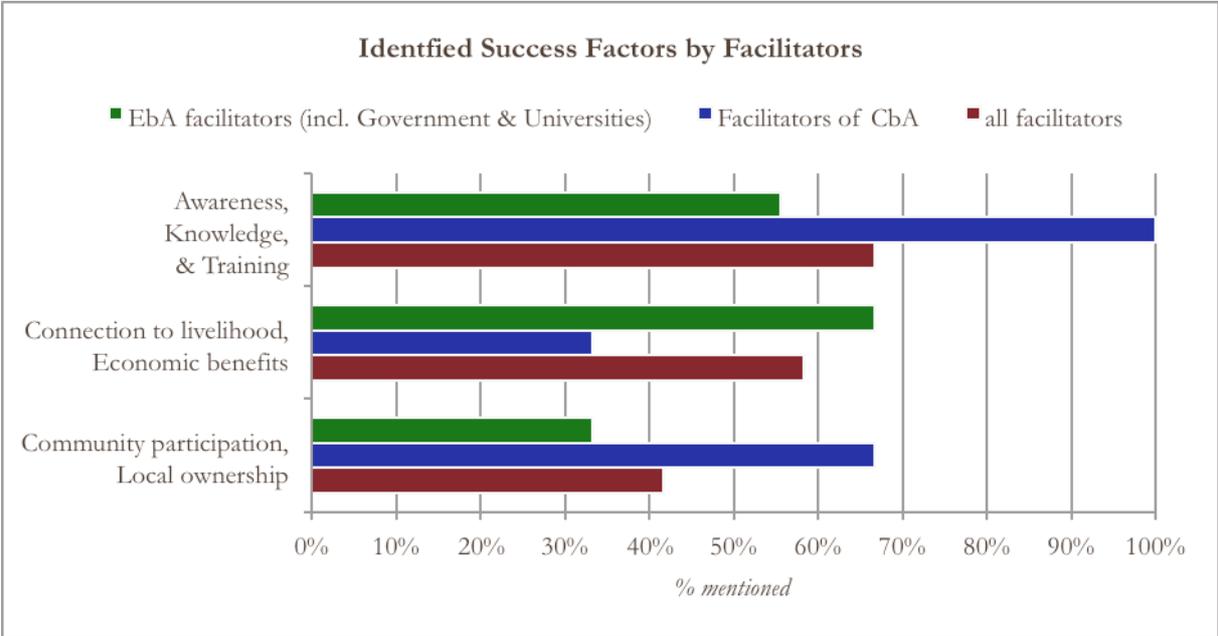


Figure 6: Identified Success Factors by Facilitators

Nearly half the beneficiaries from the Panchase area have identified the trainings received through the EbA programme as very successful. Ten out of the eleven interviewees have participated in one of the offered trainings on climate change impacts, cowshed management, the production of organic fertilizers, or the plantation of broom grass. Forty-five percent mentioned the inclusion of

the local community in the project from the very beginning. Lastly, they were grateful for interventions that contributed immediately to an increase in livelihood or provided economic benefits (see Figure 7)

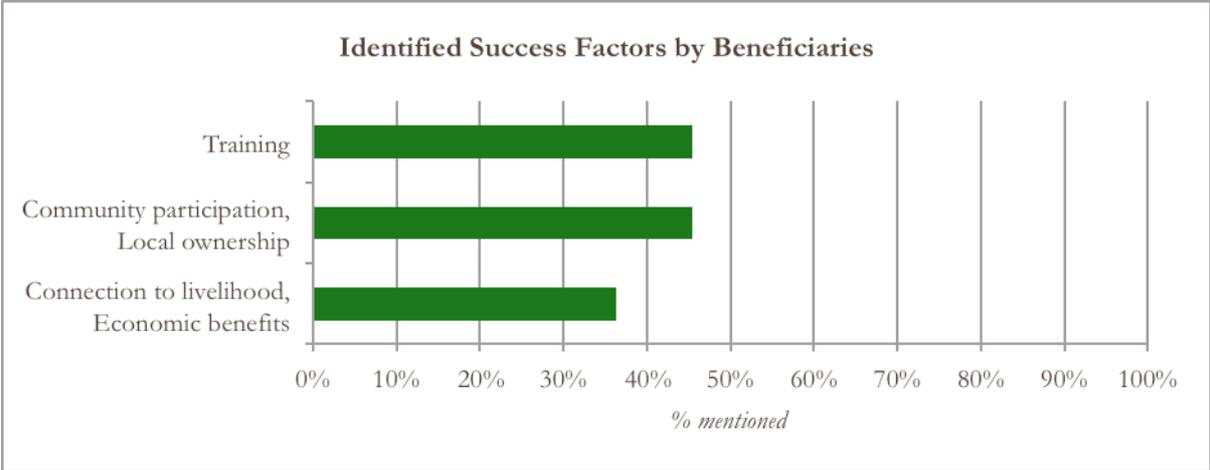


Figure 7: Identified Success Factors by Beneficiaries

More than half the beneficiaries ranked the construction of water ponds as the most successful activity of the EbA project (see Figure 8). Thirty-six percent named the provision of trainings in, and financial support for cowshed management, as well as an increased awareness on the importance of ecosystem protection and climate change impacts as successful. All women mentioned the plantation of broom grass⁴ on abandoned land, on riverbanks, and street sides as a very successful activity. NTFP, homestay management, and trainings on the production of organic fertilizers were also named among the most successful activities.

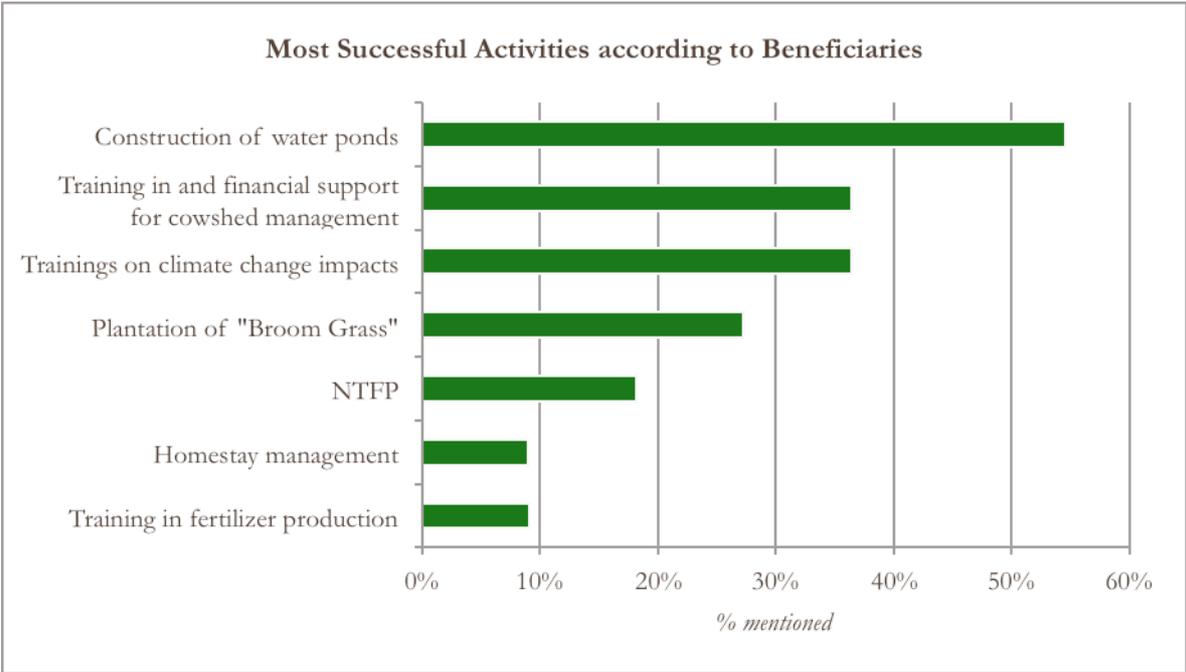


Figure 8: Most Successful Activities according to Beneficiaries

⁴ This activity was only performed with women

The challenges mentioned differed between EbA and CbA projects (See Figure 9). The main identified challenge of the EbA project was the project duration (44%). This result is closely linked to the 33% who also named the lack of monitoring instruments as a challenge. Interviewees stated that results of EbA activities could only be measured after a period of five to 10 years. Outmigration, especially by the male population, was expressed as a challenge in the EbA project in the Panchase area (33%) as well as in CbA projects in other parts of Nepal (67%). For EbA, the existing district boundaries posed a challenge, as the implementation of EbA is along ecosystem boundaries or watersheds. A lack of community participation was mentioned by 67% of CbA project facilitators and by 11% of the EbA project. The protection of biodiversity and the provision of economic benefits for the local community were considered challenging in the EbA project and named by 22% of the interviewees. Two CbA facilitators and one EbA facilitator mentioned the lack of knowledge at an organisational level as a problem. According to one university professor, there was no common understanding among the project facilitators of the EbA project in the Panchase area. For the CbA project facilitators, the lack of available climate change data for Nepal has posed a challenge (67%), as well as the high number of small-scale farmers (33%), and the lack of supporting policies (33%).

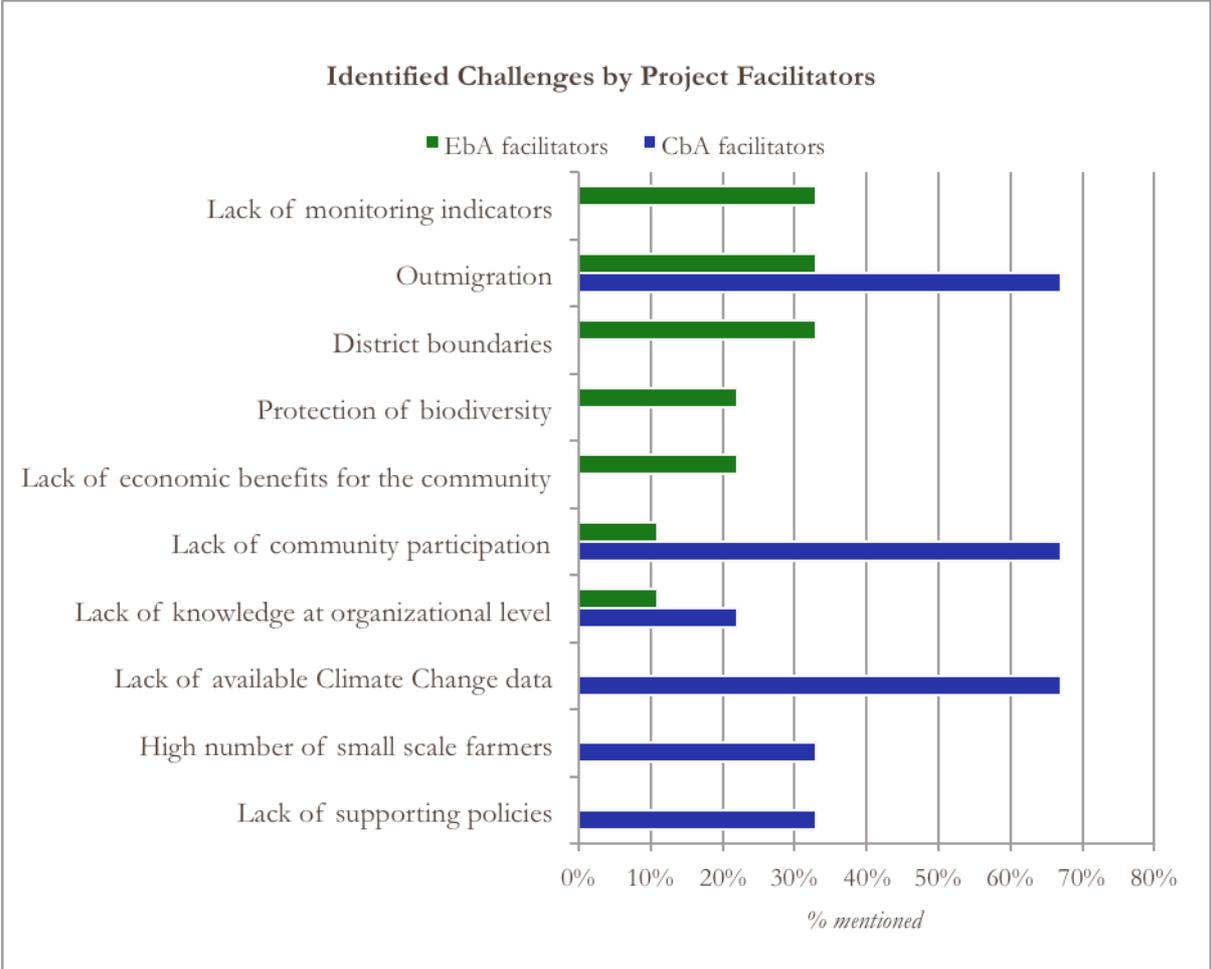


Figure 9: Identified Challenges by Project Facilitators

The challenges named by beneficiaries do not provide a clear pattern. Both village chairperson and vice chairperson from Ramja indicated a lack of transparency, especially of financial resources, as a threat to the success of the project. Four beneficiaries (36%) named a lack of trust in the government and stated that they do not favour further projects implemented by the government of Nepal. However, overall, most community members were asking for additional support and more activities that bring economic benefits. For many farmers, long-term planning appeared to be difficult, as their basic needs are often not or barely met all year around. Three interviewed beneficiaries (28%) stated further that most resources were spent on monitoring and evaluating the project, while they could have increased the project's impact. According to one beneficiary, there were people asking questions about the success of the project before they even understood what the project was all about. Two farmers mentioned the low number of community members, due to migration, as a challenge to applying all that they have learnt in the provided trainings.

5.1.1 *Perceived climate change impacts in the project area*

All beneficiaries reported that weather patterns had been changing in the past, making farming more difficult. Community members had experienced changes in rainfall, resulting in less rain during the winter months and an unpredictable start of the monsoon in July, as well as higher temperatures throughout the year. The last snow in the area had fallen eight years ago according to one beneficiary or ten years ago according to another. All beneficiaries agreed that these changes have negatively influenced their agricultural output. While with higher temperatures new crops can be grown during the summer time, winter crops cannot be planted anymore due to insufficient precipitation. The succession of flood and drought had generally made planting more difficult. Only two out of eleven interviewed community members linked these weather changes to climate change. The results from the painting workshop with school children were similar. Out of eight children, only one linked climate change to industrialization. Others painted grazing in forests, littering, or deforestation as major causes for the changing weather patterns (see Appendix III for sample paintings).

5.2 Participation

Participation was specifically named as a success factor by 45% of the beneficiaries, and by 33% of the EbA facilitators, while in CbA projects participation was rated more important (See Figure 6 and Figure 7). Similarly, the lack of community participation was a challenge for most CbA projects. In the EbA project it was also identified by one of the interviewees as challenging (see Figure 9). All community members interviewed were satisfied with the project's choice of a participatory approach. However, on the one hand, 45% of the interviewees mentioned that not all of the community had been equally included. They wished for better inclusion of minority groups. On the

other hand, 55% were fully satisfied with how the project involved the community. Minority groups in the Panchase area consist of lower class members, so called 'Dalits'. The inclusion of women has not been mentioned as a challenge. From my personal field observation, more women were involved in the project. As most men had migrated to other areas, women were doing the work in the household and on the fields. I observed that while women in the Panchase do not make most decisions, they are highly appreciated and valued. The statement by Mr Eklayba Sharma, director programme operations at the International Centre for Integrated Mountain Development (ICIMOD), at the Landscape Forum in Paris in December 2015 proves to be true: "Climate smart in Nepal is women." Two community members said that the participants for the trainings were not chosen effectively. Remuneration was paid for attending the trainings; hence, whole families were participating just to receive the financial support. However, one interviewee did not want to participate in the EbA project, and indicated a lack of time despite the financial compensation.

The project was put into practice in close collaboration with the government; therefore, the legal structures of the region were used. The government had previously worked with nine villages in three districts on forest restoration and established a forest council for each district. The project activities, previously defined in a vulnerability assessment, were prioritized in collaboration with the VDC's and the local forest councils, in order to find the optimal adaptation strategy for each village. In Nepal, at least 33% of any official committee or council needs to be female by law and this applies to VDC's. One EbA project facilitator highlighted the primary project focus as the protection of the environment and the secondary focus being the inclusion of the community. IUCN worked for the project implementation with Machhapuchhre Development Organisation (MDO), a local NGO, who had previous experience in the Panchase area and could build up their network. MDO focused on working with the environmental clubs at schools and other community groups.

Thirty-three percent of all interviewed project participants mentioned the necessity to increase the level of understanding of EbA at a local level. A facilitator from IUCN highlighted that the activities defined in the vulnerability assessment, which are best for the environment, climate robust and long lasting often do not meet the demands of the local population. Both interviewees of UNDP stated that it was difficult to break through the business as usual attitude and to raise awareness about the concept of EbA. Both university professors highlighted the importance of a common understanding of EbA at community level and for project facilitators. The representative of MDO mentioned the importance of improving the understanding of EbA, since the approach brings less economic benefits in the short-term; hence, the understanding for the long-term benefits needs to be increased.

5.3 Policies supporting the EbA approach

In Marrakesh (2001) the national adaptation programme for action (NAPA) was first designed for least developed countries (Pramova, Locatelli, Brockhaus, & Fohlmeister, 2012). In the recent Paris agreement, adaptation seems to be more prominent than mitigation efforts, finding its way 47 times into the document compared to the 23 times mitigation was named (UN, 2015a). The role and responsibility of developing countries to drive climate adaptation, however, is still vaguely formulated (Adger et al., 2003; Smith & Pilifosova, 2001).

The policy content analysis shows that the EbA approach is rarely mentioned in Nepal's adaptation policies while CbA and participatory approaches receive more attention (see Table 2). Nevertheless, NAPA does mention the possibility of using EbA approaches in adaptation activities twice, it acknowledges the importance of healthy ecosystems in order to adapt to climate change and it recommends the use of ecosystem management to ensure the ecosystem's resilience. CbA and participatory strategies are integral parts of all policies. In the NAPA, CbA is mentioned 15 times, and the focus is to build local capacity through training on climate change adaptation (GoN, 2010).

Policy		Terms			
		<i>EbA</i>	<i>Ecosystem management</i>	<i>CbA</i>	<i>Participation</i>
<i>Total</i>		2	5	19	21
NAPA	Times term mentioned	2	3	15	6
	Examples or closely linked terms	"Ecosystem-based approach to adaptation"	"ecosystem management for climate adaptation"	"promoting community-based adaptation" "community-based disaster management"	"bottom-up approaches" "inclusive participation of all stakeholders" "involvement in design [adaptation measures] and implementation" "local ownership" "inclusiveness"
Guideline LAPA	Times term mentioned	0	0	1	6
	Examples or closely linked terms			„Community specific adaptation activities“	[climate change] „requires the active participation and ownership of local communities in local adaptation planning“
Climate Change Policy	Times term mentioned	0	1	2	6
	Examples or closely linked terms	-	"enhancing capacity of ecosystems"	"community-based local adaptation actions" „community climate adaptation“	„multi-stakeholder participation“

Climate Resilient Planning	Times term mentioned	0	1	1	3
	<i>Examples or closely linked terms</i>	-	<i>„ecosystem-based basin management“</i>	<i>„community-based management can enhance adaptive capacity“</i>	<i>„stressing public participation in ecosystem conservation“</i>

Table 2: Analysis of Nepal's adaptation policies

The inclusion of disaster risk management has been identified as essential (GoN, 2011b). On the one hand, the national climate change policy emphasises the need for regional collaboration, especially in terms of watershed management, as up- and downstream regions are interdependent. On the other hand, it highlights the challenge of modelling climate change, as Nepal's ecosystems are unique and allow for little comparison. All four policies are focused on the marginalized and most vulnerable to climate change and highlight the importance of a participatory and gender sensitive adaptation approach (GoN, 2010, 2011a, 2011b, 2011c).

6 Analysis and Discussion

6.1 Ecosystem-based Adaptation

RQ1: What are the success factors and challenges for ecosystem-based adaptation?

The analysis of the interviews shows clearly that there is a multitude of success factors and challenges for EbA. A total of nine success factors and challenges were identified that are applicable to other EbA projects and four that were context specific (see Table 3). However, success factors and challenges are case specific, and not always applicable to other cases (Moser & Ekstrom, 2010).

The primary success factors are the connection to livelihoods and the provision of economic benefits. The acceptance of the project seems to be closely linked to the benefits beneficiaries can draw from the project in the long- and especially in the short-term. While project facilitators ranked the connection to livelihood as most important, beneficiaries did not. However, activities that were rated as most successful were the ones that brought immediate economic benefits and increased livelihood. The broom grass plantation and the construction of water ponds were rated among the most successful activities, as broom grass provides immediate economic benefits and water ponds improve livelihoods. This shows the need for a good balance between short- and long-term impact activities, and how both need to go hand in hand. In this context, activities that aim at increasing biodiversity without bringing immediate economic benefits are more of a challenge. While the intensified plantation of broom grass brings environmental and economic benefits, it does not contribute to an increase in biodiversity. Consequently, the balance need not only be between short- and long-term impact activities but also between economic benefits and biodiversity.

Secondly, community trainings and the resulting increased in level of awareness on climate change and knowledge of the approach contributed to the success of EbA. For project facilitators, it was essential that communities understand the concept of EbA and, for beneficiaries the received training on adaptation activities was perceived beneficial. The participation of communities in decision-making and activities could be a potential success factor as well as a challenge. Nepal's NAPA highlights the importance of community trainings to build capacity at the local level and to increase knowledge on climate change (GoN, 2010). An increased level of knowledge through training will lead to communities taking the project lead and consequently engaging in decision-making more easily.

However, we need to keep in mind that EbA is a case specific approach and no blueprint of activities is possible. Therefore, it is important that project facilitators and beneficiaries have a clear

and common understanding of the approach and its aim. Doswald et al. (2014) identify a high level of confusion surrounding the concept of EbA leading to project ineffectiveness or decision makers avoiding the use of the approach. In the case of the EbA project in the Panchase area, neither facilitators nor beneficiaries seemed to have a common and clear understanding of EbA. This complicates the definition of activities and causes confusion among the beneficiaries, which can eventually lead to reduced motivation and commitment (Doswald et al., 2014). The different expectations from the project among facilitators and beneficiaries have led to confusion, misunderstandings, and likely decreased the engagement of the community. Park and Alam (2015) highlight the importance of EbA being understood at all levels and, if necessary, translated into simple language.

Time and spatial scales were especially challenging in the EbA project. EbA is a long-term adaptation approach and its full success is only visible after five to 10 years (Ojea, 2015). While monitoring adaptation success is generally difficult (Adger et al., 2003), the conflicting timeframes of a three-year project and the longer adaptation cycle add complexity. Additionally, this short-time horizon might lead to a focus on existing problems instead of on adapting to climate change (Smit & Wandel, 2006) and on short-term economic benefits instead of focusing on long-term benefits through increased biodiversity. Additionally, the divergence between ecosystem and political boundaries can result in a challenge if policies do not actively support regional collaboration (Giroto, Ehrhart, & Oglethorpe, 2011). Ecosystem boundaries and political boundaries are generally not congruent (Giroto et al., 2011; Uy & Shaw, 2012). Therefore, EbA needs to be embedded in good governance practices (Uy & Shaw, 2012). The EbA approach typically requires a sub-regional management to work in one ecosystem (Park & Alam, 2015; Uy & Shaw, 2012). Mainstreaming EbA into policies could facilitate a collaboration and cooperation beyond political boundaries (Andrade et al., 2011).

Other challenges are the availability of climate change data and the lack of supporting national policies. The lack of climate change data and supporting policies was not mentioned as a challenge by EbA facilitators, only by CBA project facilitators. However, EbA is an adaptation strategy that builds upon climate modelling and climate change prognosis, hence, the availability of climate data is essential (Moser & Ekstrom, 2010; Munang, Thiaw, Alverson, Mumba, et al., 2013; Uy & Shaw, 2012). EbA is only mentioned in Nepal's NAPA and not in the climate adaptation policy. Fostering EbA in national policies could strengthen the approach and enhance acceptance.

Migration and a lack of trust were context specific challenges while the applied gender sensitive was a success factor to Nepal. A high level of migration has not only been a challenge to the Panchase area, but also to other regions as CbA facilitators stated. In the project area, migration has

left the community with few members and has led to a feminization (Dixit et al., 2015). EbA has little influence on migration itself; however, the provision of investment opportunities for remittances into sustainable resource management could turn the problem in a potential benefit (Choumert, Combes Motel, & Millock, 2015; Ebeke & Combes, 2013). Nevertheless, the investment of remittances into the sustainable use of natural resources needs to be encouraged on a political level (Ebeke & Combes, 2013). Additionally, two beneficiaries indicated a lack of trust in project facilitators. Trust is essential, for project success, especially when introducing a new model that opposes the business-as-usual approach (Moser & Ekstrom, 2010)

Identified Success Factors and Challenges for EbA

<i>Success factors and challenges to be generalized</i>		
1. Connection of livelihood & economic benefits	Success factor or challenge	The provision of short and long-term benefits for the local communities that increase livelihood increases motivation and commitment.
2. Training (awareness and knowledge)	Success factor	Training not only includes the local communities but also increases their level of awareness and understanding.
3. Common understanding of EbA	Success factor or challenge	Project facilitators and beneficiaries need to have a common understanding of EbA.
4. Community participation	Success factor or challenge	The participation of communities in activities and decision-making is essential for the continuation of the project.
5. Spatial Scales	Challenge	EbA requires a cross-regional approach as political boundaries often conflict with ecosystem boundaries.
6. Time scales	Challenge	The short-term project time scale for development activities contradicts with the long-term idea of EbA.
7. Protection of biodiversity	Challenge	Economically beneficial activities are, at times, in contradiction with the protection of biodiversity.
8. Availability of climate data	Challenge	Climate data modelling requires knowledge, as well as technological, and financial resources while also being relatively time consuming.
9. Supporting policies	Challenge	The EbA approach is so far not part of Nepal's existing policies for climate change adaptation. Its inclusion could facilitate project success.
<i>Context specific success factors and challenges</i>		
1. Outmigration	Challenge	Outmigration resulting in a lack of sufficient community members and a feminization of the communities threatens project success.
2. Lack of trust in project facilitators	Challenge	Trust in project facilitators is a basis for project success, as well as for participation and motivation of beneficiaries.
3. Gender sensitive approach	Success factor	In Nepal, women play a key role in most activities. Therefore, the inclusion of women's groups is essential.
4. Tradition of community organisation	Success factor	Nepal's long-term tradition in CbA is beneficial to project success and the continuation of efforts.

Table 3: Identified main success factors and challenges for EbA

6.2 Participation

RQ2: How and why is participation in ecosystem-based adaptation relevant?

Community participation is an essential part of EbA (Chong, 2014). However, in the interviews, only 33% of the EbA facilitators specifically named participation as a success factor. Though few (45%) of the CbA facilitators explicitly named it, I assume that participation has become such an integral part of adaptation that its necessity is no longer stated explicitly. As Mohan (2014) argues, in many development projects, the involvement of communities has become the ‘new orthodoxy.’ Pérez-Andrade, Herrera-Fernandez, & Cazzolla-Gatti (2010) write that community involvement is a component of EbA, as it enables communities to most effectively adapt to a changing climate through activities on a local level that ensure longevity and acceptance. According to Colls et al. (2009) participation increases effectiveness by incorporating traditional knowledge. Furthermore, Nelson et al. (2009) argue that CbA strategies strengthen the local capacity to adapt to climate change, help to diversify community livelihoods, and improve their land management skills. This hypothesis is also supported by the existing policies in Nepal, which foster participation and CbA. Similarly, international parties highlight the importance of a participatory approach and the inclusion of the local community in decision-making processes to ensure acceptability and longevity (ICIMOD, 2015; IFRC, 2009; UNDP, 2012). The aim of participative approaches is to involve the poor and marginalized in decisions at the community-level (Mansuri, 2013), which allows for the creation of new knowledge and enables the use of traditional, indigenous knowledge (Mohan, 2014). The involvement of minorities, a focus on the especially vulnerable, and a gender sensitive approach have been an integral part of the EbA project and received further support through Nepal’s climate adaptation policies.

While participatory development is considered successful, underlying power structures are rarely considered (Mohan, 2014). While local communities are mostly regarded as socially homogenous, power relations among participants, between facilitators and beneficiaries, or between donors and facilitators must be accounted for (Cooke & Kothari, 2001; Mohan, 2014). According to Cook and Kothari (2001, p. 69), “proponents [of participatory development projects] have generally been naïve about the complexities of power and power relations.” In the EbA project, the local governance structures were used and the project implemented through the existing VDCs. While this simplifies the project implementation, it also accepts and enforces the existing power structures. Desai & Potter (2006) acknowledge that power relations are inherent in development projects but warn that they can lead to confrontation if not addressed appropriately. A participatory approach is not simply identifying stakeholders and achieving a consensus among them (Cooke & Kothari, 2001). Such a consensus would most likely be unfair, considering the unequally distributed

power among stakeholders (Cooke & Kothari, 2001). Consequently, it is worth the effort to investigate and subsequently address these power structures for each community.

Additionally, participation extending from the implementing activities to designing the project and monitoring its results, could enhance trust, increase transparency, and consequently reduce conflicts (Colls et al., 2009; Desai & Potter, 2014). However, Mansuri (2013) shows that the general assumption that every community has the ability to engage in a participatory project has proven to be false in various World Bank projects. The effectiveness of a participatory adaptation strategy depends on the structures at a local level and the community's capacity to be involved (Mansuri, 2013). Participation requires the investment of time from both the facilitator and the beneficiary (Mansuri, 2013). From a democratic perspective, participation is a success in itself; however, especially for the individuals with very few resources, additional, more tangible benefits are demanded (Mohan, 2014). This has been clearly shown in the EbA project where beneficiaries favoured activities with immediate economic benefits and most community members wished for further project support. While participatory approaches are currently the 'standard' in development practises, we need to be aware that there are different levels of participation (Mohan, 2014) and that participation brings a variety of challenges if not addressed appropriately. Consequently, there is a need to rethink participatory approaches to achieve social transformations that bring justice for all participants (Cooke & Kothari, 2001).

Placing the analysed project into Mohan's (2014) framework of participation, I would argue that the project is between first and second level. By taking local knowledge into account, mutual learning was encouraged; however, demands and needs often differed from or went beyond EbA activities. With a high demand for economic benefits in the EbA project, the connection to livelihood was identified as a success factor. However, activities within an ecosystems perspective are not always the ones that bring the greatest and fastest benefits (Ojea, 2015). Additionally, a set of activities was pre-defined (UNDP, 2014); hence, the participation of the community seemed to aim at increasing efficiency and effectiveness. The EbA activities included the plantation of trees and shrubs along the street and rivers for landslide protection. In the short-term, however, bio-engineering technology became necessary and stonewalls were built to stabilize the soil until the natural solutions have reached their full functionality. Differences between demands and EbA activities lead to the conclusion that understanding and awareness by communities about the EbA approach is required to achieve a transformative and empowering form of participation.

In order to strengthen a community's capabilities for a transformative participation, Mohan (2014) writes that communities need to be empowered. EbA aims for preserving ecosystem services through sustainable resource management instead of exploiting them (Uy & Shaw, 2012). The

approach should consequently strive for the third of Mohan's (2014) participation levels. Park and Alam (2015) highlight the importance of participation of all stakeholders and local ownership of the activities to achieve sustainability in the EbA project in Nepal. However, the empowerment of communities as a collective requires the mobilisation of resources for the community to participate in decision-making (Desai, 2014). Training on climate change and ecosystem services, as well as the incorporation of local communities in all decisions could be a first step to encourage long-term thinking. Shifting our perspective on development from the need to provide economic benefits towards increasing capabilities to extend peoples freedom can, as Sen (1999) suggests, achieve a transformative form of participation and address underlying power structures.

6.3 EbA in the current Development Paradigm

RQ3: Is ecosystem-based adaptation a challenge for or challenging the current perspective on development?

The third research question combines the findings from the research questions discussed previously and links them to the broader development context. The intention is to compare the findings with current development practices and to analyse how EbA fits with development. In the literature, EbA is frequently connected to DRR strategies. Therefore, I will first look into the linkages between EbA and DRR and secondly into the linkages between EbA and development practices.

6.3.1 EbA in Disaster Risk Reduction

With the increasing frequency and intensity of disasters, DRR strategies have become an integral part of development practices (Pelling et al., 2004; White et al., 2005). In the 1970s, engineers started to focus on physical mitigation as they realised that similar disasters have different impacts depending on the system (Pelling et al., 2004). The concept of societal resilience gained importance by the end of the 1970s, shifting the focus from hard infrastructure to capacity building (Pelling et al., 2004). In the late 1990s, disaster risk reduction found its way into development, as DRR and development approaches were aiming at reducing the vulnerability of natural and social systems (Pelling et al., 2004). However, development practises can, at times, undermine DRR. For example, technological development has in the past increased vulnerability and exposure (White et al., 2005). However, there are numerous potential synergies and interdependencies between development assistance and disaster risk (Pelling et al., 2004; Schipper & Pelling, 2006; White et al., 2005). The Sendai framework for DRR (2015-2030) (UNISDR, 2015), as well as the earlier Hyogo Framework for Action (2005-2015) (ISDR, 2005) recognise the connection between climate change and disaster risks.

DRR strategies are dependent on the regulating functions of an ecosystem, which makes EbA a beneficial approach to reduce natural hazards and to increase environmental and societal resilience. Climate change impacts lead to the degradation of an ecosystem and consequently increase the

frequency of natural disasters (Munang, Thiaw, Alverson, Liu, et al., 2013). Additionally, climate change increases the vulnerability of local communities, which intensifies the impact of a disaster (Munang, Thiaw, Alverson, Liu, et al., 2013). The causal loop diagram in Figure 10 illustrates the downward spiral between environmental degradation enforced by climate change, the frequency of natural disasters, and the livelihood of local communities and illustrates the potential benefits of introducing an EbA approach into DRR strategies. EbA strategies aim at increasing the resilience of both the ecosystem and society (Andrade et al., 2011). EbA reduces environmental degradation and increase ecosystem resilience (Uy & Shaw, 2012). Additionally, it encourages the sustainable use of natural resources by providing training and having participation at its core (Andrade et al., 2011). Increasing societal and ecological resilience thus reduces the impact of natural disasters (Uy & Shaw, 2012). Consequently, DRR is a potential entry point for EbA to be mainstreamed into development.

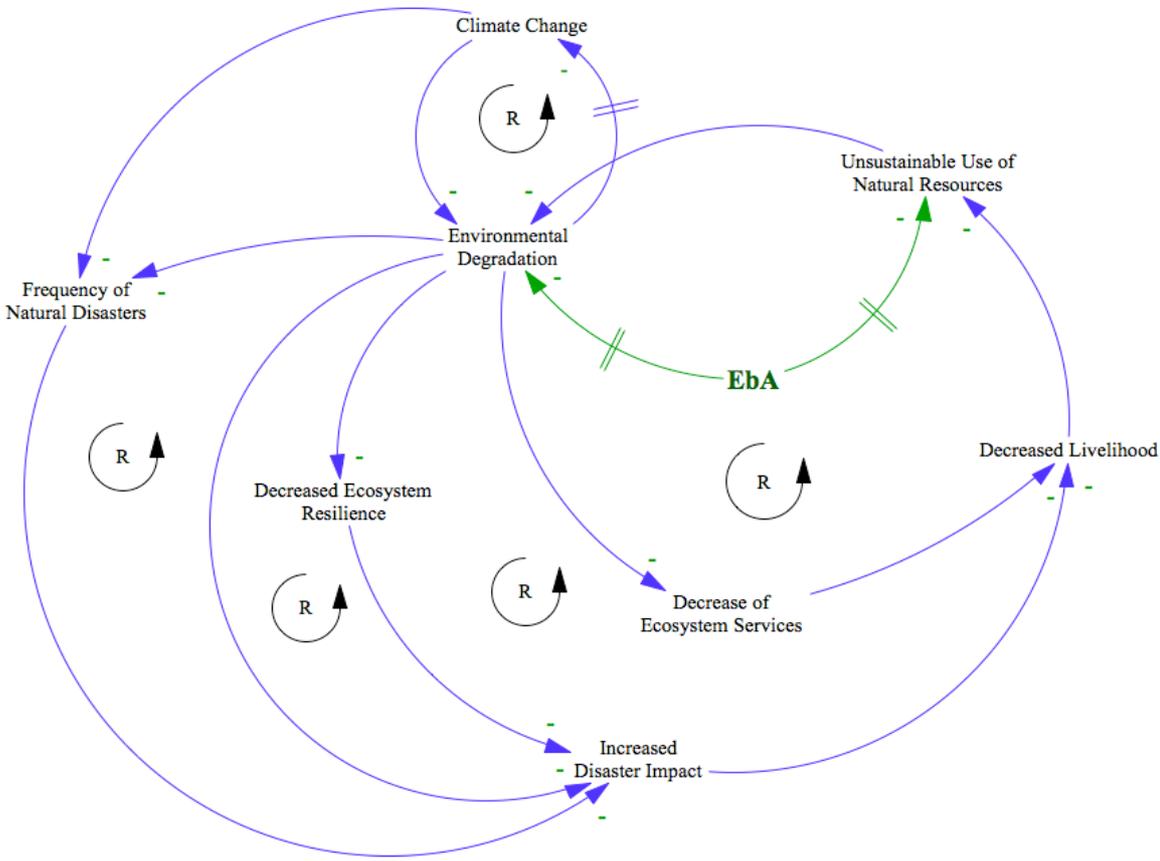


Figure 10: CLD illustrating link between environmental degradation, disaster risk, and livelihood and the effects of introducing EbA (own illustration)

6.3.2 Ecosystem-based Adaptation in Development

While EbA is already mainstreamed (e.g. through DRR as seen in section 6.1), EbA and development assistance mismatch on scales and conflict on their requirement for participation. Development activities and EbA mismatch on a temporal and spatial scale (Ojea, 2015). Primarily, EbA requires a timeframe of about five to 10 years for its results to be measurable, while current development

activities have shorter project cycles and are based on short-term decision-making (Ojea, 2015; OSCE, 2005). Doswald et al. (2014) argue that current development practices are not suitable for long-term climate change adaptation. This is especially problematic, as many EbA scholars, who call for mainstreaming EbA, pay little attention to the differences in timescales (Doswald et al., 2014). Secondly, there is a mismatch on spatial scales as political boundaries are not necessarily the same as ecosystem boundaries. EbA works within ecosystem boundaries, often times requiring the sub-regional or sub-national collaboration (Uy & Shaw, 2012). This challenges current development structures that work within existing political structures (Ojea, 2015). Thirdly, EbA requires the participation of the community to ensure long-term success (Andrade et al., 2011; Pérez Andrade et al., 2010). While current development practices are concerned with participation (Mohan, 2014), the involvement of the community is often pro-forma in practice (Cooke & Kothari, 2001) solely aiming at increasing effectiveness and efficiency (Mohan, 2014). Furthermore, the high level of uncertainty of climate change impacts (Adger et al., 2003) adds complexity (OSCE, 2005). The inherent uncertainty in climate assessments is further enhanced by the low level of understanding among decision-makers who perceive the level of uncertainty as even higher than it is (OSCE, 2005).

6.3.3 Mainstreaming Adaptation

Despite these mismatches, many scholars call for mainstreaming of climate change adaptation into development and highlight the potential benefits and synergies (Agrawala, 2004; Ayers & Huq, 2009; Klein et al., 2007). Many national adaptation policies have been developed (OSCE, 2005) and climate change adaptation has grown in importance in international agreements (e.g. the Paris agreement). In the Millennium Development Goals (MDGs), climate change was integrated into the goal to 'ensure environmental sustainability' (UN, 2010) and in the Sustainable Development Goals (SDGs) it has become its own goal (to 'take urgent action to combat climate change and its impacts') (UN, 2015b). Schipper & Pelling (2006) argue in order to achieve the MDGs (now SDGs), we need to address development, climate change, and disaster risk simultaneously, as individual approaches would result in lower effectiveness or could even conflict with each other. Similarly, Huq and Burton (2003) argue for the integration of adaptation in development to draw synergies and to avoid 'stand alone' activities. For development to be successful, Christina Figueres (2016) argues for climate change adaptation to be incorporated into development as it threatens long-term development efforts. The Paris Agreement (UN, 2015a) advises adaptation measures that contribute to sustainable development and the UNFCCC (1994) principles state that "climate change should be integrated with national development programmes" (Article 3.4). Additionally, sustainable development should facilitate adaptation, as climate change does not create new problems, but exacerbates existing problems tackled by development (Schipper & Pelling, 2006). Smith et al. (2011) argue that from a financial perspective, this integration is necessary. Currently, there is no clear division between

financial resources for development and adaptation as much of the development resources are invested in climate sensitive activities (Smith et al., 2011). They also state that a division is most likely not useful, but a better integration of the two approaches is needed to increase financial effectiveness.

6.4 EbA in an alternative development paradigm

RQ4: Could an alternative perspective on development be more suitable for ecosystem-based adaptation?

Lastly, I will discuss if an alternative perspective on development could be more suitable for mainstreaming EbA, as the approach and current development practices have contradictory elements (see chapter 6.3.2) that need to be accounted for. Specifically, I will examine if Sen's capabilities approach could be a suitable alternative.

According to a report on the linkages between climate change and development by the OSCE (2005), the two are so intertwined that a separation would not only make little sense but is also impossible. Schipper (2009) criticises the fact that adaptation is currently simplified by development practices to a process that only addresses vulnerability. In her view, adaptation is not as simple as listing adaptation measures and implementing them. Rather, adaptation requires a dynamic development approach that is currently missing to address the underlying vulnerability (Schipper, 2009). Moser and Ekstrom (2010) after identifying a set of barriers to climate change adaptation, conclude that adaptation is very context specific.⁵ Therefore, they recommend a systematic framework instead of a list of prescriptive actions (Moser & Ekstrom, 2010). Nevertheless, the identified success factors indicate potential conflicts between adaptation and current development practices, especially when focusing on increasing the resilience of an ecosystem. Ribot (2011) highlights the danger that development shifts its focus from cause to response. Instead of focusing on the cause of vulnerability and aiming at increasing resilience, development is focusing on short-term response (Ribot, 2011). Therefore, Schipper (2009) calls for a paradigm shift in development. This would enable adaptation to guide sustainable development and enhance the effectiveness of adaptation measures. Moser and Ekstrom (2010) advise a shift from short-term to long-term adaptation scales in order to reach a truly dynamic and transformative approach to adaptation as illustrated in Figure 11. The findings from the EbA case study indicate clearly that current development practices might be unsuitable for EbA to be mainstreamed. Development activities focuses on coping measures (Ribot, 2011), while EbA focuses on long-term adaptation with transformative character. Additionally, the requirement for an empowering and transformative level

⁵ Find a full list of potential barriers and a framework to identify them in 'A framework to diagnose barriers to climate change adaptation' (Moser & Ekstrom, 2010)

of participation contradicts with development activities that employ participatory approaches only in the project implementation phase.

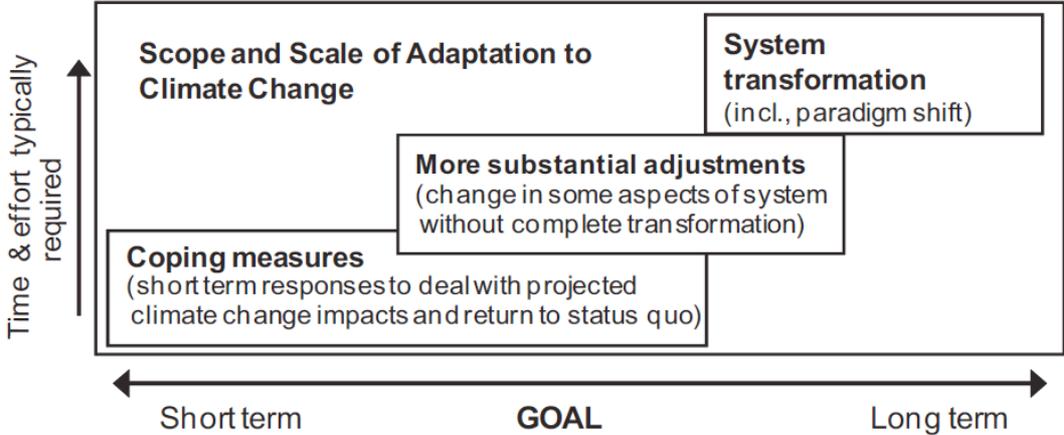


Figure 11: Scope and Scale of Adaptation to Climate Change (Moser & Ekstrom, 2010)

Development as a dynamic approach, should embrace change from within and from outside, which could allow for a paradigm shift, in which climate change adaptation can be mainstreamed (Ramalingam, 2013). Smith and Pilifosova (2001) argue for a shift in our socio-economic system that allows for immediate adaptation measures at local level. Climate change does not create new problems write Schipper and Pelling (2006), but problems on a scale not experienced before . For this to be achieved, we need a shift in perspective in order to facilitate an integrated approach to sustainable development that accounts for the contradiction between development and adaptation. The EbA project in Nepal could consequently be implemented across spatial scales and combined with other development activities. Sen's (1999) capabilities approach could allow for such a shift in perspective, focusing on improving human capabilities to adapt to climate change instead of focusing on cost-benefit analysis and GDP growth rates. Figure 12 illustrates how the forces of climate change, adaptation and development could be combined through a capability approach to development in order to effectively achieve sustainable development. On the one hand, participation with a transformative intention, as described by Mohan (2014), could empower local communities. These empowered communities would consequently be able to accelerate their personal utilization function in order to develop capabilities to adapt to climate change (White, 1996). This would then trigger a shift from the current tokenism in participation to actual, transformative participation that empowers people to take decisions, change, and adapt (Mohan, 2014). Sustainable development, on the other hand, could focus on the underlying causes of vulnerability to reduce the vulnerability of communities. This would henceforth facilitate societal and enable ecological resilience.

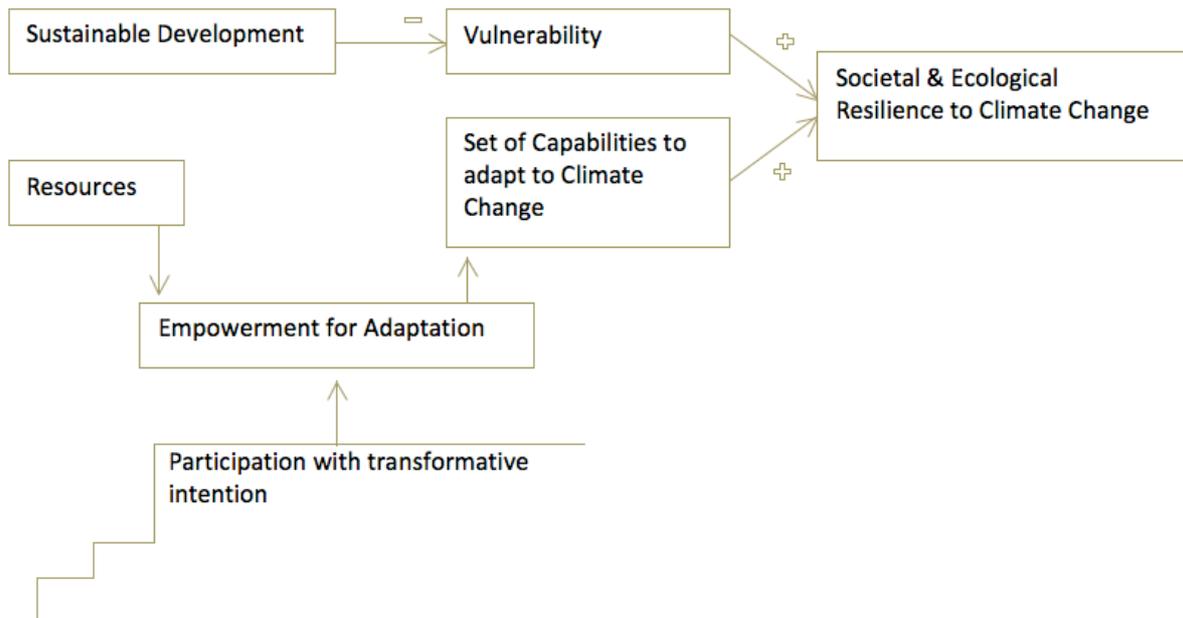


Figure 12: A framework for an alternative development perspective (adapted from Mohan, 2014; Wells, 2015)

Ramalingam (2013, p. 363) concludes that future aid and development should “resemble the world of which it is a part: fluid, dynamic, emergent. It would be as open to change on the inside as it was hungry for change outside. It would be an open innovation network, catalysing and leveraging change in countries around the world. Aid would exist on the border between order and chaos: a product of human innovation, of scientific realism, and of our shared values.” For an EbA project, this would mean a shift away from justifying why there are not more immediate economic benefits to allow for adaptation across scales. For climate change adaptation and development assistance, this would create a worldview apart from GDP growth, where the development of capabilities is the cornerstone. For the Panchase Mountain Ecological region, this could mean flourishing communities with a strong set of capabilities to adapt to change instead of communities trying to measure their well-being only on economic output and growth.

7 Conclusion

In recent years, EbA has gained popularity worldwide due to its provision of long-term, sustainable, and climate robust solutions. Nevertheless, EbA has its challenges and might not be applicable in every case. Ecosystems, and especially mountain ecosystems, are unique and require a tailored adaptation approach. The aim of this thesis was to investigate how EbA fits with current development strategies and if the need for adaptation could be a catalyst for a change in perspective on development. Therefore, I analysed the success factors of EbA in mountain ecosystems, which are especially vulnerable to climate change, and the role of participation in adaptation approaches. The results are based on an EbA project in western Nepal.

A total of nine general and four context specific success factors and challenges were identified. Key identified success factors for EbA are the provision of economic benefits and the uplifting of livelihoods, as well as a common understanding among facilitators and beneficiaries. Major challenges for EbA are the conflicting timeframes with current development projects lasting about three to five years and the longer adaptation cycle lasting approximately five to 10 years. The protection of biodiversity was also a challenge, as diversification does not necessarily bring economic benefits in the short-term.

Participation is an integral part of EbA and ensures its effectiveness in the long-term. The involvement of the community was rated as a success factor for the project in Nepal. Even though participation has become the 'new orthodoxy' in development, oftentimes participation is practiced on a pro forma level. Power structures within a community and the community's capabilities to participate are rarely accounted for. Participation that empowers people to adapt to climate change requires the mobilization of resources, such as time for capacity building. Development and especially adaptation practices need to rethink participatory approaches to achieve social transformations that bring justice for all participants.

The international community and EbA scholars currently aim to mainstream adaptation efforts into on-going development practices and highlight the resulting benefits and synergies. However, this research has shown that EbA conflicts with development in four areas. Firstly, the different timeframes of development projects and EbA require the approach to provide immediate results. Secondly, there is a mismatch on spatial scales, as ecosystem boundaries and political boundaries often differ. Thirdly, EbA requires participation with transformative intention for its effectiveness, while development practices mostly pursue a participatory approach that aims to increase

effectiveness and efficiency. Fourthly, a high level of uncertainty results in hesitancy by politicians and practitioners to use the EbA approach.

To address these contradictions, I examined if a shift in perspective on current development practices results in a more suitable framework for EbA. Mainstreaming EbA into development as it is currently practised would limit its effectiveness. Sen's capabilities approach focusing on increasing human capabilities to adapt to climate change could be a possible alternative framework to development. Such an alternative perspective could allow EbA to maximise its potential, and development practice to be more dynamic and embrace change from within and outside.

In the framework of this thesis, I was only able to highlight some constraints of mainstreaming EbA in development, and to raise the question if an alternative perspective could be more suitable. Therefore, the topic calls for further research in the areas listed below.

1. An extended analysis on the opportunities and constraints of mainstreaming adaptation into development that considers different adaptations strategies.
2. An investigation of other alternative perspectives on development that could be suitable, or more suitable, to allow for adaptation to be mainstreamed into development.
3. The inclusion of mitigation in the discourse as discussed in the study by Klein, Schipper, & Dessai (2005)
4. An analysis of the theory of access, as access to resources can be a barrier to developing capabilities and the ability one has to get resources and to participate.

While there is much more research needed, I would like to conclude that EbA is a challenge for development and challenging the current development paradigm. An alternative perspective, such as Sen's capabilities approach, could free adaptation from the need to constantly prove its effectiveness under a cost-benefit analysis and enable development to show its benefits under the given circumstances in an alternative value framework. Only, if we challenge the status quo can we change, even if it might be inconvenient at first.

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Appendices

Appendix I: Climate Policies

Policy	In place since	Remarks
NAPA - National Adaptation Programme of Action	10 th of September 2010	
LAPA - National Guideline for Local Adaptation Programme of Action	November 2011	LAPA for Kaski district was not yet developed at the time of the research
Nepal's Climate Change Policy	July 2011	
Climate Resilience Planning	January 2011	

Appendix II: Interview Guide

Welcome part

Thank you very much for your valuable time to answer my questions.
How much time do you have available for us to talk?
Give card: in case of any questions you're most welcome to contact me

Introduction to research aim

The aim of my research is to take a closer look at ecosystem based adaptation projects that enable climate smart adaptation and mitigation to climate change in mountain ecosystems. Specifically focusing on the HKH region in Nepal. The aim is to investigate challenges and opportunities for these projects in order to identify success factors and possibilities to out- and upscale successful projects.

Interview Questions

1. *Easy start off questions on interviewee's background and projects they are working on.*
 - a. Could you tell me a bit about your background and your current work?
 - b. When did climate change issues become part of your agenda for development strategies?
 - c. What would you say has been the international influence in driving this agenda in Nepal?
2. *Questions investigating EbA and climate smart adaptation*
 - a. In your current organisation, how many development projects are focusing on climate change?
 - b. Is your organisation using an EbA or climate smart approach in projects?
 - i. For how long has this approach been used?

- ii. How many projects are following this approach?
 - iii. If not: Is there a reason to avoid EbA?
 - c. Do you have other climate change adaptation projects that are not necessarily EbA or climate smart adaptation?
 - i. Could you describe those projects?
3. *To investigate the success factors*
- a. Have EbA and climate smart adaptation projects been successful so far?
 - i. What made those projects successful?
 - b. What are the criteria used to judge success of a project?
 - c. Could you identify prerequisites for success?
 - d. How is success monitored during the project process and after a project is completed?
 - e. What role does the community have in judging success?
4. *To investigate the major challenges of the projects*
- a. What are/were the challenges when realizing the projects?
 - i. What was/ is the greatest challenge?
 - ii. Why is this a challenge?
 - iii. How have you overcome the challenge or how could this challenge be overcome?
 - iv. Are those challenges specific to Nepal or mountainous areas?
 - b. Do you know of similar projects elsewhere?
 - i. How are your challenges similar where might they differ?
 - c. Could you identify the most important cross cutting issues in your projects?
 - i. Why is this a cross cutting issue?
 - ii. How are you dealing with this issue?
5. *To investigate the role of ownership, participation, and justice in climate smart adaptation and mitigation strategies (if not already mentioned as success factor or challenge)*
- a. What would you say are some of the local dynamics that affect the success or failure of a project and also its ownership by the community?
 - i. How are local communities organized?
 - b. How is the local community involved in the project?
 - i. In which phase of the project is the local community involved (planning, introduction, long-term hand over)?
 - ii. Why is community participation in the project important?
 - iii. How are project participants chosen?
 - iv. How are participants engaged in the project?
 - c. How is participation in EbA or climate smart adaptation projects different from other projects (in the past), if at all?
 - d. How do you ensure longevity of the project once the project team is no longer involved?
 - e. How do you address the need to involve women, minority groups and other vulnerable or disadvantaged groups in projects?
 - f. How well are the projects accepted by the local community?
 - i. Have you had difficulties with a participatory approach?
6. *To investigate future opportunities and up-scaling possibilities*

- a. Where do you see opportunities or limitations for EbA / climate smart adaptation and mitigation in the future?
- b. What lessons can be learnt from your experience in Nepal that could be helpful elsewhere?
- c. Is there anything unique about the local context or projects and what factors should be taken into account when modifying projects for different social, economic and cultural contexts?
- d. Have projects been up-scaled or are they planned to be up-scaled?
 - i. Horizontal or vertical up-scaling?
 - ii. What are prerequisites to upscale projects?

Extended interview questions for the government

7. To investigate the overall approach in development projects and the importance of participatory approaches

- a. How does the government support climate change adaptation in Nepal?
 - i. Are there policies or guidelines currently in place to support climate change adaptation?
 - ii. Since when does Nepal have policies on climate change adaptation?
 - iii. Are those policies / guidelines adopted by NGOs / INGOs
- b. What importance have EbA or climate smart adaptation projects in climate change adaptation policies (NAPA & LAPA)?
 - i. Why are these approaches important / not important?
 - ii. How many projects focus on EbA (%)?
- c. How important do you think that these projects include the communities and follow a participatory approach or local ownership?
 - i. Does the government actively foster participatory approaches?
 - 1. If yes: How are they fostered?
 - a. Is community engagement included in policies?
 - 2. If not: Could you tell me why the government does not actively support participatory approaches?
- d. Do you see specific challenges with participatory projects?
 - i. Are those challenges specific to Nepal or mountainous areas?
- e. Do you collaborate with other countries in climate change adaptation projects?
 - i. With which countries are you collaborating?
 - 1. How does collaboration look like?
 - ii. Do you face similar challenges?
 - 1. How are they similar / How do they differ?

Thank you and good-bye part

Is there any possibility to follow up with you via email or in case of further questions, may I schedule a second interview with you?

Could you send me the project reports of the projects you have been talking about?

Is there a possibility to visit one of your projects in the field?

Could you recommend someone I should / could talk to for my research?

Narrative walks with project beneficiaries

Narrative walks are a mixture between observation and interviews as a research method. The intention is to receive an overall sense of how project beneficiaries experience climate change and what they think about the projects implemented in their village or region now and in the future, without making them sit through an interview. The questions are, therefore, more to guide the talks than to conduct an interview, which allows the 'interviewee' to talk freely about his/her experience.

Interview questions

1. Have you experienced changes in weather patterns?
 - a. Why do you think has this changed?
 - b. What impacts does this have on your community?
 - i. Has this had negative and/or positive impacts on your agricultural output?
2. Have you received help in order to adapt to climate change before?
 - a. How does the current project differ from earlier projects? (*if*)
 - i. Would you say this approach is more beneficial for the community?
 - ii. What is your opinion on projects with an ecosystems perspective?
 - b. How do you feel about the help you have received?
 - i. Would you say the project is successful?
 - ii. What would you change/adjust in the project?
3. How has the community been able to get involved in the project?
 - a. How have you personally been involved?
 - b. Who in the community has been involved in the project?
 - i. Are minority groups specifically involved?
 - ii. Are women's groups involved?
 - c. Could you explain to me how your community is structured?
4. How could this project be continued in the future?
 - a. Who will be taking care of the project once [organisation] has gone?
5. Do you think current efforts to adapt and mitigate climate change are sufficient?
 - a. Would you like to receive more support from outside organisations?
 - b. Would you wish for more support by the government?

Appendix III: List of interviewees

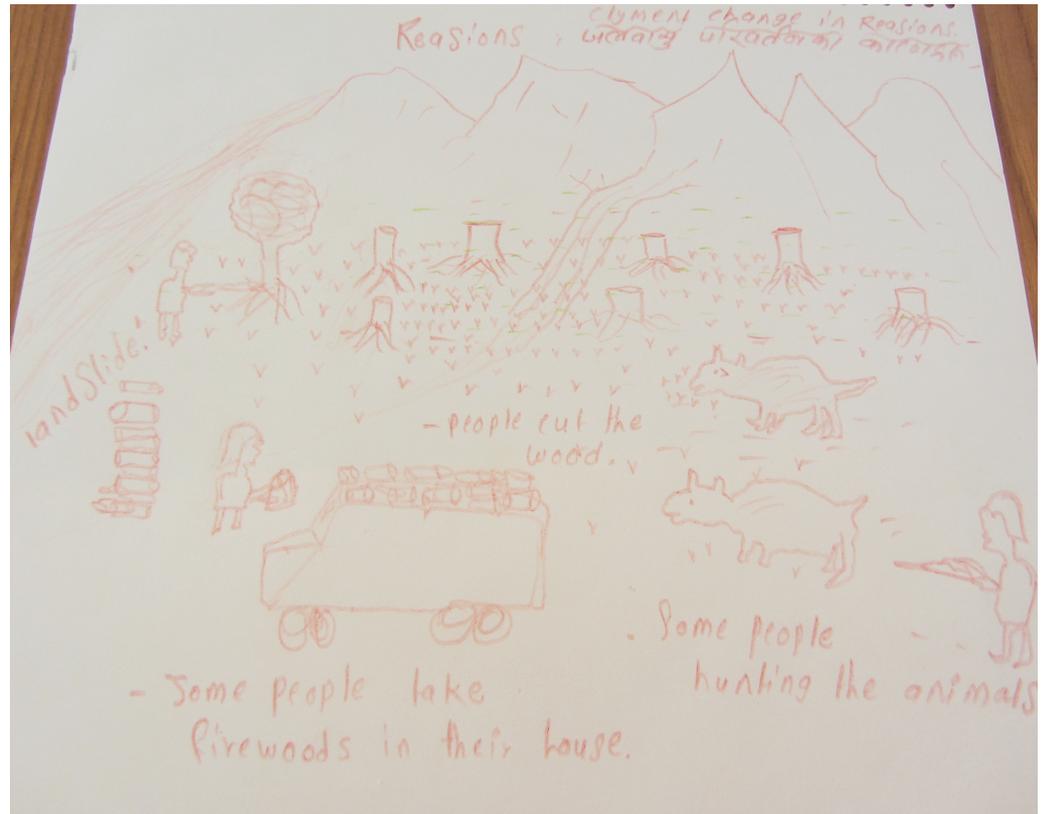
#	Organisation	Name	Role	Project	Working area
1	United Nations Development Programme (UNDP)	Mr. Pragyajan Yalamber Rai	Project Coordinator Ecosystem based Adaptation (EbA) in mountain ecosystem in Nepal	EbA - Ecosystems-based Adaptation in Mountains Programme	Panchase area
2	United Nations Development Programme (UNDP)	Mr. Randir Kumar Singh	Head Field Office Pama, Kaski	EbA - Ecosystems-based Adaptation in Mountains Programme	Panchase area
3	International Union for Conservation of Nature (IUCN)	Ms. Anu Adhikari	Programme Officer	EbA - Ecosystems-based Adaptation in Mountains Programme	Panchase area
4	Machhapuchhre Development Organazation (MDO), Archalbot, Pokhara, Kaski	Mr. Dil Bahadur Bhattarai	Chair person & Joint Secretary Panchase Forest Area	EbA - executing partner of IUCN in the Panchase area for the EbA project	Panchase area
5	The Mountain Institute	Ms. Meeta Sainju Pradhan	Director of Himalayan Program	EbA out-scaling in collaboration with IUCN	tbd
6	Karnali Integrated Rural Development and Research Centre (KIRDARC)	Ms Geeta Pandey	Advocacy and Knowledge management Coordinator	CbA - Climate Change, Food Security and Disaster Risk Reduction	Karnali
7	Karnali Integrated Rural Development and Research Centre (KIRDARC)	Mr. Gobinda Bahadur Shahi	Programme Manager	CbA - Climate Change, Food Security and Disaster Risk Reduction	Karnali
8	Food and Agriculture	Mr. Arjun Singh Thapa	Programme Officer FAO-	CbA - Reducing vulnerability and	

9	Food and Agriculture Organization of the United Nations (FAO)	Mr. Krishna Prasad Pant	National Technical Coordinator	CbA – Redcing vulnerability and increasing adaptive capacity to respond the impacts of climate change and variability for sustainable livelihood in agriculture9sector	
10	The Lutheran World Federation (LWF)	Mr. Gopal Dahal	Emergency Response & DRR Manager	CbA - Climate Field School: An Innovative Approach to Climate Change Adaptation	Far east and far west of Nepal
11	Ministry of Population and Environment	Mr. Ram Hari Pantha	Under-secretary (Technical) and Chief- Climate Change Section	3 projects on EbA: (EbA) Project for mountain Ecosystems (Joint project with UNEP, UNDP, IUCN) Project Mountains, Mangroves Desert Nepal EbA project	All Nepal
12	Ministry of Forestry, Kaski District	Mr. Gopal Gurung	Head of Ministry of Forestry in the Kaski District	EbA - Ecosystems-based Adaptation in Mountains Programme	Panchase area
13	Kathmandu University	Mr. Parbat Dhungana	Assistant Professor for Environment Education and Sustainable Development & Program Coordinator, Multidisciplinary Masters' in Sustainable Development (MMSD)		
14	Tribhuvan University	Mr. Dinesh R Bhuju	Technical Advisor, Tribhuvan University, Central Department of Environmental Science / Boardmember, Resources Himalaya Foundation / Adjunct Professor, Agriculture and Forestry University / Academic Coordinator: Master in International Cooperation and Development		

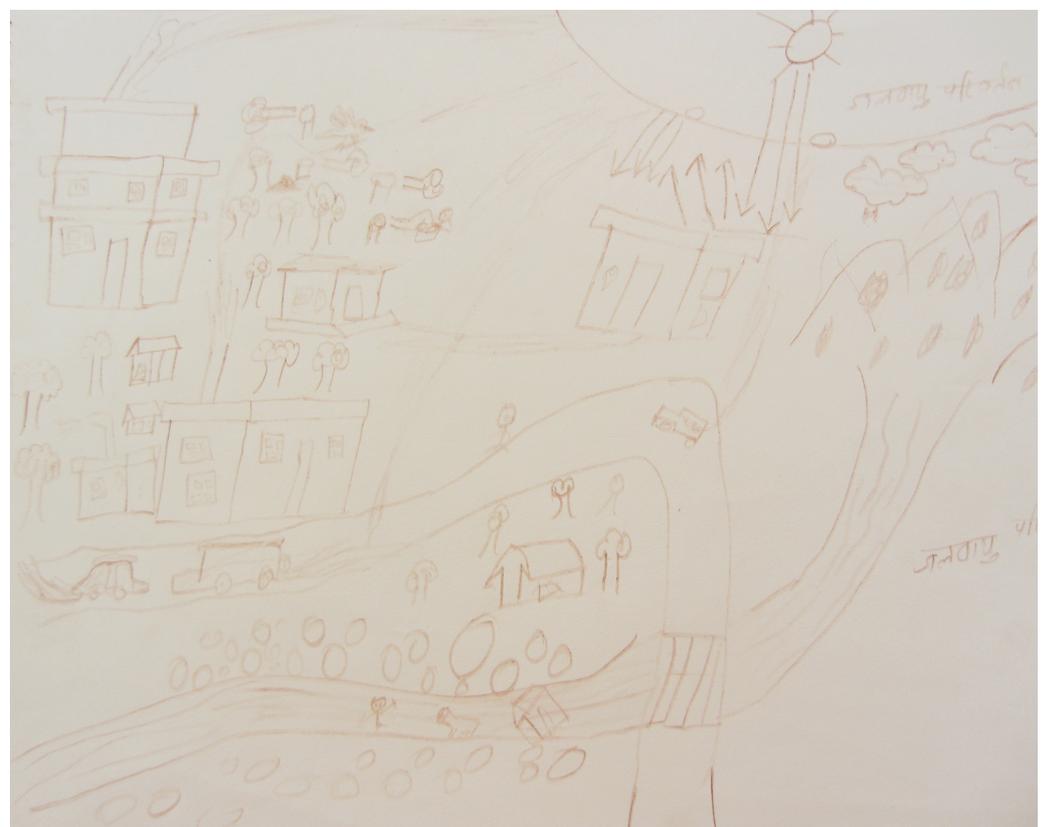
List of interviewed project Beneficiaries

#	Name	Role	Village
1	Mr. Ram Gurung	Farmer and Guesthouse owner	Beneficiary in Panchase Banjyang (VDC Arthar)
2	Ms. Bhiammcumari	Member of homestay management & farmer	Beneficiary in Chittre (VDC Chittre)
3	Mr. Sukbahadur Gurung	Chair person of school management committee, eco-club coordinator, member of district committee of Panchase protected forest	Beneficiary in Chittre (VDC Chittre)
4	Mr. Madhusudhan Adkikari	Teacher, social mobilizer	Beneficiary in Chittre (VDC Chittre)
5	Ms Adhikari	Women's group leader	Beneficiary in Chittre (VDC Chittre)
6	Mr. Tara Bdr. Gurung	Village chairperson Ramja	Beneficiary in Ramja (VDC Ramja Deurali)
7	Mr. Narayan Sharma	Vice chairperson Ramja	Beneficiary in Ramja (VDC Ramja Deurali)
8	Mr. Prasad Sharma	Teacher and farmer	Beneficiary in Ramja (VDC Ramja Deurali)
9	Ms Bishnu Maya Paudel	Social mobilizer and farmer	Beneficiary in Ramja (VDC Ramja Deurali)
10	Ms Suntalo K.C.	Farmer	Beneficiary in Ramja (VDC Ramja Deurali)
11	Mr. Krishna Prasad Lamichhane	Farmer	Beneficiary in Chittre (VDC Chittre)

Appendix IV: Climate Change Illustrations by School Children (Chittre, Kaski district)



Picture 1: Exploitation of natural resources as reason for Climate Change (as illustrated by most children)



Picture 2: One student drew industrialization as cause for a changed climate in their village