Collective Climate Action in Lao PDR
-An analysis of the determinants for sustainable adaptation and climate resilient development

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Executive summary

Climate change, is one oft the most important and complex global public goods challenges facing human kind and possibly the biggest market failure in history.
Global environmental governance approaches are working on long-term commitments for mitigation efforts. Investments in adaptation science have been made but the translation into implementing adaptation actions still remains in the trial stage especially in developing countries. Successful sustainable adaptation is dependent on the adaptive capacity and vulnerability of a system, region, country or community. What makes this transformative process of an adaptation pathway sustainable is determined by stakeholder engagement and governance practices. This paper analyzes the human-driven economic, political, cultural and social forces influencing sustainable adaptation in the regional context of Lao PDR. For this local research with stakeholder interviews and field side visits have been undertaken to evaluate on the implementation of climate resilient development projects.

Keywords: Lao PDR, climate change, adaptation, vulnerability, adaptive capacity, sustainable development, resilience, collective action, democracy, local knowledge, community development, participation, social capital, social learning.

1. Introduction

The global impacts of climate change have been recognized around the world with the agenda of combating it by mitigation and adaptation strategies. Climate change mitigation can be governed and measured globally through international alliances as carbon emission reduction initiatives and trading, in contrast to adaptation what is understood as a local issue. Investments in adaptation science have been made but the translation into implementing adaptation actions still remains in the trial stage especially in developing countries. The literature finds that adaptive responses are framed by values, interests or institutions and a diversity of limitations and barriers relating to human behavior and governance makes the implementation process lack (Pelling, 2011). Research has been done on different regional climate change vulnerabilities and adaptation options but the documentation of actual on the ground implementations is still rare. Social, cultural, political, economic and natural forces affect the adaptive capacity, the vulnerability of people and the adaptation process itself. Especially in the case of developing countries struggling with the fight against poverty, heaving weak institutions and limited financial capacities and being the most affected by climate change, local adaptation has to be revised on each step of decision taking from policy making, adaptation option chosen, implementation and monitoring. The evaluation and documentation of implementation and monitoring processes is mostly still "in progress" so that conclusions for further action taking cannot be made. Literature that characterizes barriers and opportunities also explores the reasons for the limited conversion of assessments and plans into action (Wise et al., 2013). A key challenge for adaptation research is therefore to identify which barriers are likely to arise in which kinds of contexts to inform and how to address them.

The following research aims to fill in this knowledge gap for the special case of Lao PDR.

Despite still being a least developed country (LDC), Lao People's Democratic Republic (Lao PDR) has made significant progress in poverty alleviation over the past decades to reach the government's goal of leaving this stage by 2020. With an increasing export of natural resources mainly to its neighbors China, Vietnam and Thailand, economic benefits are generated through hydropower development, mining, timber production and large-scale agricultural land acquisitions by foreign investors. The challenge will be that the high economic growth is evenly distributed and translated into inclusive and sustainable human development (UNDP, 2013). The one-party state's economic drive comes along with direct socio-economic and environmental impacts as for instance dam building, resettlements,

deforestation and loss of biodiversity. This development stands in direct conflict with recently extended active climate change mitigation and adaptation efforts. The livelihood of the local, especially rural marginalized population is likely to be affected by a changing climate as droughts, floods or saltwater intrusion in the Mekong's aquifer, weather hazards and climate variability. Lao PDR is a landlocked country, in which 80 per cent of the population makes a living of subsistence farming. Agriculture is the major livelihood base and depends therefore highly on the adaptive capacity against climate change impacts.

The Lao government has adopted national climate change policies and has incorporated them into their development goals. However, lacking financial and human resources on all governmental levels (national, provincial and district) challenges the implementation process yet. At the same time, Official Development Assistance (ODA), Non-Governmental-Organizations (NGOs) and the private sector, operating in Lao PDR, have comprehensively integrated climate change adaptation into their development agenda. The projects include for instance the distribution of climate-smart agricultural tools and techniques, environmental education and disaster risk reduction trainings with communities in the rural areas.

This research evaluates through stakeholder interviews and participatory observation the implementation of climate change adaptation initiatives by the involved stakeholders. It elaborates on governance and stakeholder engagement practices and the external forces shaping adaptive capacity and therefore on the outcome of adaptation activities. Through field trips to adaptation project villages and interviews with local communities a holistic picture of the Lao case for sustainable adaptation will be drawn by analyzing determinants for vulnerability and resilience to cope with the impacts of climate change.

The upcoming chapters are structured as following.
After a short introduction illustrating the research objectives and questions, chapter 2 gives an outline on the theoretical and thematic framework of adaptation science in the context of development. Potential economic, political, cultural and social forces will be illustrated, which can shape the adaptive capacity and vulnerability to climate change. Chapter 3 deals with the regional setting of Lao PDR, its political and socio-economic framework, vulnerability and adaptive capacity to cope with climate change and the actions already taken to combat the global threat locally. In chapter 4 the key findings of the field research carried out in Lao PDR are presented giving an overview of the climate resilient development efforts

happening on the ground to reach sustainable adaptation. The external and internal variables discussed in the theoretical chapter will be tested for the country case of Lao PDR. Chapter 5 discusses the findings in a general context. Recommendations and conclusions in the context of sustainable development are made.

1.1 Research objectives and questions

Research objectives

The literature identifies determinants, which can shape the sustainable implementation of climate change adaptation actions. Therefore the aim is to test these framing values, interests and institutions and the localized limitations and barriers relating to human behavior and governance on their influence on sustainable climate change adaptation and communities' resilience and capacity building to cope with climate change impacts in Lao PDR.

An analysis of the implemented climate change adaptation actions, participating stakeholders and their influencing roles in climate resilient development will be undertaken to then evaluate on the sustainability of these adaptation processes.

Based on this scenic evaluation, recommendations for further climate change adaptation actions will be given.

Research questions

1. What kinds of climate change adaptation interventions and activities do the Lao government, ODA, NGOs and the private sector implement to sustainably build local resilience and capacities on community-level?

2. What economic, political, social and cultural drivers shape the process of sustainable climate change adaptation in Lao PDR and affect the projects outcome? How is the level of information sharing, participation, communication and cooperation determined by the identified forces?

3. Are these drivers understood as limitations and barriers or as transformative chances for sustainable adaptation ?

2. Theoretical and thematic framework

2.1 Climate change in the global context of development

Climate change is understood as global issue with large impacts on local level. Climate change in IPCC usage refers to a change in the state of the climate, it refers to any change in climate over time, whether due to natural variability or as a result of human activity (IPCC, 2007). In contrast the United Nations Framework Convention on Climate Change (UNFCCC), refers, defining climate change, to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (UNFCCC, 2014). These changes include global temperature rise, decreasing water availability and changing ecosystems next to climatic hazards as droughts, floods and general weather uncertainties. During the last decade the general climate change debate has shifted from a focus on the evidence and the causes of climate change to finding ways how to aviate further damage (IFC, 2011). Therefore and for the purpose of this research the existence and origin of climate change as combination of natural and human cause will not be questioned. Moreover the focus is on the analysis of the actions taken against its impacts. The theoretical framework will centralize adaptation to climate change as the local solution to a global threat, embedded into development goals and determine the variables that shape its implementation.

As climate change is understood as a global public good it can also be characterized by a global free rider problem in which developed countries have been unevenly producing more carbon emissions in the past than developing nations, which are at the same time unevenly more affected by them. Developing countries have been facing a double burden of being impacted by climate change more drastically than developed countries due to lacking capacities for innovative technologies and resources to cope with it one hand. On the other hand these countries have the goal to develop as fast as possible, alleviate poverty and gain economic growth. Globally increased awareness and understanding of sustainable development and the associated challenges and opportunities put developing countries under pressure of meeting international social and environmental sustainability guidelines by increasing economic growth.

Global threats need global solutions, which demand cooperation and collective action on multi-national scale. Supranational institutions as the United Nations (UN) built global alliances to guide on mitigation and adaptation measures. Mitigation strategies are for instance the Kyoto Protocol, which commits its parties by setting internationally binding

emission reduction targets or to name one of its market mechanisms the Clean Development Mechanism (CDM) with which developed countries can implement an emission-reduction project in developing countries to compensate carbon credits (UNFCCC, 2014). However, enforcement is only possible on voluntary basis but without a regulatory instance or international law obligations. It remains national governments' decision to integrate climate change policies and strategies into their national agendas for sustainable development. Sustainable development has been defined in many ways, but the most frequently quoted definition is "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Climate change impacts will compromise exactly these needs by limiting the access to natural resources and affect socio-economic standards negatively. Therefore implementation of sustainable adaptation actions needs to be governed in an effective way.

In many developing countries corruption, the absence of civil society and a lack of efficiency and effectiveness in governance structures counteract the development of the country (Pahl-Wostl, 2009). The distinction between governance and management of resources and programs is often not clarified. Management refers to the activities of analyzing and monitoring, developing and implementing measures to keep the state of a resource/program within desirable bounds established by the governing body (World Bank, 2012). The notion of governance takes into account the different actors and networks that help formulate and implement environmental policy and/or policy instruments (Pahl-Wostl, 2009). Governance gaps can arise easily if responsibilities are not well-defined and multi-level interactions between states, the market and civil society is not functioning. Therefore, next to government duties, there is a call for multinational companies to focus on avoiding climate impacts of their activities (Social Accountability International, 2012). It remains a challenge to clearly identify the responsibilities of the multi-national and –dimensional stakeholders especially when it comes to inner state measures. Differing interests between the stakeholders can occur in non-cooperation and even raise conflict potential. Natural resource-rich developing countries find themselves often back in dilemmatic contradictive activities of large-scale natural resource extraction for international export on one side and repairing the damage of the initial with development projects on the other.

To conceptualize the different theoretical themes, which play a role for the analysis of climate change adaptation initiatives in a developing country case, a closer look will be taken on the framework of climate adaptation in the context of sustainable development. Climate action

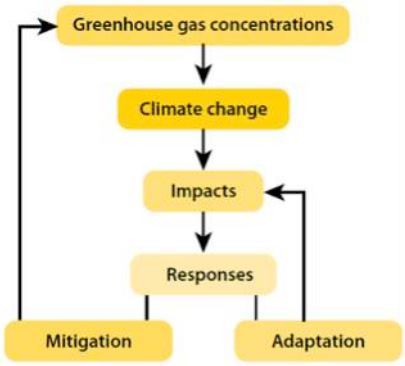
goals as climate-resilient development met by reduced vulnerability and increased adaptive capacity will be analyzed on its bias of economic, political, social and cultural forces. These possible limitations and barriers for sustainable adaptation and its mainstreaming into development targets can influence the level of information sharing, participation, communication and cooperation between the involved stakeholders and hinder collective climate action.

2.2 Climate change adaptation as a part of climate compatible development strategies

2.2.1 Adaptation science: vulnerability and adaptive capacity

Climate change is a fundamental threat to sustainable development and the fight against poverty. There are three important concepts related to climate change, its impact and the responses of natural and human systems: vulnerability, mitigation and adaptation. Vulnerability is characterized by the potential physical climate change impact based on the system's exposure and sensitivity and on the adaptive capacity to combat it (Barr et al., 2010). Mitigation and adaptation are the two strategies for addressing climate change (see figure 1). Mitigation is an intervention to reduce the emissions sources or enhance the sinks of greenhouse gases (Locatelli, 2011). Adaptation is an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2001; Locatelli, 2011). "In the context of human dimensions of global change it refers to a process, action or outcome in a system (household, community, group, sector, region, country) in order for the system to better cope with, manage or adjust to some changing condition, stress, hazard, risk or opportunity" (Smit et al., 2006).

Figure 1: Climate change cycle



Center for International Forestry Research (CIFOR), 2012

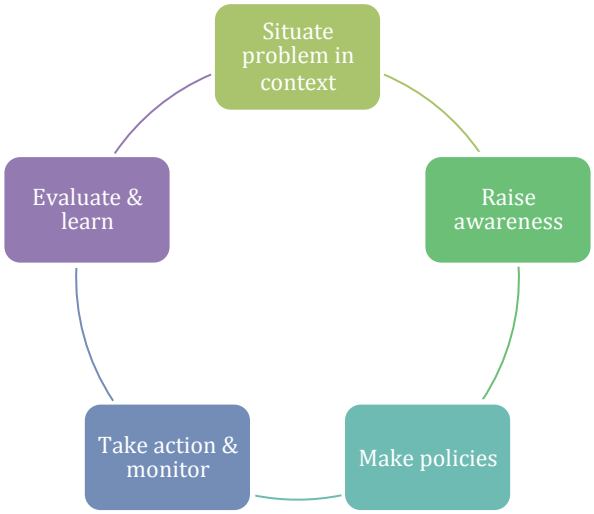
Both approaches are necessary to combat climate change since mitigation addresses the causes and adaptation the impacts of climate change. Adaptation benefits are local compared to global mitigation efforts. Adaptation aims to reduce vulnerability but can only have a short-term effect. Therefore local groups have to always (re-) adapt to new variability and vulnerabilities. "Adaptations are manifestations of adaptive capacity, and they represent ways of reducing vulnerability" (Smit et al., 2006).

It is an on-going process addressing many factors and stresses and involves changes in social and environmental processes, perceptions of climate risk, practices and functions to reduce

risk and exploration of new opportunities to cope with the changed environment (Olmos, 2001). The literature argues that the many assessments of impact, vulnerability and adaptive capacity for informing choices between adaptation options lack usefulness as well as the links to implementation due to a diversity of limitations and barriers relating to human behavior and governance (Hinkel, 2011).

Based on the articles of Wise et al, Smit et al., Basset et al. and Pahl-Wostl adaptation can be seen as a pathway to resilience. This pathway has to be designed by decision makers and depends very much on the regional context. However, a general adaptation plan with the following steps included can illustrate a learning cycle for long-term adaptation agendas for states.

Figure 2: Adaptation plan



Author's graph, data: Wise et al., 2014; Smit et al., 2006; Pahl-Wostl, 2009

The social and ecological problem situation of climate change has to be identified and integrated into the local context of the country. If it is identified, awareness for it has to be risen in the population and engaging with different stakeholders is crucial to then make the right policies. The implementation of those has to be ensured through frequent monitoring to then evaluate the actions for future lessons learned.

In practice the natural system can react with changes in crop growing, in the ecosystem or wetland migration. Human systems adaption can also be divided into private and public spheres. In concrete actions this means that with an anticipatory approach private household have the possibility for adaptive insurances against climate change or risk changed construction of houses (Teri, 2006). Creating a larger crop diversification can be a response

for changed agricultural practices. Public institutions can anticipate with the installation of early-warning systems or build incentives for relocation and compensation payments or subsidies (Teri, 2006).

In agriculture, reduced rainfall and higher evaporation rates would call for new means of irrigation practices. Such a change would require a national policy framework which integrates traditional coping mechanisms along with new practices and emphasizes on the importance of including climate change as a long-term consideration while formulating policies (IPCC, 2001).

Differing socio-economic and institutional arrangements in certain regions may result in different impacts on farmers and different adaptive responses in short- and long-term.

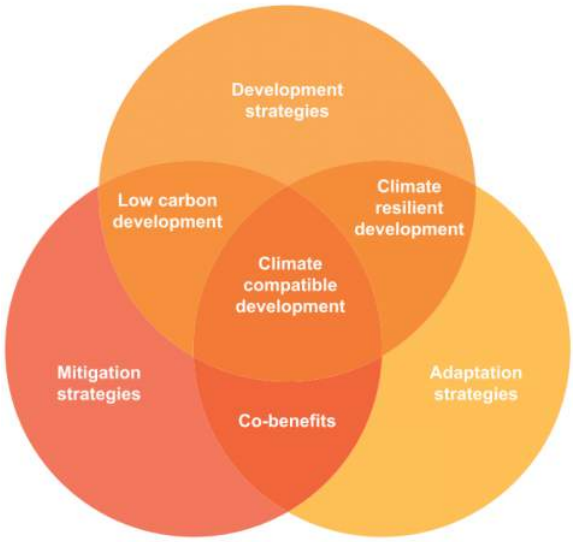
Next to regional differing climate variability, varying community believes and cultural tradition may place greater or lesser value on different consequences and therefore have strong preferences for different types of adaptation measures (Hobday et al., 2006).

"Successful climate change adaptation and vulnerability reduction is rarely undertaken with respect to climate change alone" (Smit et al., 2006). The literature revises that vulnerability reduction appears to be most effective in combination with other development strategies and plans.

2.2.2 Integrating adaptation into development targets

Many developing countries' government's focus on poverty reduction, food security, health care and education but leave climate change issues out of policy priority. Developing countries lack capacities to cope with climate risks even though climate change has large-scale impacts on all development issues. Climate hazards and uncertainties impact food security and the health situation of people. If climate change is mainstreamed into general development activities by small and cost-effective adjustments instead of being interpreted as a separate threat, it is possible to reduce the vulnerability to socio-economic and environmental hazards. The concept of climate

Figure 3: Climate compatible development



Mitchell et al., 2010

compatible development is a recently discovered research field unifying climate change adaptation and mitigation strategies with development strategies and is defined as the development "that minimizes the harm caused by climate impacts, while maximizing the many human development opportunities presented by a low emissions, more resilient, future" (Mitchell et al., 2010). It emphasizes climate strategies that embrace development goals and integrates the threats and opportunities of a changing climate (see figure 3). New development processes that safeguard development from climate impacts and encourages climate resilient development and reduces emissions without compromising development goals (low emissions development) are keys to reform climate actions (Mitchell et al., 2010). Climate compatible development goes beyond the separate development goals by "asking policy makers to consider "triple win" strategies that result in low emissions, build resilience and promote development simultaneously" (Mitchell et al., 2010). As an example climate smart agriculture can indicate "a triple win situation through increased productivity and food security, rising resilience and reduced emissions" (Bickersteth, 2010). Climate compatible development with the unification of development, adaptation and mitigation as combined strategies has not been much researched, for this reason very limited literature is available. To integrate global mitigation strategies into conformed local adaptation-development goals presents a challenge but should be investigated in further research.

The object of this study is the overlaps of adaptation and development strategies to analyze scenarios for local-scope options.

The literature is still largely dominated by the analysis of adaptation as simply an adjustment seeing climate impacts as the main source of vulnerability. Little attention has been paid to the social roots of vulnerability and the necessity for political-economic change to achieve "transformative adaptation" (Bassett et al, 2013). Development actions can address multiple sources of vulnerability, ranging from those specific to climate change impacts to those that generate poverty and general insecurity (McGray et al., 2007). Pro-poor development actions can be seen as complementary to reinforce adaptive capacity to climate change (Bassett et al., 2013). Vice versa climate change adaptation has an influence on a variety of development issues including health, education, sanitation and infrastructure and can promote other benefits that lead to equitable and sustainable development. For instance climate change adaptation will sustainably shape the food production through changing agriculture cropping methods or "simply shifting planting dates or switching to an existing crop variety, may moderate negative impacts" and can determine food security for local farmers (Lobell et al.,

2008). It overlaps naturally with development because climate-sensitive vulnerability and poverty reduction strategies are crucial for adaptation. Climate resilience is the ability to recover quickly from climate hazards and shocks. Resilience reflects the amount of change a system can undergo and the degree to which it can re-organize and build capacity to learn and adapt (Mitchell et al., 2010). The literature points out the necessity for educational tools as an adaptation decision-making guidance, knowledge-sharing programs and databases and information tools (Bickersteth, 2010). The information gap stays in practical examples from the field where these theoretically suggested tools and methods would have been tested to find evidence of their effectiveness.

The issue remains in defining the stakeholder's role and the financial resources investing in it. How climate change adaptation is coordinated and implemented in a country depends highly on the political, cultural and socio-economic framework it is embedded in.

2.3 Governance and adaptation capacities: The political economy of climate change

The main goals of climate change adaptation of "reducing vulnerability, fostering resilience and developing the capacity to experiment" and learn are combined to be achievable but can be shaped by lacking communication, cooperation, differing interest between the stakeholders, socio-economic factors or regional cultural tradition (Ensor et al., 2009). These governance issues are increasingly recognized as important for the success or failure of adaptation (Brockhaus et al., 2009). The UNDP defines governance as the complex mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights and obligations, and mediate their differences (UNDP, 1997). The governance-adaptation linkage is crucial for sustainable climate action and demands a multi-stakeholder participatory approach. Adaptation is a knowledge intensive topic that involves many cross-cutting issues, addresses different political or administrative levels and needs shared responsibilities and coordinated action between different regional and sectoral actors (Umweltbundesamt, 2013).

2.3.1 Economic governance of climate change adaptation: the financial framework of aid

Sustaining low emissions resilient growth and social development is a challenge for policy-makers in developing countries. They are confronted with climate change characteristics as high scientific uncertainty, the potential for surprise events and the need for long-term planning horizons (Eakin et al, 2009).

Climate-related economic development challenges and opportunities can possibly be found in for instance goods, which are exported by rising transport costs and changing relative prices. Export-led agricultural strategies, which also face uncertainty over temperature can change and the volume and distribution of rainfall. “Producers from developing countries may benefit from exploiting demand for biofuels or the opportunities presented by carbon market incentives to conserve forests. Conversely, countries with a traditional economic reliance on exporting high carbon fuel sources may be disrupted by a shift in demand to cleaner fuels” (Mitchell et al., 2010). These direct and indirect economic impacts of climate change on development mean that policy-makers need to consider the appropriateness of different economic growth strategies and how to incentivize and regulate low emissions transitions, technological innovation and skills development.

A conflict of interest can arise between resource intensive sector development as part of economic growth strategies and climate adaptation and development projects, which aim to protect these resources. An other resulting issue might be the access for the local population to these resources. Projects with resource extractions on large-scale and for instance in line displacements of people changes their baseline situation to access these resources as water or forests and can reduce their adaptive capacity and increase their vulnerability.

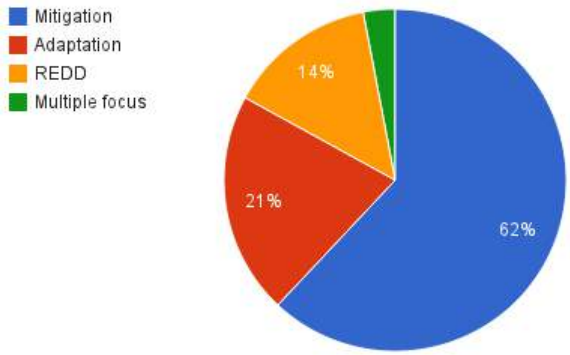
National Adaptation Programs of Action (NAPAs), UNFCCC guidance, provide a “process for Least Developed Countries to identify priority activities that respond to their urgent and immediate needs to adapt to climate change” (UNFCCC, 2014). The integration into national agendas and budgetary frameworks and potential coordination mechanisms is crucial, as adaptation development needs to touch on all sectors and will include regulatory, as well as fiscal, measures (Mitchell et al., 2010). In the case of Least Developed Countries NAPAs, translation to in-country planning and action remains limited, and the literature argues that NAPAs are not being written in ways that readily translate to real action (Wise et al., 2014). However, successful adaptation actions are evident and show that NAPA plans are possible to be implemented and to provide lessons and potential options for future direction as in for instance small Southeast Asian island groups (UNDP, 2012).

Most developing countries struggle with lacking financial resources for an adequate climate resilient development with the needed climate change adaptation tools to make their population climate-resilient against the impacts. The origin and impacts of climate change are caused mainly by the developed industrial world and affects most seriously the developing

nations, makes the call for strong development assistance more compelling (Stern, 2006). Supranational development organizations and developed country's aid function works as financial support to build up adaptive capacities. Moreover the UNFCCC calls on developed countries to "assist the developing country parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation" (UNFCCC, 1992b). The allocation of financial resources is based on physical impact, adaptive capacity, which together determine vulnerability to climate change, and implementation capacity, which promotes adaptation effectiveness. There are "institutional issues related to governance, accountability and the link to the prevailing development aid framework" (Barr et al., 2010). The literature states that coordination and distinction between the two financial flows for adaptation and development has to be made with adaptation finance as a proven additional to existing development assistance (Klein et al., 2008). On the other side the literature has so far made the recommendation for a stronger adaptation-development-nexus by implementing projects. It remains therefore questionable if the financial distinction between the two is indispensable or just more bureaucratic effort.

Insufficient implementation capacity demands different implementation arrangements, as for instance, the replacement of budgetary support with externally controlled project management and the need for capacity building as an adaptation (and development) priority (Barr et al., 2010). A shift in aid provision from mainly financial support to more technical and knowledge transfer can be noticed. However, supranational institutions as the World Bank or the UNDP estimate the costs for climate change adaptation in developing countries up to US$100 billion per annum (Barr et al., 2010). Most of the invested international funds into climate change related development projects are going into mitigation programs (see figure 3). Barely above a fifth is invested into local adaptation, what supports the assumption of underestimated importance for internationally intervened community-based resilience building. An aid combination of complementary technical assistance, project management and an acceleration of development assistance might be the way for an effective adaptation but needs sufficient funding.

Figure 4: Climate change related international funds



Auhor's graph, data: MONRE, 2013

2.3.2 Inclusive governance: Democracy, participation and multi-level stakeholder engagement

To achieve climate resilience and reduced vulnerability in a country through well-established adaptation policies and their implementation the political framework has to allow effective activities and operations. Factors as the level of a country's democracy and public knowledge and participation can have major influence on climate change adaptation and development. In order to tackle climate change, cooperation on global and local level is needed as the promotion of inclusive and broadly representative glocal decision-making channels (Held et al., 2009).

The scientific debate focuses more and more on the increasing fragmentation of global climate governance with a mosaic of international policies as emission targets and trades and of actors, including governments, civil society, science and business, and their interlinked political activities in this field (Pattberg et al., 2007). It explains also the shift from a predominantly state authority in governance issues to a multi-stakeholder sphere in which public-private partnerships intervene in policy making and outcome. This agency beyond the state can be found practically in joint climate change action programs of local governments with NGOs and private supplier to develop community projects. "Agency can be understood as the power of individual and collective actors to change the course of events or the outcome of processes" (IVM, 2014). As an information gap, the assessment of the institutional framework these actors create in order to govern climate change on global and local level is missing. More possibilities are offered for issues-linkages and strategic bargains among actors but at the same time the need for coordination among a growing number of agents in global climate governance increases (Pattberg et al, 2007). However, even though the role of the state might be shifting to be less important in this context, states can influence the political framework in which agency can develop better than in others.

The literature outlines that democracies are more likely than authoritarian regimes to protect environmental quality (Holden, 2002). Democracy can appear in different forms, direct or representative, but it keeps the general idea of allowing people to participate equally. "Democracies have better access to information, with fewer restrictions on media and sources of information, and greater transparency in decision-making procedures" (Held et al., 2009). "They encourage the advance of science, which is responsible for the awareness about climate change and other forms of environmental threats" (Giddens, 2008). Democracy also allows the population to found pressure groups or social movements to influence political activities. In autocratic regimes as a communist one, civil society is weak so that the government has

fewer incentives to legislate sustainable policies. Collective agency as in form of a NGO might be restricted so that governance efforts beyond the state are counteracted. An autocratic regime involves the general public less into policy and decision-making and is more likely to be influenced directly by interest groups (Steves et al., 2013).

National policy-making depends initially on government structures, which differ in the number of actors whose agreement is necessary for policies to be enacted (Tsebelis, 2002). In democracies parties and generally politicians in the government have an interest to take into account the opinions of their constituents. The level of democratic responsiveness depends on the election rules and on the degree of media freedom, what influences the amount of information accessible for the population (Steves et al., 2013). The ability of filtering media information depends on the educational level of the individuals.

Bättig et al. (2009) finds that while the effect of democracy on political commitment to climate change is positive, the effect on policy outcomes, say implementation, is ambiguous.

Democratic governance is characterized as inclusive, participatory and accountable, which forms an essential framework for achieving resilience (Smit et al., 2006). A problem occurs with this in a global governance case, which can be complex in targeting global public goods as climate change what has a domestic and an international domain. The institutional fragmentation and competition between states can bring uncertainty about the international institutions' role and functions with blurred objectives (Held et al., 2009). Especially in the case of developing countries, which suffer from significant deficits of accountability and inclusion, their entire populations can be marginalized or excluded from decision-making in a system of global governance (Held et al., 2009).

Differences on national governance levels become clear between the countries and show that the relationship between climate change mitigation and adaptation and policy commitment is not necessarily in line. For instance emissions may rise despite good climate change policies due to economic development objectives (Steves et al., 2013). The government might be generally an effective policy implementer but struggles to contain emissions due to for instance fossil fuel-based electrification and urbanization (Steves et al., 2013). Lacking institutional capacities and their coordination can hinder an effective climate change policy implementation. To measure how advanced a country is in its development of climate change strategies following criteria can be considered (Steves et al., 2013):

1. *International cooperation*

   How quickly has a country ratified the Kyoto Protocol and whether it is participating in flexible mechanism as the Clean Development Mechanism (CDM);

2. *Domestic climate framework*

   Are climate change laws and targets adopted and what is the level of institutional engagement in climate change (ministerial level);

3. *Regulatory measures or targets*

   Are sectoral or cross-sectoral regulations identified?

These criteria can measure the policy-framework readiness for a climate resilient development but does not give evidence on policy outcomes. For a positive policy outcome the institutionalization of local governments with decentralized responsibilities on national and local level might be a key.

Governmental authorities are often fragmented and are separately in charge of related topics as climate change adaptation, disaster risk reduction or sustainable water and energy supply. A stronger cooperation between the departments can reduce administrative costs and guarantee a better monitoring process on implementation so that comparable benchmarks for all climate change-related sectors can be developed. Also the lack of connectivity between the national and local governance level rises gaps between locally elected representatives and civil society and may lead to further isolated political processes and a reduction of the adaptive capacity and higher risks of vulnerability at the local level (Brockhaus et al., 2009). More delegated decentralized responsibilities but equipped with the needed financial resources allows a stronger connection and negotiation with the remote disconnected population which are the most marginalized.

Next to shared responsibilities between national and local governments, the involvement of the local citizens and civil society plays a role for adaptation actions. Participation in the context of effective adaptation and development ha been discussed broadly in the literature. Emphasis is put on public participation, which requires the access to information and free media initially. Raising public awareness depends highly on the level of education, what influences the amount of information the population has about the scientific evidence of climate change (Steves et al., 2013). However, there are limitations to participation as the key for climate resilient communities. “Resilience places an emphasis on inclusive processes led by stakeholders. It requires participatory assessments, planning and accountability to improve service delivery, reduce social exclusion and enhance relations among parties” (Held et al.,

2009). Participation is reflected as inclusive stakeholder engagement but "how participation might be progressed as a collective process between all of the stakeholders involved" is scarcely discussed (Collins et al., 2009). Rethinking participation goes together with a transformative approach of adaptation as a co-evolutionary process (Bassett et al., 2013). "This perspective recognizes that adaptation requires learning rather than simply participation, and specifically a form of learning which is collective in nature. The term social learning has arisen in response to a growing recognition that learning occurs through situated and collective engagement with others" (Collins et al., 2009). However, the agency of stakeholders to work collectively depends again on institutional arrangements, which "enable them to learn through building their stakeholding in an issue" (Collins et al., 2009). This social learning process is framed by the way of communication and requires the recognition of the "historical situatedness of change possibilities, and thus the trajectory-determining initial starting conditions associated with implementing participatory processes" or in other words path-dependency (Collins et al., 2009; Pahl-Wostl, 2009).

The adaptive capacity, as illustrated, is shaped by the governance issues, country's political and economic structure and the government's inclusion into international cooperation and commitment. But limitations can also be more of societal values, perceptions, processes and power structures within society (Adger et al., 2008). It can influence the level participation and moreover social learning processes. "Adaptation decisions depend on the perceptions of risk held by society, which may act as limiting factors if the society does not believe the risk is great enough to justify action. The undervaluing of places and cultures may limit the range of adaptation actions" (Adger et al., 2008). The literature outlines that the ability to adapt is determined in part by the availability of technology and the "capacity for learning but fundamentally by the ethics of the treatment of vulnerable people and places within societal decision-making structures" (Adger et al., 2008).

2.3.3 Culture, power and social capital: determinants for collective action

The previous subchapters illustrated governance issues in the climate change adaptation process. Economic forces as differing interests of the involved global and local actors can determine the access to resources and more generally influence the adaptive capacity und vulnerability to climate change next to financial matters. Politically, governance issues on global, national and local level can appear through undefined responsibilities and the level of commitment, democracy or participation. Lacking information sharing, communication and

cooperation can result but these determinants shape the strength of collective action and are influenced as well by the ability of social learning.

Economic and political drivers are rather external system variables, but there also society based cultural and social forces, which can shape climate change adaptation.

Cultural interpretation of science and risks affect adaptation and its way of implementation. Culture influences how people support adaptation interventions, and their motivation to respond to them (Adger et al., 2012). This is based on culturally shaped values, which might differ between adaptation efforts that are created rational and effectively by governments and development organizations, and those that are considered by remote communities. “In climate change adaptation, as in development more generally, culture and politics interact to determine who has voice, whose values count and what information is legitimate in society” (Adger et al., 2012). “The limitations to adapt are set by the agents of change, states, markets and civil society, and their ability to act collectively” (Adger, 2003). The effectiveness of chosen strategies depends on the social acceptability of options for adaptation. “Adaptation processes are shaped by their agents and their relationships with each other, the framing institutions and the resources they depend on” (Adger, 2003). Decisions are based on how these relationships are connected with each other and on the strength of their networks. This can be summarized under the term of social capital, what describes “relations of trust, reciprocity and exchange; the evolution of rules and the role of networks, civil society and collective action” (Adger, 2003). So far not much literature has been published on this variable as a force for adaptation, although its degree can be crucial in the context of a culture specific analysis of adaptation restrictions. The theory of social capital provides an explanation for how individuals use their relationships to other actors in societies for their own and for the collective good (Adger, 2003). Collective action itself can only take place if individuals are connected to each other through networks and a constant flow of information to build up participative social learning processes (Collins et al., 2007). If individuals build a set of collectively held networks in for instance communities, public social capital can be the outcome and may shape institutions and build a local governance level beyond the state (Wise et al., 2014). It also has an important part in obtaining access to natural capital (in this case natural resources) for individuals and societies (Adger, 2003). An active information exchange between the state and civil society promotes social and policy learning through democratic participation and environmental governance for a sustainable use of environmental resources (Agrawal, 2001). In an autocratic state scenario social capital is often suppressed to weaken civil society and can cause conflicts. In case of lacking capacities for a

strong state and a rolling back of the government can encourage social capital in its need to substitute a state answer and to formulate collective power to combat climate change.

The level of social capital influences the amount of information flow and sharing inside a network. On this basis decisions for communication and possibly cooperation between stakeholder groups are made. The level of information and knowledge can therefore affect how much power an individual or a group has. More theoretically power can be understood as "the structural capacity of a social actor to impose its will over other actors. All institutional systems reflect power relations, as well as the limits to these power relations as negotiated by a historical process of domination and counter-domination" (Castels, 2007). In a democracy power can be equalized with the centrality of a network in which the most powerful is the one with the most information sources (Bonacich, 1978). It can be of interest to communicate and cooperate extensively and widen the network to reach more power over others. In a non-democratic system with a strict hierarchy it can be more of an advantage to share information with people who are higher up in the hierarchy but not with the whole network (Bonacich, 1978). Adaptation to climate change therefore depends also on social capital, its use for building networks, in which the right communication of information and cooperation can lead to a more powerful position in society. Actions need both leadership and a collaborative spirit (Stern, 2006). Recognizing adaptation as a transformative process includes "raising awareness and understanding of the interplay between knowledge, values, power and agency to inform responses to change, particularly in dynamic, complex and contested contexts (Wise et al., 2014). It is stated that there would be "no innovation or evolution to higher adaptive capacity if individuals or organizations never revisited basic values and beliefs. A lack of critical self-reflection is a severe constraint for societal learning and transitions to more sustainable resource governance approaches" (Pahl-Wostl, 2009).

The adaptation science literature agrees cross widely that there is often little recognition of adaptation as an increasing need to facilitate transitions of governance arrangements and transformations of societal processes, norms and values (Wise et al., 2014). However, this approach seems to see the only way of adaptation in transforming society and culture instead of suggesting research in possibilities for culture embedded adaptation processes.

4.4 A guide for sustainable adaptation?

After analyzing economic and political determinants, the previous subchapter was dealing with social and cultural forces as value-based beliefs; social capital through built networks what enables collective power for climate adaptation actions. All these determinants have

potential to influence the adaptive capacity, vulnerability and resilience of climate impacted groups. They drive knowledge, information sharing, communication and cooperation for collective action and reflect stakeholder engagement and governance systems. What these forces have in common is that they are dynamic in term of varying in time, by type and from the stimulus; they are place- and system-specific and need to be tested empirically in the special regional case.

Adaptation can potentially reduce the negative impacts of climate change, but little attention has been paid to the consequences of adaptation policies and practices for sustainability (Eriksen et al., 2011). Certain adaptation strategies might interfere with other sustainable development targets and can trigger unintended negative effects on people and the environment. Therefore it is crucial to identify the synergies between adaptation and sustainable development. As with debates about sustainable development, the climate change problem raises questions about the underlying development pathways causing both environmental problems and poverty (Adams, 2009). An underlying premise for the concept of a unified sustainable adaptation is that many responses to climate change will create social and environmental externalities, including trade-offs and negative consequences (Eriksen et al., 2011). Sustainable adaptation takes the wider effects of adaptive responses on other groups, places and socio-ecological systems into account, both in the present and in the future (Eriksen et al., 2011). A response to concerns that adaptation has often been operationalized in practice through changes in technology, institutions and managerial systems, rather than challenging current development paths, including the social, economic and political structures that underlie many contemporary problems (Klein et al., 2007). Modeling guidelines on global sustainable adaptation and generalize certain characteristics for adaptation strategies is dangerous since the local context has to be analyzed. But there are four principles, which can be summarized as path for sustainable adaptation planning.

1. **Recognize the context for vulnerability, including multiple stressors**
2. **Acknowledge that differing values and interests affect adaptation outcomes**
3. **Integrate local knowledge into adaptation responses**
4. **Consider potential feedbacks between local and global processes**

Based on the first principle sustainable adaptation places emphasis on how the structural and contextual factors that create vulnerability, such as chronic poverty and unequal terms of trade, influence the outcomes of adaptation measures (Eriksen et al., 2011).

The second principle aims sustainable adaptation to may involve a more transparent political process that creates enabling conditions and access to information that supports decision-making adaptation. For example linking democratization and empowerment efforts with those of adaptation can potentially address differing or even conflicting adaptation interests (Eriksen et al., 2011).

Integrating local knowledge based on the experience of living in a risky place and of observing the natural environment is essential for sustainable adaptation efforts and is an increasing bottom-up approached answer (Olsson et al., 2001). "In the dominant scientific discourse, practices of the poor have often been blamed for environmental degradation, and resource control has consequently been transferred from local populations to central governments or to private actors" (Benjaminsen et al., 2006). Vulnerable communities are used to e.g. climate hazards as floods are capable of generating social learning, which can result in proactive behavior in terms of well-organized community participation and leadership in disaster response, and improved capacity to adapt to climate extremes (Eriksen et al., 2011). Local knowledge in disaster risk management is critical for reducing vulnerability among the poorest, and can be combined with policy efforts to address social equity and vulnerability (Eriksen et al., 2011).

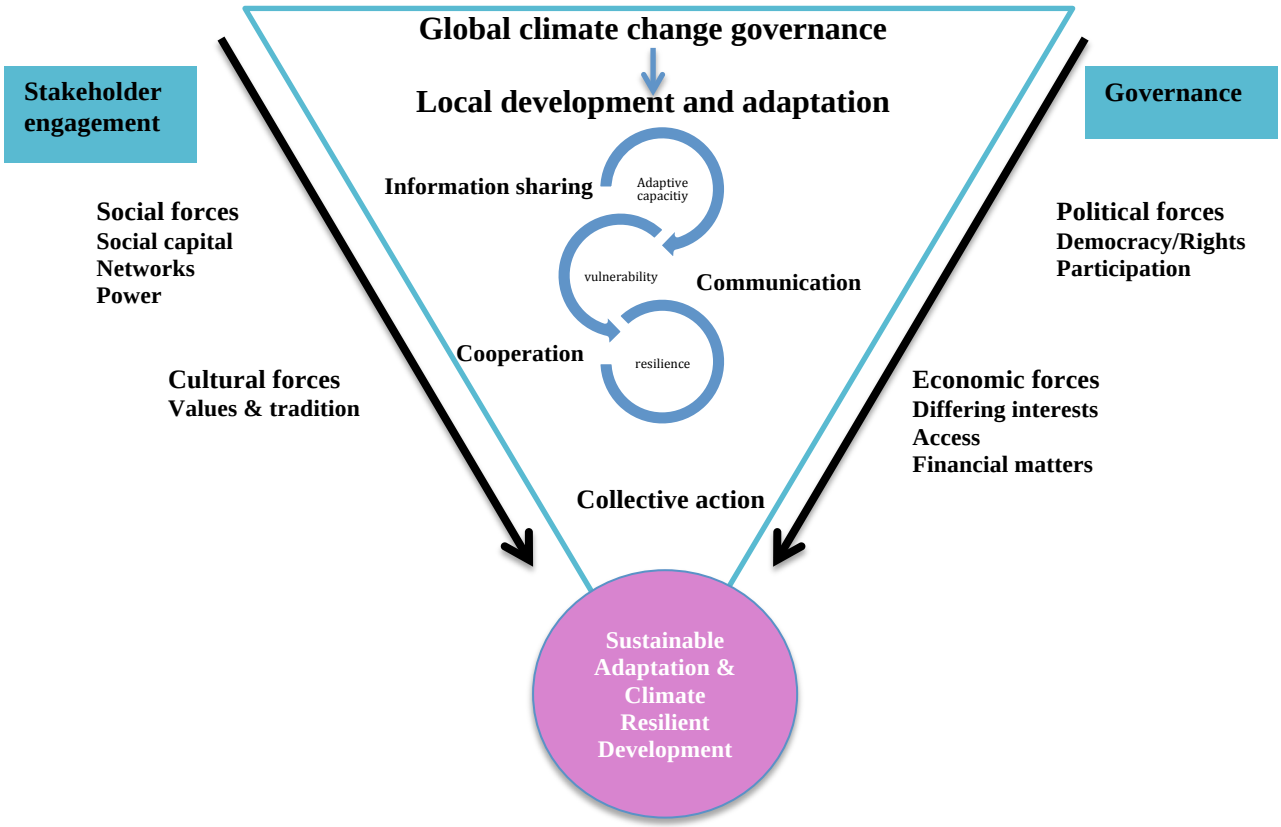
The fourth principle is based on the glocal character of climate change impacts and adaptation as adaptation can influence, next to the local outcome, also wider variables as migration, trade patterns and urbanization processes.

Sustainable adaptation requires anticipatory learning with continued reflexivity and calls for the importance of social capital and community empowerment, what enables knowledge sharing and collective action (Tschakert, 2010). Socially marginalized groups, the most vulnerable ones, must be included into decision-making processes. "The road to sustainable adaptation starts with the understanding that adaptation is a 'process' rather than a list of actions and measures that address specific climate change impacts" (Eriksen et al., 2011).

The literature identifies that to achieve a win-win development-adaptation situation more than good governance is needed. The empowerment of the poor to restructure social, political, and economic relations in their favor will be the key.

As shown in this paragraph, sustainable adaptation is a process, taking an adaptation plan, as demonstrated in chapter 2.2.1, as the baseline and taking then the illustrated economic, political, cultural and social variables into account. The variables are not independent from each other, what enhances the complexity of this science.

4.5 Conceptual model



The conceptual framework demonstrates that for the goal of sustainable adaptation and climate resilient development the adaptive capacity und vulnerability has to be analyzed for its shaping forces. Each factor is not independent from each other. Sustainable climate change adaptation should be understood as a transformative pathway and is shaped by behavior economics but also by regional variables as the political system, economic development or culture. With a unified governance and stakeholder engagement approach collective action can be driven to make out of these limiting forces chances for sustainable adaptation.

Since the literature has not provided any evaluation on sustainable climate change adaptation projects in the local context of a developing country, the special case of Lao PDR with its many external influences shaping the path of a climate-smart development is focus of this research. To measure how the here demonstrated theoretical variables influencing climate change adaptation on the local ground a regional framework with the challenges Lao PDR is facing in a global and local context will be outlined.

A key challenge for adaptation research is to identify which barriers are likely to arise in which kinds of contexts to inform how to address them (Wise et al., 2014).

3. Regional framework

3.1 The national and regional context

Lao PDR is a land-locked, mountainous country with a small population of 6,4 million inhabitants but rising economic growth of an average GDP of seven per cent per anum (UNDP, 2013). Lao borders China, Myanmar, Vietnam, Thailand and Cambodia and owns 35 per cent of the transboundary Mekong River, which secures the livelihood of millions of people. 67 per cent of the population lives in rural areas and almost half of the remote villages are without access to connecting roads and make their major income through subsistence farming and fishing (PIDUP, 2010). Lao PDR is still considered as a least developed country but has been constantly decreasing the poverty rate to 27,6 per cent of the population (UNDP, 2013). The country is on course to achieve the Millennium Development Goal targets by 2015, however the challenge now is to ensure that all Lao people benefit from the country's development (UNDP, 2013).

Figure 5: Map Lao PDR

ADPC, 2012

Lao PDR is a country with 49 recognized ethnic groups. Especially the rural indigenous population, mostly marginalized by insufficient provision of infrastructure, energy supply and sanitation, are lacking access to education and health. There is a diverse use of indigenous languages with many indigenous people not speaking the Lao language. Culture and traditions are highly valued in Lao society so that cultural practices can still be found to be conserved in rural areas. The Lao population is mainly Theravada Buddhists, also incorporating spirituality into their daily life. Studies found that the well-being levels of Lao people are very much depended on their attitudes toward their society and their cultural values (Ruchiwit, 2013).

Lao PDR is one of the poorest countries in Southeast Asia.

An additional unique challenge is the presence of unexploded ordnance (UXO) from the Second Indochina War, which continues to destroy lives and limits agricultural production and expansion in certain areas. More than two million tones of bombs were dropped by the United States on all provinces between 1964 and 1973 to block North Vietnamese arms and troops (UXO Lao, 2013). 30 per cent of those failed to detonate and continues to remain in the ground, maiming and killing people, and making socio-economic development substantially difficult (UXO Lao, 2013). There is a strong correlation between UXO

contamination and rural poverty with 91 per cent of the poorest districts also being affected by unexploded ordnance (UNDP, 2013).

The whole Southeast Asian region, Lao PDR is affected by climate change impacts and tries to build effective adaptation measures to combat it. As a matter of fact Lao PDR represents a special case in terms of political and economic forces determining sustainable adaptation activities. The current economic development can reduce the adaptive capacity and raise the vulnerability of the local population to climate change impacts. In the following a closer look will be taken at these drivers.

3.1.1 Political structures and trade relations

Politically the country has considerably opened up in recent years, ratifying six out of the nine core human rights treaties. However, the single-party socialist republic is still ruled with the only political party Lao People's Revolutionary Party being in office and is considered as non-democratic. As a market opening development Lao PDR joined the ASEAN Free Trade Area (AFTA) in 1998 but is still in the planning phase of joining the World Trade Organization (WTO) (Kyophilvong, 2008). While the human rights situation has improved the government maintains tight control over the population to minimize the potential challenges to the ruling party with a strong presence of the military in political und public life. Even though new elections are coming up in 2016 rising rural-urban inequality and the government's unpopular land policies pose risks to political stability. However, continued rapid economic growth, an extensive security apparatus and a ban on opposition parties will keep the ruling party's position secure (The Economist, 2014). So while the Lao Constitution guarantees freedom of assembly, religion and speech, in practice political or other forms of dissent are not tolerated and dealt with harshly (ASEAN, 2014). Next to a tightly controlled state the government of Lao PDR has a weak enforcement of laws, a lack of capacity to regulate development and the existence of corruption makes an effective implementation of development goals more difficult (Matthews, 2012). Civil society movements are persecuted and the level of public participation remains low.

Even though Lao PDR is growing economically it remains still one of the poorest countries in the region and relies heavily on Official Development Assistance (ODA), Foreign Direct Investment (FDI), and remittances from working migrants in for instance the wealthier neighbor Thailand. Over two third of the population make their living on subsistence farming in the rural areas with constrained agricultural development by a lack of modern skills, inadequate infrastructure and capital (ASEAN, 2014). The consequences are for instance

difficult access to health center within a distance of ten kilometers only being available to less than 50 percent of the population (MRC-GIZ, 2013). Although the average poverty rate was significantly reduced the past decade 60 per cent of the rural population still remains under the poverty line (Jica, 2010). Even though more market economy forces were established in the past the country remains politically non-transparency and is in practice heavily regulating import and export licensing. In terms of foreign relations the politically similar regimes of Vietnam and China are holding close bilateral relationships with Lao PDR having high investment influence on the poorer but resource-rich country.

Changing global supply and demand for agricultural commodities, population growth, changing diets, growing energy demand and increasing rates of urbanization are increasing the global demand for food and fuel from agriculture (Cotula, 2012). This development pushes Lao's main, natural resource intensive industries as hydropower, mining and timber production. Large-scale land acquisitions by Chinese investors into monoculture food cropping for exports to China represent another important income base. The main development challenge is ensuring that the benefits from high economic growth are evenly distributed and translated into inclusive and sustainable human development.

3.1.2 Hydropower development

About 90 per cent of FDI value is related to the resource industry (World Bank, 2009).

The worldwide hydropower boom as a clean energy source for electricity production is lately under controversial discussion by being on one hand a carbon low renewable energy provider but having other environmental and socio-economic impacts for the local population through dam construction caused displacements and biodiversity losses. The Mekong River offers beneficial opportunities for hydropower development. The hydro-proponent literature often mentions an advantage of potential flood prevention through the water reservoirs built together with the hydropower dam. However, flood mitigation by reservoirs is theoretical, since it is found that dam construction just have a little impact even on minor floods (MRC-GIZ, 2013). In general the management of a reservoir for power production leaves just a small available volume for flood storage, compared to the volume of flood generating runoff (Joy, 2012). Nevertheless, Lao PDR has recognized this investment potential since only nine per cent of the Lao river part hydropower capacity has been used so far (Delang et al., 2011). With the target to become the "Battery of Asia" over 70 new dam constructions on the Mekong River are planned over the next five years (International Rivers, 2008). This is sold to over 90 per cent abroad, mainly to provide the country's neighbors China, Vietnam and

Thailand with electricity, although 30 per cent of the Lao population is still living without access to electricity (Smits, 2012). This newly gained economic growth could potentially be used to provide the local population with electricity, general infrastructure, healthcare and alleviate poverty. Even though the Lao government passed a "Policy on Sustainable Hydropower production" in 2005, which aims to include social, environmental, economic and regulatory aspects of building dams larger than 15 megawatts, results of the policy implementation as of local development have been rare and electricity is still only available in a few urban areas (Menon et al., 2013). International activist NGOs as International Rivers remark that there is an underestimation of scales and magnitude of expected impacts by the conducted environmental and social impact assessments Lao PDR officially agreed with the Mekong River Commission (MRC) on to undertake before starting constructions (International Rivers, 2008). Displacements of local rural population, changing fish migration and deforestation are only a few examples of the impacts of hydropower development. The debate was heated the last years by controversial large-scale dam constructions as for instance the Xayaburi or newly the Don Sahong dam which forces hundred thousands of people to resettle, influences natural river flow patterns, the river being the main food provider for millions of riparian citizens. The impacts are expected to be large considering climate change caused droughts and less water availability. The MRC, a river basin management institution responsible for a sustainable water resource use of the lower Mekong River including the states Lao PDR, Thailand, Cambodia and Vietnam, was founded to unify competing national interests, security concerns and upstream-downstream trade-offs. Even though it officially requested immediate building freezes for the Don Sahong dam as an example, it does not have an executive authority over national governments and Lao PDR continued the constructions before even finishing the ordered impact assessment (Baird, 2011). The MRC faces the challenge to build a functioning decision support system, for what shared data and information between countries on water, energy and food production and policies is needed. Their role is to link the different stakeholders and create dialogs between them to identify incentives for collaboration influencing national decisions for transboundary benefits (The Mekong River Commission, 2012). On local level, resettled communities are complaining about an inadequate compensation with low compensation payments and worse conditions of the new agricultural land not being able to make a living out of subsistence farming anymore (Delang et al., 2011). Special agreements on hydropower export are made with the neighboring investor Thailand, who has almost no domestic hydropower development, to import 90 per cent of Lao PDR's electricity production (Grumbine et al., 2012). The structure

and politics of the Thai electricity sector, private sector profiteering and a strong domestic civil society are driving Thailand's hydropower investment in neighboring Lao PDR. Combined with Lao PDR's weak political framework opportunities are created for potential water grabbing. Powerful actors and drivers from Thailand converge with enabling factors from within Lao PDR. The government's openness to investment, a lack of capacity to regulate development, corruption and an autocratic state controlling grassroots of civil society, provide an environment that enables powerful actors of the Thai energy sector to capture the benefits of hydropower development while neglecting the social and environmental costs (Matthews, 2012). The most impacted by water grabbing in the Mekong region are the environment and millions of people dependent on natural resources. On the other hand the current global hydropower boom has the potential to bring positive benefits to people and the global environment. Hydropower will certainly be an element of future energy provision. But it is important for the Mekong and the rest of the world that progress is made to ensure that benefits are equitably shared and that there is a better balance between winners and losers (Matthews, 2012). The MRC is making steps into the right direction by asking for more transparency documented in the plans for further hydropower development by each river state. However, incentives for powerful transboundary cooperation have to be established to improve the quality of the Mekong hydropower decision-making. An unsustainable use of natural resources, as the water resources of the Mekong River can have wide ranging consequences especially combined with climate change impacts.

3.1.3 Mining

Mining is the second largest industry in Lao PDR. In order to use this potential for FDI the Lao government promotes foreign mining activities to extract mainly gold, copper, zinc and lead for further economic development. The positive effects of a flourishing mining industry are contributions to infrastructure development, such as road networks and electricity connections. Mining projects can also have spillover effects on Small and Medium Enterprises (SMEs), creating enterprises, which facilitate the transfer of technology and improved knowledge and skills to domestic SMEs (Kyophilvong, 2008). Besides potential employment opportunities, mining causes environmental, social and health impacts as deforestation, less access to clean water or resettlements (Oxfam, 2014).

3.1.4 Deforestation

Lao PDR's large forest landscape attracts many foreign investors and governmental plans for timber production. It goes hand in hand with deforestation and promotes therefore the largest carbon emissions emitter. The forest is one of the main sources of livelihood for the poor and rural communities especially with regard to timber and non-timber forest products, herbal medicine and firewood (PIDUP, 2010). The government blames local small-scale farmers for deforestation actions due to unsuitable farming practices, using slash and burn agriculture and identifies the main issue in shifting cultivation. The Lao government officially states that timber needs to be extracted and sold for war debts repayments from the Indochina war. These state logging practices have been taking place for the past 30 years combined with illegal logging by Lao individuals and foreign loggers to earn money through timber export (Vajpeyi, 2001). Since the 90's the government allows three state companies in cooperation with the military to operate logging processes and to build joint ventures with foreign companies (Vajpeyi, 2001). International aid agencies are also heavily involved in the forestry sector in Lao PDR. However, donor involvement outside the forest sector is playing an even more destructive role in removing control of forests and land from local communities (Vajpeyi, 2001). As an illustrative example, the Asian Development Bank (ADB) is currently funding a series of road constructions in Vietnam, Lao PDR and Cambodia, which will improve access to forests, and expedite transport of logs (ADB, 1999).

These booming industries in Lao PDR support each other to generate economic benefits. For instance the development of hydropower is providing the logging industry with a lucrative means of avoiding forest laws. Half of the official log harvest comes from reservoir areas of proposed hydropower dams (Vajpeyi, 2001). It raises the potential and incentive for logging above the maximum level of the proposed reservoirs for additional deals. This happened in the case of the proposed Nam Theun 2 hydropower project in which the military-run logging company took practice until activist NGOs brought the issue to governmental attention (International Rivers, 2012). Since the government relies on external funding from international development aid agencies as the World Bank for large-scale hydropower projects to then get commercial investors on board, illegal logging practices are officially avoided. In 2000 the World Bank announced it would not give the guarantee until "the government commits itself to significant political and economic reforms" (Vajpeyi, 2001). With the international pressure and potential withdrawal of funds, incentive schemes for a more responsible natural resource extraction approach might be drawn. The forest resources available to local communities, in form of food, firewood, medicine or grazing land are

simply removed or placed off-limits to the people who live there (Vajpeyi, 2001). Intensive agricultural cropping and infrastructure development demand for large-scale deforestation and forest degradation, causing also increasing carbon emissions what strains the whole world as a global public bad (World Bank, 2005).

On a global governance level the UN initiated the REDD (Reducing Emissions from Deforestation and Forest Degradation) program and later on the implementation program REDD+ including conservation, sustainable forest management and enhancement of forest carbon stocks, sustaining poverty reduction of the local population. It is engaged in several multilateral negotiating blocks, including the Association of South East Asian Nations (ASEAN) and the UNFCCC's Least Developed Countries (LDCs) (DOF, 2011). The Lao government supports a flexible yet internationally binding agreement for REDD+ that aims to adopt fund-based mechanisms in the short-term, allowing for participation in the voluntary carbon market (DOF, 2010). The Forest Carbon Partnership Facility (FCPF) and the Forest Investment Program (FIP) are supporting the country in its REDD Readiness Preparation by providing financial and technical support and monitoring, reporting and verification tools. A REDD task force was created, including representatives from NGOs, consultancies and the private sector, to manage the implementation of REDD+ in a sustainable way. ODA organizations are developing participatory management guidelines for production forest areas with local authorities and training on emissions reduction cropping for local communities. In 2007 the government has committed itself to the ambitious target of increasing the proportion of forest cover to 70 per cent of the total land area by 2020 (PIDUP, 2010). The idea of this climate change mitigation program is that the achieved payments will be used to invest in clean energy (particularly hydropower), flood-related adaptation, and developing village economies, including the strengthening of healthcare and education (Mitchell et al., 2010).

How this cash flow is transferred into Lao's development agenda's implementation is not documented in the literature but is recommendable to be part of REDD+ project evaluations.

3.1.5 Land acquisitions and rights

In the last decades the granting of land concessions and leases has increased significantly, so that today 72 per cent of the country's total land is in foreign hands (UNDP, 2013). As a driver for development, the government tries to attract foreign investors with low leasing prices and taxes, to tap global markets and generate local economic and human development. The neighboring countries China, Vietnam and Thailand are making direct land investments on large-scale with mainly China owning a large part of the country's north cultivating mono-

crops as bananas, water melons or cassava to secure their own population's food security. Most of the granted lands were formerly small-scale agricultural landscapes with cultivated land, bush fallows and patches of forests. Crops grown, forest products and other edible material gathered, are crucial elements of the country's own food security, particularly for the poorer households of local communities (Foppes et al., 2004). Also, prior to their transformation such multifunctional landscapes provided an array of ecosystem services such as preserving biodiversity and sequestering carbon. The poorest people living in those areas have been affected the most by the environmental damages of climate change, deforestation and lowered water quality through foreign agribusiness. Not well-defined property rights in a country in which most of the land is state-owned simplifies the practice of displacements of small-scale local farmers (The Economist, 2014). However, foreign investments bear generally the potential for a country's development by introducing new technologies, transferring knowledge and emphasizing innovation. If foreign investors follow codes of conducts, responsible business guidelines and international policies to minimize environmental damages, the contribution for a just recently opened up country to the global markets can be high. Recent central governmental policies as the "Lao National Agricultural Biodiversity Program" which efforts to build management capacities for conserving agricultural resources or the "Land and Forest Allocation Program" which allocates land use rights to villages and individual households are making steps into implementing participatory adaptation interventions for local development and raising awareness for environmental issues (Kenney-Lazar, 2012). These policies represent tendencies towards a more sustainable land use and rights implementation.

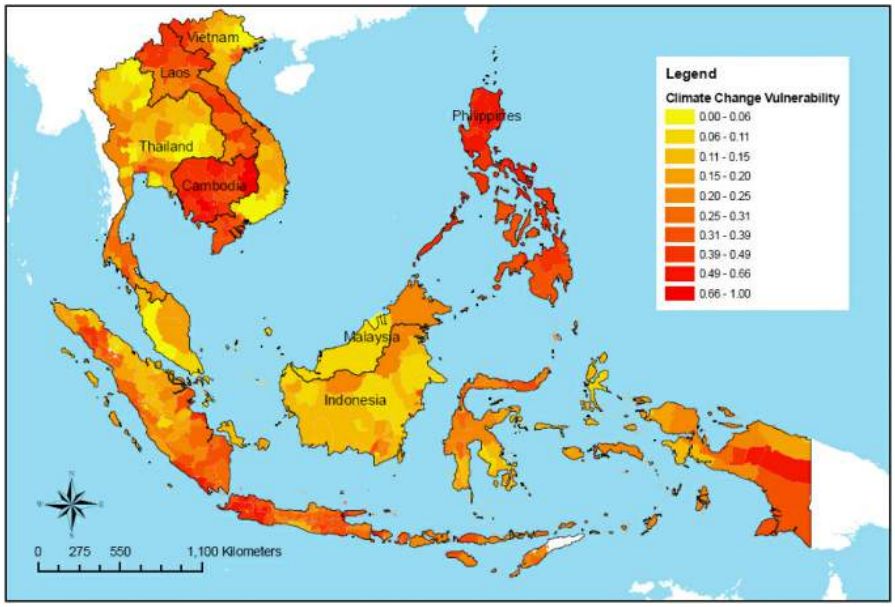
The political structure and the main economic drivers in Lao PDR demonstrate the differing and dilemmatic interests of the public and private stakeholders. Low governmental capacities, a prevalent status of non-democracy paired with barriers for public participation and limited resource access of the local population are indicators, which will be analyzed empirically for their determining influence of adaptive capacity.

3.2 Climate change in Lao PDR: vulnerability and adaptive capacities

Climate change is a global threat and has environmental and socio-economic impacts all around the world on water resources, ecosystems and crop production (PIDUP, 2010). Consequently, the poorest countries and communities are likely to suffer the most due to their geographical location, low incomes, and limited institutional capacity, as well as their

predominantly reliance on climate change-sensitive sectors like agriculture, forestry and water

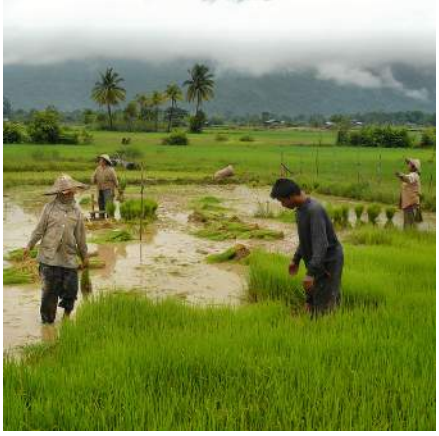
Figure 6: Climate change vulnerability in South East Asia



Anshory et al., 2009

(PIDUP, 2010). The climatic and hydrological variability and uncertainty and the livelihood dependence of the people make the Lower Mekong River basin (LMRB) especially sensitive to climate change (Bastakoti et al., 2013). The "Climate Change Vulnerability Map" (see figure 6) shows Lao PDR's high vulnerability to climatic risks and hazards so that changing climatic conditions affect agriculture, water resources and livelihood options strongly. It has been recognized as one of the countries that are most vulnerable to climate change impacts due to its particularly high dependence on climate-sensitive natural resources and low natural and human based adaptive capacity. The agriculture sector (farming, animal husbandry, forestry and fisheries) is directly dependent on land and climatic resources (temperature and rainfall) (Bastakoti et al., 2013). The industrial sector as mining, agricultural processing, hydropower and wood processing as the main sub-sectors is by large resource-dependent (PIDUP, 2010). Energy and transport are particularly sensitive areas, where Lao's hydropower potential and strategic territorial position within one of the world's fastest growing regions can contribute to regional sustainable solutions.

Figure 7: Rice farming in Lao PDR



UNDP, 2012

To combat climate change Lao PDR has to implement policies, tools, mechanisms and solutions to adapt to these changes. By now Lao PDR still has to build capacities for climate change adaptation due to its poor institutional framework. With rising socio-economic development financial resources are technically available for an adequate climate change action plan.

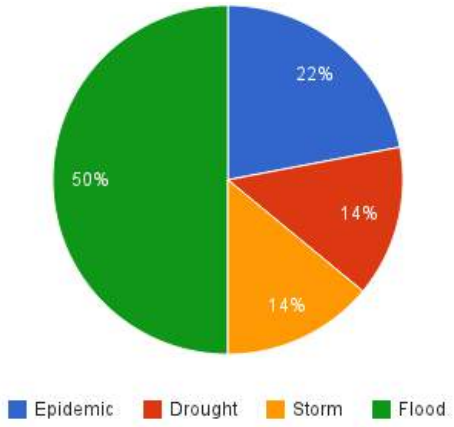
The thriving hazards are either geological or hydro-meteorological in nature and include earthquakes, tsunamis, volcanic eruptions, floods, landslides, droughts, and forest fires (World Bank et al., 2011). In this context climate change will decrease food security as production patterns change due to shifts in rainfall, evaporation, run-off water, and soil moisture (World Bank et al., 2011).

According to data from the Lao Department of Meteorology and Hydrology, *drought* conditions in the last 20 years were characterized by higher and irregular increase in temperature (World Bank et al., 2011).

Rice production (see figure 7) and household food security is affected so that around 188,000 households in Lao PDR are at risk of food insecurity caused by drought, taking into account that rice is the staple food for the population being highly dependent on water supply (Penalba et al., 2013). These vulnerable households are located primarily in the northern provinces of Lao PDR and can generally be considered as susceptible to droughts (World Bank et al., 2011). These droughts are causing crop failures, famines, migration, epidemics, pests, forest fires and saltwater intrusion (MRC-GIZ, 2013).

The plain areas along the Mekong River in central and southern Lao are most vulnerable to *floods*. Large rain-fed rice fields were destroyed in the past two decades; also the damages inflicted by floods on the irrigation system caused more than US$ 5 million worth of damage (World Bank et al., 2011). They lead to direct deaths, damage of infrastructure, harvest losses, epidemics, pests and landslides (MRC-GIZ, 2013). Local farmers experience financial losses from reduced agriculture and livestock production. This can result in increasing migration from rural to urban areas and a loss of social and community cohesion (MRC-GIZ, 2013). Extreme flood conditions disrupt drainage systems in cities and are able to overwhelm sewer systems. As a result, pollutants, like chemicals and toxins, and raw sewage are spreading and likely damage the downstream water quality and the sustainability and productivity of the environment (Huong et al., 2011). It can contaminate drinking water supplies and create conditions where the risk of outbreaks of water-borne diseases is growing (Nguyen, 2007). While immediate damages of floods can be significant subsequent impacts on public health, transport, energy supply and ultimately socio-economic impacts like

Figure 8: Climate hazards in Lao PDR



Author's graph, data: MONRE, 2013

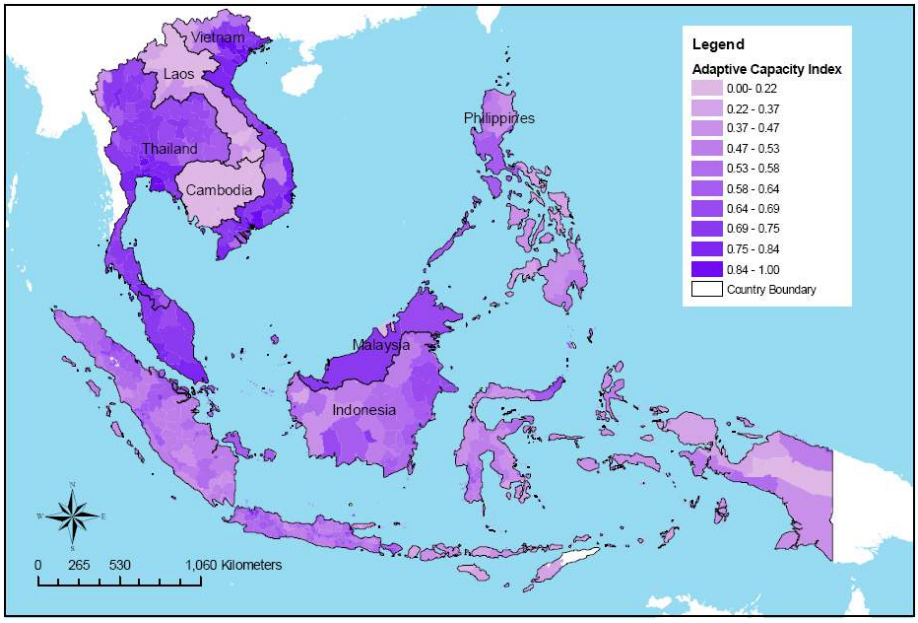
increase of poverty are often even more damaging (MRC-GIZ, 2013). The long-term effects can include migration and political and social instability.

Epidemics outbreaks as smallpox, malaria, diarrhea, dysentery, dengue fever and cholera and have been registered and associated with recurrent floods and droughts (World Bank et al., 2011). A repeating number of storms, typhoons, and southwest monsoons have been noticeable and caused damages of US$ 400.000 (World Bank et al., 2011).

Next to these natural weather changes due to climate change, hydropower dam constructions are influencing the fish migration by a higher use of the water resources and relocating of river flows (Orr et al., 2012).

The climate change caused weather changes will have socio-economic implications for the local population. The increase in floods is expected to have implications for the agricultural lands along the Mekong River and its tributaries. A temperature increase, along with a decrease in rainfall during the dry season, can lead to longer and severe droughts. Climate change and the increase in frequency and in magnitude of these events plus a loss in agricultural production are expected to make more people food insecure, in particular in the rural areas and present new challenges for water storage and affecting the country's economy (World Bank et al., 2011). The impacts of climate change will increase migration and displacement due to an increased rate of natural disasters, water insecurity and poverty.

Figure 9: Adaptive capacity in South East Asia



Anshory et al., 2009

All these environmental harms have socio-economic impacts on the local populations' livelihood. Mitigation and adaption solutions have to become higher priority in the government's development policy agenda to raise adaptive capacity, which is considered to be low at current status (figure 9). The most vulnerable to be impacted is the already most marginalized part of the population

living in the rural mountainous areas of Lao PDR. Small-scale and resource-limited farmers respond to climate-related hazards based on their level of knowledge and understanding about the phenomena and their available resources (Penalba et al., 2013). Without an effective institutional support for a sustainable adaptation, rural communities' solution might be only temporary and reactive instead of seeking a long-term approach. The integration of the local population into policy-implementation to raise awareness and build local capacities for adaptation is important to find the most suitable solutions. The concept of participation is present in many official policy documents, but the application of it is questionable. The voice of civil society is restricted and limited by the prohibited formation of national NGOs with any independent social agenda (Jusi, 2012). These deficiencies hinder independent action taking apart from international development agencies funded and executed projects.

As illustrated, South East Asia faces multiple climate change hazards like droughts, floods, cyclones, sea level rise and landslides (Anshory Yusuf et al., 2009). General development policies in Lao PDR are adopted to use the gained benefits for further educational, health and infrastructure development and to alleviate poverty in a long run. Climate change impacts and the newly booming industries paired have environmental and socio-economic backsides, which need to be governed.

This chapter presented the ecological determinants for adaptive capacity and vulnerability. The following presents the local communities' perception, the so far adopted policies by the Lao government, climate change adaptation projects initiated by ODA agencies, the environmental education level in the country and the information sharing process on climate change and other environmental issues. This information will indicate further information on adaptive drivers and localize the country-context information gaps, which are to be researched empirically.

3.3 Climate change adaptation unplugged: The current status in Lao PDR

3.3.1 Local communities' answer

Adaptation is a concept, which has existed for many centuries and is anticipated with local knowledge by rural communities. During droughts and water shortages rural communities in Lao PDR practice intercropping and plant different crop varieties to reduce the impacts. For combating floods collective actions were reported by 30 to 40 per cent of local farmers including relay of information about climate-related events, construction of paddy field dike and sand bagging to protect rice fields from being flooded (Penalba et al., 2013).

The majority of farmers do not receive any early warning on climate hazards as typhoon or flooding. The only information about changing weather conditions is communicated between the community members. Based on past studies the communities' perception of climate-related risks is that the impacts of climate change will be more severe in the future and they associate it with human activities as overexploitation of natural resources and construction of infrastructures that block waterways (Penalba et al., 2013). Most rural farmers are not aware of the national policies on climate change, land and water use and forest conservation what indicates a lack of information transfer. Interventions from the local governments are necessary to improve the communities' capacity to adapt to climatic changes.

3.3.2 Governmental Policies on climate change-relevant topics

Based on Steves model of advanced climate change strategies development, Lao PDR can consider itself as an advanced policy-maker with having integrated CDM protocols, identified climate change targets and reorganizing ministries for a cross-sectoral climate change policy approach. Specifically the government of Lao PDR has identified following adaptation actions as priorities in response to current and projected climate variability and change:

Agriculture and Forestry

The action plan includes the provision of secondary professions training for farmers to improve the livelihood conditions affected by natural disaster induced by climate change; the implementation of different adaption options (e.g. flood tolerant rice varieties, small-scale irrigation, land-use change, local learning); capacity building for village forestry volunteers in forest planting, caring, and management techniques as well as the use of village forests (World Bank et al., 2011). Climate change policies have to be mainstreamed into forest management activities with an adequate modeling of climate change-forest dynamics, and vulnerability assessment (UNDP, 2013). To ensure sustainability and prepare for the adaptation to climate change the biodiversity conservation and management has to be enhanced. In the case of forest management the mitigation and sequestration opportunities is important to be considered. "Land use change and forestry (LUCF) is the largest greenhouse gas emitter in Lao PDR but the forests has also the potential to sequestrate about five times the country's total GHG emissions" (UNDP, 2013).

Water sector

With the booming hydropower sector an assessment of the industry's vulnerability to climate change impacts needs to be done for a water secure river basin. Through increasing urbanization also the amount of wastewater is rising and is to be analyzed to guarantee

countrywide water security (MONRE, 2013). “The government’s agenda includes studies, design, and build of multi-use reservoirs in drought-prone areas; build a sustainable drinking water and sanitation system with community participation in flood- and drought-prone areas; survey underground water sources in drought-prone areas; mapping of flood-prone areas; raising awareness of water resource management; improve knowledge and skills of engineers who design and build water and sanitation systems; establish an early warning system for flood-prone areas and improve and expand meteorology and hydrological networks and weather monitoring systems” (World Bank et al., 2011).

Energy sector

To combat climate change in the energy sector certain mitigation efforts have to be made as the provision of electrification for the whole country aims 90 per cent of the population having electricity by 2020. Clean and renewable energies as solar, wind and pico-hydropower have to be accelerated community-based especially for rural areas (PIDUP, 2010).

Also mainstreaming climate change adaptations into infrastructure and transportation development is crucial for communities’ access to health and educational institutions.

Health

Next to research and increase prevention of epidemics, “providing access to safe water and improved sanitation to reduce diarrheal diseases and implementing surveillance programs to identify and respond to outbreaks of malaria and other infectious diseases is crucial” (PIDUP, 2010).

With the assistance of ODA agencies the Lao government has adopted following climate change policies (PIDUP, 2010, World Bank et al., 2011):

Climate Change Policy	**In cooperation with**
Climate Impact and Adaptation Sectoral Strategy for Rural Infrastructure in Lao PDR	Asian Development Bank (ADB)
Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts	UNDP & GEF
Capacity Enhancement for Coping with Climate Change: Lao People's Dem Rep	ADB & Nordic Development Fund
Climate Change Enabling Activity (Additional Financing for	UNDP

Capacity Building in Priority Areas)	
National Adaptation Program of Action (NAPA)	UNDP
Nam Theun 2 Hydro-electric (NT2) Sustainable Hydropower Program	World Bank
Flood Vulnerability Assessment and Mapping Program (FVAMP)	MRC
Community Based Disaster Preparedness Program	Lao Red Cross

The Ministry of Agriculture and Forestry (MAF) has adopted the UNFCCC's National Adaptation Program of Action (NAPA), which is an environmental management project directly linked with all national development strategies and policies, "including the National Action Plan (NAP) to Combat Drought and Desertification, Eight National Priority Programs, National Growth and Poverty Eradication Strategy, and the 7th National Socio-Economic Development Plan (NSEDP) 2012-2015" (World Bank et al., 2011). NAPA identifies strategies that focus primarily on improving the livelihoods of communities that have low adaptive capacity and are vulnerable to many kinds of climate change hazards, "gradually minimizing the impacts of climate change by improving food security, ensuring the sustainable use and management of natural resources, and building the capacity of relevant staff" (World Bank et al. 2011). Initiated in 2004 and submitted to the UNFCCC in 2009, "it contains a total of 45 projects, twelve of them classified as urgent and immediate adaptation options, for a total resource requirement of US$ 85 million" (World Bank et al., 2011). In 2010 the Strategy on Climate Change Lao PDR was approved with the purpose to outline the Government of the Lao PDR's approach to mainstreaming climate change in the 7th NSEDP and "build climate resilience in critical sectors of economic development and poverty reduction, involving its people in partnership with the international community" (PIDUP, 2010).

The main goals are (PIDUP, 2010):

a) *Reinforce Sustainable Development Goals of the Lao PDR, including measures to achieve low-carbon economic growth;*
b) *Increase resilience of key sectors of the national economy and natural resources to climate change and its impacts;*

c) *Enhance cooperation, strong alliances and partnerships with national stakeholders and international partners to implement the national development goals;*

d) *Improve public awareness and understanding of various stakeholders about climate change, vulnerabilities and impacts, GHG emission sources and their relative contributions, and of how climate change will impact the country's economy, in order to increase stakeholder willingness to take actions.*

The Guiding Principles are (PIDUP, 2010):

Principles	**Explanation**
Climate Change Mainstreaming as Core Element	Ensure that climate change adaptation and mitigation are incorporated as a priority into the next National Social Economic Development Plan (7th NSEDP), strategies, programs and projects at all levels of government, institutions, businesses and local communities, within the framework of sustainable development; with social and economic development and poverty eradication as overriding priorities.
International Partnerships	Work with and seek support from international partners for capacity building, development and transfer of technology to support the implementation, adaptation and mitigation strategies and actions for low carbon growth.
Capacity Building as a Pressing Priority	Build national capacities in government agencies, technical institutions, private sector and local communities in developing and implementing climate change adaptation and mitigation for policies and actions.
Integrated Solutions and Co-Benefits	Develop and implement integrated adaptation and mitigation solutions that are low-cost, improve energy efficiency, promote cleaner production, build adaptation/mitigation synergy and generate economic, environmental and socioeconomic benefits.
Innovative Financial Instruments	Elaborate appropriate financial packages to ensure optimal implementation of adaptation and mitigation action plans
Awareness, Education and Community Participation Leading the Way	Increase public awareness and understanding of climate change impacts and the need for mindset transformation towards adaptation and mitigation to mobilize communities to implement climate change adaptation and mitigation actions.

2011 the nine agencies being previously in charge of water management issues were combined to a newly established ministry, the Ministry of Natural Resources and Environment (MONRE) (Jusi, 2012). The Ministry has subdivisions, which are separately in

charge of for instance climate change mitigation, climate change adaptation and disaster risk reduction.

Due to the Nam Theun 2 (NT2) project, one of the largest hydropower projects with controversial discussions about its implementation in the past, policies related to social and environmental impacts and resettlement issues have been revised by introducing a National Policy, the "Environmental and Social Sustainability of the Hydropower Sector" in Lao PDR combined with the establishment of the first Watershed Management Protection Authority to build capacities for climate change mitigation through hydropower (Jusi, 2012). The Lao government is obliged to report new planned hydropower projects to the MRC and get first an approval of them before starting the constructions. However, the construction of the Xayaburi dam in 2012 and the Don Sahong dam in 2013 have been started before the revision and report of MRC was finalized. The on-going dam constructions give reason to be concerned. The NGO International Rivers report, that although the government of Lao seeks high revenues from electricity export, they are not shared with the population. Social and environmental regulations and laws are adopted; the policies are not implemented though. Instead of alleviating poverty, the hydropower development will create more through resettlements without adequate compensation and taking the main livelihood provider, the riverside away from the locals and risk food security (International Rivers, 2008).

The documents outline the government's focus on raising public awareness, education and community participation to understand climate change impacts and to mobilize communities to implement climate change adaptation and mitigation actions. For this the government elaborates appropriate financial packages to ensure optimal implementation of adaptation and mitigation action plans using innovative financial instruments. However, there is no clear evidence on tools used or how they will be established for the implementation of these actions. Community-based agricultural adaptation measures are planned to be piloted in "selected communities to promote the diversification of crops, the introduction of drought- and flood-resilient crop options, resilient farming methods and low-cost water conservation and irrigation technologies" (UNDP, 2012).

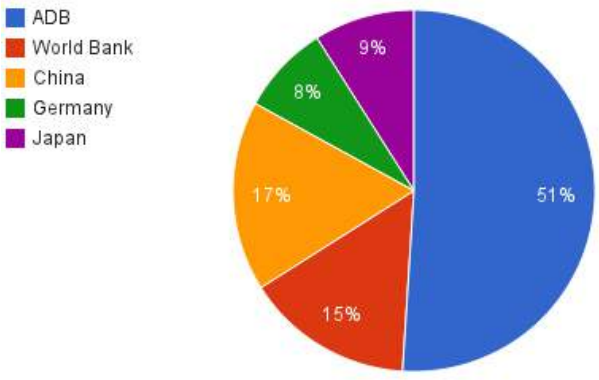
Available historical climate data of the past 40 years in the country are very limited and incomplete. The study on climate change impacts and vulnerability in Lao PDR has not yet reached the stage of adaptation analysis, including for specific sectors or regions (UNDP, 2013). The literature identifies the institutional and policy gaps in defining roles and responsibilities among the ministries on national and local level (Jusi, 2012). ODA organizations as the UN, the World Bank or the Asian Development Bank give financial and

technical support to the government of Lao for the country's development. An actual monitoring system on triggering down the development interventions from national to local level has not been established and documented. A low level of public awareness of climate change issues can be registered what is not least due to weak local institutional capacities, lack of financial and human resources, and lacking implementation of national strategic plans. A stronger cooperation between the ministries is needed to combine climate change, water and forest management to and cope climate change for a sustainable development of Lao PDR. A holistic approach and workable programs should be developed to simultaneously reduce poverty and enhance climate resilience, particularly in rural communities. Win-win or "no regret" policy options must be practical and appropriate for local conditions (MONRE, 2013).

3.3.3 Climate change adaptation projects with international cooperation

"Under Article 4.5 of the UNFCCC, developed countries have an obligation to help developing countries to address climate change by promoting, supporting and facilitating the development and transfer of technology and capacity" (MONRE, 2013). Lao PDR has received no explicit or direct technology transfer under the convention. Nevertheless some of the projects and activities under the UNFCCC, such as those related to vulnerability, mitigation and adaptation could contribute to technological or knowledge development. Lao PDR also has received ODA or loans from international partners, as well as from public or private investment, that related to natural resource and environmental management in general, and in many cases, to climate change in particular (UNDP, 2013). These activities mostly comprised research or demonstration projects. However, there has not been done any assessment of the contribution to national technology development or transfer from these projects.

Figure 10: Support for water resource projects by sources

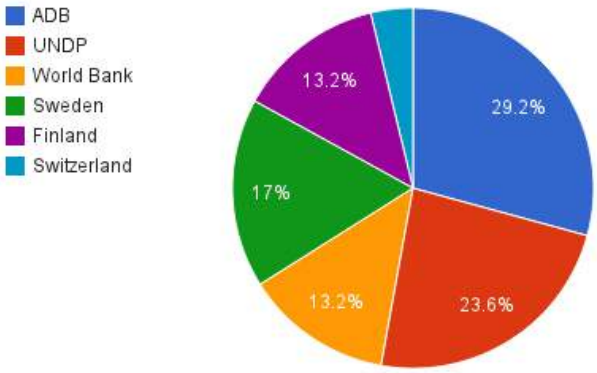


Author's graph, data: MONRE, 2013

During the Sixth NSEDP, nearly US$90 million worth of projects/activities related to water resources, environment, meteorology and hydrology were carried out in the country (MONRE, 2013). Of this, nearly 90 percent related to water resources, and the rest to the

environment as a whole. Most projects were supported by the ADB, the World Bank and Government of China.

Figure 11: Support for environmental projects by sources



Author's graph, data: MONRE, 2013

The common path for development and transfer of technology is through trade and investment as business case. In Lao's case most FDI focus on hydropower, mining, agriculture and forestry and reached an extraordinary level the past decade. The literature states that more research will be enhanced to develop early warning systems in the national climate change adaptation strategy with more weather stations around the country (MONRE, 2013).

3.3.4 Environmental education

Even though the public knowledge on climate change is considered to be low, environmental education has experienced major steps forward by for instance the establishment of a Faculty of Environmental Science at the National University of Lao PDR to provide the first possibility for formal environmental education. Environmental campaigns for public awareness raising have been launched with the lead of ODA. However, both educational measures only reach the well-educated urban population, which represents a small part of Lao people and the least vulnerable ones to climate change impacts. Especially the application of modern technologies to enhance public awareness on climate change is yet to be developed in the country. With limited communication infrastructure and facilities, including "space technology (ICT, satellite, long-distance learning, etc.), dissemination and exchange of information to enhance environmental awareness remains a formidable challenge" (UNDP, 2012). To build governmental stuff capacities technical assistance through ODA as by ADB or GIZ was provided the last years by organizing workshops on climate change, including inventory estimation, mitigation option analysis, CDM issues, vulnerability assessment, and adaptation option analysis with MONRE stuff (ProCEEd, 2014). Despite efforts to strengthen national capacities on climate change, limited human resources, high workload and high turnover rates within some government entities continue to be the main constraints faced by the country (MONRE, 2013). Because climate change remains a relatively new issue, external support for national academic or research institutes also remains limited. Capacity

strengthening for these institutes, especially in advanced methodologies related to climate change vulnerability and adaptation and mitigation analysis, is strongly required. In 2012 a national study on environmental education was undertaken by MONRE, GIZ and PADETC, a local NGO, finding that even decision makers in government institutions and mass media lack the necessary expertise. “What researchers found alarming is that almost half of the people interviewed agreed to exploit the environment or lose a species for satisfying human needs as they do not believe that the environment is in danger” (ProCEEd, 2012).

3.3.5 Information sharing and public media access

The low level of environmental knowledge is not least because of limited information transfer. Public awareness raising and information sharing on climate change issues remains insufficient developed. Access to internet is limited on provincial level compared to urban areas. Even though internet has been used for information exchange local websites are only providing limited and not up-to-date information (UNDP, 2013). At present, more conventional approaches such as leaflets, brochures, radio or TV continue to be the main mechanisms to disseminate information to the public (MONRE, 2013).

Information on project activities is primarily developed by project implementers or support organizations such as UNDP, World Bank, ADB and international or national NGOs. There exists substantial room for improvement on information sharing and networking at national level, with the national focal point as the center for such initiatives.

3.3.6 Information and knowledge gaps

The National Climate Change Strategy has identified goals, missions, guiding principles and priority areas, and strategies have been integrated into sectoral development and action plans. However, the challenge remains to effectively carry out such plans. Given that the impacts of climate change are less perceivable compared to other pressing economic issues, approaches are needed to ensure sufficient consideration is given to climate change issues in prioritization processes. Next to it a comprehensive monitoring and evaluation mechanism has to be established by considering the diversity of stakeholders involved into project activities. It should be ensured that international development cooperation and assistance are in line with general sustainable development goals of the country. Formulating a win-win approach will be key for Lao PDR to pursue a national climate change strategy without sacrificing primary socioeconomic objectives.

With a focus on vulnerability and adaptation there is a need for more appropriate national climate scenarios as a foundation for an impact analysis. A lack of long-term historical data on meteorology, hydrology and water flow, and forest resources continues to constrain vulnerability and adaptation studies. In-depth studies on sectoral impacts especially on socioeconomic aspects in relation to agriculture, water resources, forests and public health are needed. To carry out climate change adaptation projects in a sustainable way long-term climate finance requires significant investments. In terms of capacity building there is extremely limited development of national capacity especially on the global climate change negotiation process but also on local training and public awareness raising campaigns (MONRE, 2013).

The country and context specific literature has provided information on climate change adaptation policies adopted by the government and an overview of projects planned. No up to date database with implemented projects exists so far to give an overview of the activities carried out on the ground. An evaluation on results of implemented projects has not been published neither is literature available on how these projects might be shaped by external und internal determinants and the interaction of global and local stakeholders. A three months field research phase was undertaken to close of this information gap. The following will present research methods used to then elaborate on the findings made.

4. Research design, methodology and limitations

4.1 Research design and methodology

The research design chosen for this study is descriptive to gather initially information on the local projects happening on the ground and to identify the key stakeholders involved. Descriptive research is used to obtain information concerning the current status of the research subject outlining what is happening, who is involved, when, where, and how associated with the research problem with respect to variables or conditions in a situation. It demonstrates relationships between the actors involved into the research problem and aims to gather data to present a complete picture of the given subject.

As very little information was provided through literature review on the research topic and questions, scope needed to be left for the development of hypothesizes during the field research phase. Therefore grounded theory was used as methodology to discover the theory through analyzing the data. The premise was made in the early research stage that sustainable climate change adaptation is determined by internal and external influences and factors. After several interviews were conducted and patterns in the interview content could be identified, it was possible to decide on the focus of this climate change adaptation implementation research and continue the interviews and observations with this focus. The theoretical model was changed after the initial research findings showed the relevant information gaps. The main goal is to identify the determinants of sustainable climate change adaptation in the special case of Lao PDR.

Qualitative data collection as unstructured and semi-structured interviews, participatory observation, group discussions and field notes were chosen as methods (Bernard, 2006).

Qualitative research methods were chosen to gain a holistic understanding of the complex processes involved in the research topic (Desai et al., 2006). The theoretical literature gave an overview on the possible political, economic, cultural and social drivers for sustainable adaptation but these variables have not been researched and analyzed together in one model neither in a specific country case. Based on the country and context relevant literature and first interviews and observations it was possible to estimate which variables are relevant based on the information collected. The first qualitative interviews were held mostly unstructured to able to estimate which information is relevant enough to focus on. The later interviews were semi-structured a few core questions. It should be noticed that the indicators chosen are not a finite list. Moreover the research is exploratory and demonstrates a pilot project on which further research can build up to measure also quantitatively.

Focus group discussions were chosen as method due to field limitations as a foreign researcher. The initial interviews with key informants held the information that individual field visits solely by the researcher were strongly not recommended out of security reasons.

4.2 Sample and measures

4.2.1 Sample

As in qualitative research usual, the sample size did not have a numeric target. The aim is to generate as much information as necessary to make conclusive assumptions on the research topic. The sampling aimed to have a variety of stakeholders as respondents. The sample consists 19 unstructured/semi-structured interviews of on average 30 to 45 minutes with mainly international key informants (experts) working on climate change adaptation projects in rural Lao PDR. Following table gives an overview of the interviewed expert groups/categories.

Expert group interviewees	Number of sources
Official Development Assistance (ODA)	3
NGOs (local)	12 (1)
University	1
Private companies	3

The expert interview partners were chosen through initial internet research on the non-governmental involved stakeholders in climate change adaptation. Due to very limited available public information on the organizations websites and the suitable contact person, spontaneous visits to the organizations' offices were proven to be the best strategy for information gathering. Also snowballing technique from one informant to the other was a useful to get to the right contact person and to discover possible relevant key informants, whose were not considered before.

Expert interview topics

- Climate change adaptation interventions/ activities general + own project
- Environmental education/knowledge about climate change in Lao PDR (public, institutional)
- Political situation in Lao PDR
- Economic drivers
- Challenges and limitations for climate change adaptation (generally/project based)

The unstructured and semi-structure interviews with the key informants implementing climate change adaptation projects in Lao PDR focused on the topics listed in the box.

Furthermore semi-structured and structured interviews were collected in form of group discussions of approximately one to two hours with community members of six villages participating in climate change adaptation projects implemented by two NGOs. The two NGOs agreed to take the researcher to the field side they are operating in. The visited villages were chosen by the NGOs with short-term calls on the villagers' availability. The participants for the group discussion needed to be part of adaptation project; other sample criteria on for instance gender, age or education level could not be made by the researcher in its accompanied position. This fact bears the potential for data biases. The group discussions were held with eight to ten people. In the initial field visit to three villages with NGO No.1 consisted semi-structured interviews lead by the project managers. The researcher had the chance to ask additional questions about the project and climate change in general. The second field visit with NGO No.2 consisted the same topics and conditions as in the first group discussion (see box) but was structured with a beforehand-prepared questionnaire by the researcher.

Community interviews

- Climate change awareness/knowledge
- Communities' satisfaction with project activities
- Noticable changes since project had been implemented
- Participation in decision-making for project implementation
- Project sustainability (further methods/tools using after project leave field) and recommendations

The structured survey questions were chosen based on the information of the initial community discussion to make the villages comparable but were extended for possible new insides (see appendix for questionnaire). Participant observation was used during the interviews in the villages to identify socio-cultural patterns as hierarchy inside a community, gender-based behavior or educational level observed by e.g. language literacy skills (Bernard, 2006).

At the end of the field visits the two governmental district officers were interviewed to integrate the government's voice into the research. They were chosen due to their function in government assistance of the NGO's climate change projects. The district officer being in charge of the villages visited initially was interviewed in a semi-structured way for around 20 minutes with the lead of the project managers. The second district officer was interviewed in a structured form with a prepared questionnaire, which was sent to his office beforehand, so that it could be approved and answered partly before the

Government interviews

- Climate change adaptation interventions/ activities (project and general)
- Government operations structure (national/ local)
- Challenges and limitations for climate change adaptation
- Public-private partnership opportunities

interview. It consisted similar question as in the first interview to make it again comparable. The topics discussed are listed in the box.

Participatory observation was also used on two international events, the MRC International Conference on Cooperation for Energy, Food and Water Security in Transboundary Basins under Changing Climate and the ADRA SEA: REACTi Dissemination Workshop for Lessons Learned. Regional stakeholders from governments, ODA, NGOs and private sector attended. Attending different sessions and having conversations with the participants about the research topic made further information gathering in an outside interview setting possible. Through this insights about regional climate change adaptation could be collected. Further contacts for potential interview partners were made and observations on the stakeholders' interactions with each other and the topic were possible to make.
Field notes were taken throughout the whole field research phase and are added to the data analysis.

Figure 12: Field research stations

Author's graph, data: google maps

Geographically (see figure 11) the field research was mainly conducted in the northern part of Lao PDR and event-based in Vietnam. All expert interviews took place in the capital of Lao PDR, Vientiane; one field interview visit went to three project communities (and its district officer) in the northwestern province Luang Namtha, the other three project communities (and its district officer) were interviewed in the northeastern province Xiang Khouang, the MRC Conference took place in Ho Chi Minh City in Vietnam and the ADRA workshop in Hanoi, Vietnam.

2.2.2 Measures

The variables measured in qualitative data are discrete/categorical so that variable x can have a finite number of numerical values, categories or codes.

In this study the function for the dependent variable x is chosen as:

$$F(x) = \text{Sustainable climate change adaptation}$$

It is performed through:

$$x = \text{adaptive capacity}$$

Note at this stage that a complete function cannot be provided due to non-existing quantitative data material. But it can be argued that based on plausibility the function can be linear, with an increase in F(x) by risen x. An increase in adaptive capacity raises the sustainable adaptation process. The estimation is that the function is characterized by increasing marginal benefits. The functional interpretation is then that if there are more positive internal and external determinants the marginal level of sustainability will rise. A linear function with determinant c could be:

$$F(x) = m*x + c_1 + c_2 + \ldots$$

Since qualitative research does not try to find a numeric result of the different variables the gradient m cannot be measured. Further quantitative research for this scenario is recommended.

However, what stands in the measurable possibilities of qualitative research are the independent variables, here defined with c_x, which will be only analyzed on their presence and not on their numeric value. Their strength will be interpreted based on the research findings. The independent variables in this research, chosen based on the theoretical and regional literature and the interviews, are identified as following for the Lao PDR case:

Constant variable	Attribute
c_1	Level of democracy (Public rights, information and participation)
c_2	Free market and resource access
c_3	Financial resources
c_4	Social capital, networks
c_5	Social learning/Participation
c_6	Cultural tradition/Spiritual beliefs awareness
c_7	Education and knowledge (Environmental)
c_8	Information sharing (between project implementers)

c_9	Communication (between all stakeholders)
c_{10}	Cooperation (between project implementers)

These independent variables were subject of the theoretical framework and are adjusted to the country case. This list is not a finite one; there are more and other determinants of sustainable climate change adaptation. This is an estimation based on the attributes found. The independent variables demonstrate the determinants analyzed in this research project. The data approximates but does not measure the attributes.

The x with its attribute adaptive capacity takes into account, that if adaptive capacity is increased, vulnerability to climate change is decreased. The complexity of the variables are that x is not only possibly dependent on c_x, moreover are the independent variables not independent from each other, they determine each others influence. The variables c_4, c_5 and c_7 are more society based and of internal character. This means that in a quantitative model these variables could not be measured by adding it (+ c_x) to the dependent variable x since they are an integrated part of adaptive capacity and would have to be integrated into the variable x. The other independent variables are of external character.

The interview findings and observations will initially provide an overview on the implemented climate change adaptation projects happening in Lao PDR, to then analyze the stakeholders engagement, interaction, evaluate on project structure and outcome as possible. The hypothesis is if listed independent variables shape/influence the process of climate change adaptation and therefore adaptive capacity positively and reduce vulnerability, climate resilient development and sustainable adaptation is possible.

4.3 Limitations

The research in the field was limited by several factors.

The political system of an autocratic state in Lao PDR goes together with governmental control in the sense of a surveillance state in all activities and practices happening in the country. Field visits to the project sides have to be announced and accompanied by a governmental agent. This can influence the openness of villagers to talk about sensitive issues while being observed, out of the fear of the consequences or even to be arrested. The data collected from the interviews might be biased therefore.

Time and legal restrictions made it impossible to look at all climate change adaptation projects in Lao PDR. Especially the community interviews are based on adaptation projects of

two NGOs. Therefore the findings are not representative for all project outcomes but can give an estimation of important factors which can be researched in the future.

Besides the political and legal restrictions the language barrier limited the general communication with the local population. Even with attended language classes in Lao the majority of communities in the remote areas speak their own indigenous languages. Therefore a double translation from the indigenous language to Lao to English made some information lost in translation. Also publicly available information is very limited.

Due to cultural patterns including gender roles, independent research conduction was limited outside the expert groups for a female researcher.

Financial limitations occurred in form of self-financing field trips to the project sides with a fixed budget.

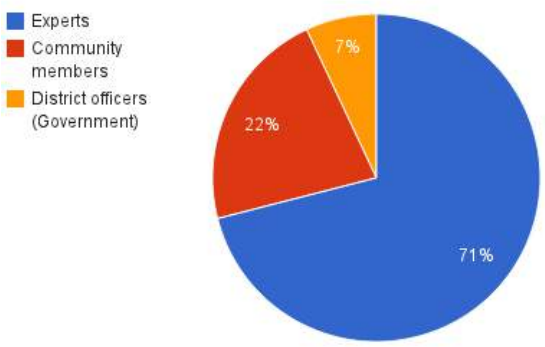
The high level of bureaucracy in Lao PDR prolonged and delayed several stages of the research so that several interviews planned could not be held at the end.

5. Findings and analyses

The country specific literature identifies a gap between climate change adaptation policy-making and policy implementation in Lao PDR. Theoretic literature was also found on potential political, economical, cultural and social forces of adaptive capacity and vulnerability determining sustainable adaptation and climate resilient development. The research aimed to estimate the relevant internal and external determinants for sustainable climate change adaptation actions in Lao PDR. For this different adaptation initiatives and interventions happening on the ground were evaluated through stakeholder interviews and field observations to measure their outcome.

The following figure shows the interviewee groups in percentage.

Figure 13: Interviewees by sources



The qualitative interviews serve as description of the processes happening in Lao PDR. The data findings are an approximation and are not free of biases based on the composition of the interview partners by most interviewees being foreign development experts.

5.1 Climate change adaptation interventions/activities

The following list outlines briefly the interviewed organizations and their climate change adaptation activities carried out in Lao PDR.

Organization	Activities
ODA: Asian Development Bank	Consultancy project with MONRE on improving climate change mitigation and adaptation policies (sustainable agriculture, water management) with case studies in flooded regions in Luang Prabang and Saravane province.
Gesellschaft für International Zusammenarbeit	GIZ is in an advisory role for the MRC and MONRE. Its work is focused on developing guidelines and recommendations for

	sustainable development policies (climate change, water governance).
Mekong River Commission	The MRC is an inter-governmental agency that works directly with the governments of Cambodia, Lao PDR, Thailand and Vietnam on their common specific interests—joint management of shared water resources and sustainable development of the Mekong River through setting benchmarks.
NGOs:	
Adventist Development and Relief Agency	ADRA started the "South East Asia: Regional Environmental Adaptation to Climate Change Training and Implementation" (SEA: REACTi) initiative, which is a pilot project in cooperation with the local government for facilitating training in climate smart agriculture techniques.
Australia-Asia Program to Combat Trafficking in Persons	Culture program: Traditions of indigenous ethnic minorities relevant for adaptation efforts.
Care International	Programs on disaster management, de-mining and development, food and livelihood security, and health in the remote regions of Northern Lao. With a newly won EU-funding Care International starts its climate change adaptation program this year with a focus on climate-smart agriculture and disaster risk reduction.
Caritas	Caritas is working in emergency and humanitarian relief, health care and educational development. A new natural resource project will be released to build local community resilience against vulnerability of natural disasters and reduce future uncertainties. The organization focuses hereby on farmers' education for climate change adapted agricultural practices and disaster risk reduction training for remote villages.
INGO Network Lao PDR	INGO Lao is a network of 75 listed NGOs operating in Lao PDR, offering focus group meeting for NGOs working in the same field.

International Water Management Institute	The IWMI is a scientific research organization focusing on the sustainable use of water and land resources to develop scalable agricultural water management solutions.
Norwegian Church Aid	NCA works on different livelihood improving, gender-based violence and climate change adaptation projects. As part of their livelihood and trade project they provide opportunities for income generation and access to credit and markets for remote villagers and assist communities in sustainable management of local natural resources.
Oxfam	Oxfam works with rural communities on climate smart agriculture projects for more crop and food diversity and has newly established a disaster risk reduction unit.
Promotion of Climate-related Environmental Education – Participatory Development Training Centre	The ProCEEd project is in cooperation between GIZ, the local NGO PADETC and MONRE aiming to gain more environmental education for the local population and capacity building of governmental district employees. The educational program includes mapping of changes, village theaters and environmental bus tours for capacity building and awareness raising.
SNV	SNV is piloting a new climate smart agriculture project to introduce new cropping methods to local communities as a way to adapt to climate change impacts. With a participatory approach the project implementers discuss with the villagers what kind of new methods are the best to incorporate.
Village Focus International	VFI is a local NGO focusing on land security and local management of natural resources in rural villages. Their climate change program takes place with a focus on REDD+.
World Wide Fund for Nature	WWF focuses on sustainable biodiversity and natural resource management with an embedded climate change adaptation and disaster risk reduction program.

Private Sector:	
Aecom	This project aims to revise the National Strategy on Climate Change and make recommendations for implementation.
Lao Institute for Renewable Energy	LIRE provides renewable energy solutions through its private sector members (e.g. Sunlabob). The institute offers agronomical, technological and socio-economic research services to develop climate-smart energy provision to rural communities.
Sunlabob Renewable Energy	Sunlabob is a company specializing in renewable energy and clean water solutions cooperating with NGOs in rural climate change adaptation projects.
University:	
Faculty of Environmental Science	Studies offered in Environmental Science with subtopics in climate change + existing student climate change working group SEED.

What all projects have in common is their compulsory cooperation with the Lao government and the integration of governmental district officers in the local fieldwork. The private companies listed serve either as advisory or technical assistance with the lead of an ODA organization or NGO. Climate change adaptation projects in Lao PDR can be therefore be categorized into two types.

The first ones are organized by the large ODA organizations as the UNDP, the World Bank, the IFC, Asian Development Bank and also government-funded development aid organizations as GIZ from Germany. These projects have the main goal to help the Lao government professionalizing their climate change policies. For this, case studies in the field are undertaken to collect data and make valid recommendations on what kind of programs and tools should be implemented for a climate resilient development. The climate change policies presented in chapter 3 were all made in cooperation with ODA. Representatives interviewed from three ODA organizations underlined their advisory function in suggesting climate change adaptation strategies and training national governmental personnel's as MONRE in

environmental topics and climate change. Their role is limited to these actions so that projects on the ground might be financed by ODA with large budgets but the implementation of community activities is left to the government.

Community-based climate change adaptation projects are mostly carried out by international NGOs with international and local serves. These projects have a very limited budget, depending on international private donors and supranational institutions as e.g. the European Union. The NGOs assess the most impacted regions and build projects on small-scale with marginalized communities in rural areas with little access to national infrastructure. The projects usually have durations of one to five years. Local district officers usually accompany the field visits and community integrated tasks of the projects.
Based on the interviews and locally reached literature following most frequently noticed climate change adaptation activities are carried out.

Environmental education is an integrated part of most climate change adaptation programs to raise climate awareness between the target communities affected by climate change and local government agents.

Figure 14: Environmental education in Xiang Khouang

With the use of media material, theatres and other educational learning methods the impacts of climate change are explained together with a demonstration of possible actions to cope with it. The opinions differed between the experts if climate change awareness raising campaigns should ideally take place before introducing climate smart techniques and tools or together. Climate change is a long-term issue; its adaptation needs to be revised with changing and newly appearing hazards. Trainings with local communities for a better understanding of the issue is crucial but also with governmental agents who are responsible to continue the knowledge transfer after the development organization leaves the field.

About five million people in Lao PDR are directly dependent on agriculture for their livelihoods. Rural communities in the mountainous regions are mainly subsistent farmers.

Figure 15: Climate smart agriculture in Xiang Khouang

Climate smart agriculture is a program to show local communities how to better cope with the climatic uncertainties and hazards affecting the agricultural yields and their food security. New cropping techniques and diversified crops and agricultural products, seeding methods and animal vaccinations are introduced to adapt to the changing climate and make them more robust. Long-term changes in the patterns of temperature and precipitation are expected to shift production seasons, disease patterns and alter the set of feasible crops, affecting production, prices, incomes and ultimately livelihoods. Tools for sufficient water management livestock and poultry management are introduced in cases of unexpected floods or droughts.

Disaster risk reduction (DRR)

Climate hazards as the uncertainty of long rainy seasons and floods require preventive measures to reduce the risk of sudden disasters, which can destroy the existence of the already marginalized poor communities. The installation of early warning systems or water regulation and management tools can reduce the extent and socio-economic consequences of disasters. In Lao PDR not many organizations have integrated DRR into their climate change programs, although three of the twelve interviewed NGOs are working on the set up. The need for DRR tools is also recognized by the government and was stated in the interviews by the district officers.

Additionally, some organizations have integrated further components into their climate change adaptation programs as electricity provision through renewable energy solutions as pico-hydropower or solar home system installations or biogas programs. Missing infrastructural access as no connection to roads or the national electricity grid determines a low adaptive capacity next to low financial capacities.

Private sector involvement is anticipated by a few organizations through value chain and inclusive business development. Sustainable partnerships between SMEs and smallholder farmers are aim to be established. Connecting small-scale farmers with suppliers bears

potentials for market access and employment opportunities for smallholder farmers. Products sell of rice, bamboo or silk improve the income of the poor and ethnic minorities.

Furthermore ecotourism is supported by several organizations as an additional possibility for income generation for the local communities.

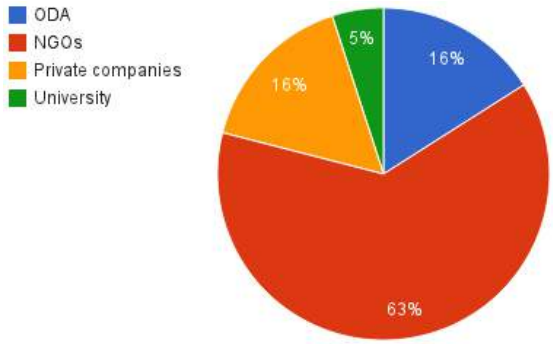
Based on the information from the interviews with ODA organizations and NGOs and observations made on the attended conferences it can be stated that the issue of climate change impacts and its need for fast adaptation activities is generally recognized by all development workers and national governments in the region. Nearly all active development organizations have adopted a climate change related program into their portfolio as well as the national governments in South East Asia into their environmental policies. On policy level, as outlined in the literature, the gap between policy-making and implementation on the ground activities can be confirmed. However, community-based projects are recently started pilots. This means that the project outcome with clear success stories and lessons learned are still under evaluation. Nevertheless, findings contributing to the assessment of climate adaptation actions in Lao PDR can be demonstrated to make a forecast for possible further interventions.

In the next section the results of the expert, community, government, conference and workshop interviews and observations will be demonstrated to then discuss the tested independent variables for their determination of adaptive capacity and sustainable adaptation.

5.2 Key findings of expert interviews

19 expert interviews with representatives of ODA, NGOs, an academic institution and private companies were held. The figure shows the interview partners in percentage to outline possible biases in the dominant answers by the proportion in the results.

Figure 16: Expert interviews by sources



Even though most interviews were organized unstructured, patterns in the identification of relevant issues for the research topic could be drawn.

Low environmental education of the population was mentioned by all experts what comes along with a generally low educational level in Lao PDR. Nearly all interviewees stated that the knowledge of climate change can be reduced to the notice of climate variability's in form

of climatic hazards as floods and droughts. One NGO expert mentioned that the Lao translation of the expression “climate change” is “changes in ground, air and sky” missing out factors as the long-term character of the climatic changes. “*People are adapting to changing weather but they do not anticipate”*(Representative NGO). Local villagers participating in climate change adaptation projects realize the need for changes for instance in agricultural cropping techniques and methods to adapt to climatic changes but request mostly fast-track solutions to solve only current issues. The project implementers stated that this fact slows the implementation stage of climate change projects massively down. In three interviews it was mentioned as a reason to change strategies and to initially build fundaments through environmental training programs before starting any technical activities. The opinions diverged in this case since a few experts see the better implementation strategy in demonstrating adaptive tools and techniques directly to the farmers who mostly would lack the education to read through technical documents.

"People don't have conceptual thinking, make them do something and talk meanwhile to them" (Representative ODA).

Since climate change adaptation is based on continuous changes in climate and therefore needs to define always new strategies to cope with climate change impacts, awareness has to be created through a profound environmental education. All stakeholders working in climate change adaptation have recognized this educational gap and have therefore integrated it into their programs. By training local communities and government agents it is although necessary to make a stronger distinction between the terminology of climate change and climate variability. As reason for the low public awareness the political system being a non-democracy with no public information sharing was mentioned.

Southeast Asia has been developing rapidly in the last decade so that most of global development aid and funding from large international institutions goes to projects in Africa. All NGO representatives mentioned the lack of funding as a major hinder of implementing their projects. “*The climate change adaptation projects happening in Lao are generally “experimental” in terms lacking capacities and coordination in the local villages and the low budget to realize activities by small NGOs*” (Representative NGO). An observation of comparing the conducted interviews especially between NGOs with small budgets showed that there is a high competition for international funding. Distinction between the donor’s interests

“If you want funding call it climate change” (Representative ODA).

for project funding and the organizations target were mentioned to explain interim difficulties for project implementation. *"When it comes to apply for international funding the term "climate change" is better used to show the long-term vision of the projects. There are no new innovative ways of climate change adaptation solutions available so that a run for funding encourages exaggerated proposals with impossible to implement project goals."*(Representative ODA).

Observations and at later interview stage the direct question for other projects showed that the organizations seemed to not know about each other's climate change adaptation activities. The level of information sharing, communication and cooperation to synthesize joined programs especially considering the limited budget of each organization appears very low. It was recognized by one interviewee that *"power games are played between the stakeholders"* (Representative NGO).

The experts mentioned to struggle with cultural barriers and spiritual beliefs of the villagers, which harden the implementation process by not accepting new adaptation methods helping to combat climate change and replacing traditional methods to deal with climatic hazards. Changing weather patterns are interpreted by communities as spiritual signs next to experienced language barriers with indigenous communities. It was claimed that to win the trust of rural communities for e.g. new agricultural techniques remains a challenge.

Culture shapes the implementation process of climate change adaptation and should therefore be recognized and integrated into the interventions of development organizations to secure a long-term progress. By now the assumption development agents are not considering local knowledge, based on their livelong experience living in the area, as useful could not be rejected. As in the theoretical part outlined participation is based on social learning of all involved stakeholders from each other. Even though community-participation is outlined in most project brochures the implementation of it is questionable and the way to do undertake the projects seems to remain without consideration of local opinions.

It was recognized by four interview participants that the projects are not carried out in a sustainable way. Sustainability limitations are seen in a too short-term engagement, *"they should last at least over five years to be able to reflect on the project outcome"* (Representative NGO).

The interview answers diverged highly by asking about private sector involvement. One NGO, which tries to involve the private sector in their development work stated that *"the cooperation with the private sector is therefore seen as an essential part of self-sustaining long-term and whole value chain development"* (Representative NGO). The interviews and observations showed that there is a low level of engagement with private companies from NGO and governmental side. An interview with one of the district officers showed that no interest from the side of private companies for cooperation is perceived. The weighting of cost-benefits analysis would show an unprofitable result taking infrastructure conditions in rural areas and transport costs into account. Local research and observation showed that even though governance on global level is shifting towards the private sector, the private sector in Lao PDR is still underdeveloped and has not the powerful role as the state control of the autocratic government. However, the few local private companies existing seem to have oligopoly status as for instance Sunlabob providing renewable energy solutions.

Ten of the interviewed experts commented on power relations and structures in Lao PDR. Land rights abuse was mentioned since Chinese investors are taking over land by leasing it for five to ten years for large-scale rubber and fruit plantations. The original Lao owners partly become their employees and cannot cultivate their own products anymore and have to buy e.g. rice. There is no land owner rights system so that the communities have no power to defend themselves. As soon as climate hazards as floods thrive the land the original Lao farmers are left back with it.

Figure 17: Chinese banana plantations

Figure 18: Slash and burn practices in Luang Namtha province

The literature states these foreign investments as possibility for local employment what cannot be confirmed due to the interview findings and observations. Chinese investors mostly bring their own Chinese workers to the plantations or hire Vietnamese farmers, which are stated to be cheaper. To build larger-scale monoculture plantations slash and burn and deforestation activities can be noticed.

Figure 19: Deforestation in Luang Namtha province

The experts stated that power relations play a high role, the hierarchy is strong and nobody can make decisions without permission. The weak role of civil society and the fear of the government render the population silent. Founded civil society groups and NGO networks are officially banned but seem to be tolerated for development work. The other large-sector developments as hydropower and mining were mentioned for in the previous chapters already mentioned socio-economic and environmental harms. One interviewee said that *"climate change is often an excuse if something happens in the hydro- or mining industry"* (Representative ODA) meaning that climate change impacts are officially used to hide human activity based impacts.

5.3 Key findings of field visits to project communities

Two field trips were undertaken to interview rural communities participating in climate change adaptation projects with two NGOs.

Group discussions were held with three communities in Luang Namtha province and three in Xiang Kouang province, both regions experiencing similar climate hazards as unusual long rainy seasons and floods. The interviewed villagers are subsistent farmers living in major poverty and experiencing limited access to infrastructure and therefore to health centers and schools. The villages are all of small size with between 20 and 32 households living there. The villages all have a village head and women unions are established to deal with traditional gender issues. They all take part in climate smart agriculture projects.

The three target villages of NGO No.1 showed the characteristics of being indigenous, ethnic minority groups, not speaking Lao, with no connection to the national electricity grid, very poor sanitation and road conditions and with high rate of illiteracy and heath issues as

diarrhea and opium addiction. The province of Luang Namtha is considered as the poorest province and used to be the main region for opium plantations with many local farmers making an income on this addicting crop and being addicted. NGO No.1 started therefore with a health program for the addicted villagers to then introduce new crop diversification possibilities by implementing a climate-smart agriculture project. Nowadays there are much less victims and the introduction of small-scale agribusinesses to the communities promoting the production of other crops as mushrooms, cassava or banana shows improved livelihoods in the eight villages the NGO is active in. Most of the small-scale business is done with the province bordering neighbor China. The biggest climate change impacts for the region are unusual long periods of rain and floods.

Figure 20: Women Union's leader in Luang Nathma province

The project managers illustrated that the agriculture projects are going well but the integration of a community-revolving fund for the villages had mixed results. The idea of a community-based microfinance project to support climate-smart agri-business could not be established in all villages due to defaulted loan repayments. Furthermore the NGO is cooperating with a local supplier to provide electricity to the villages through clean energy solutions as pico-hydropower or solar home systems.

The three visited target villages of NGO No. 2 are part of a pilot climate-smart agriculture project in five villages in Xiang Kouang province close to the Vietnamese border. The major differences between the two visited areas could be identified in the better infrastructure of the villages in Xiang Kouang. Moreover, the communities all speak the Lao language and the interviewed project participants were able to read and write, observing them taking notes. They stated to not have any health problems even though the villages do not have a working sewing system. The most concerning climate change impacts noticeable in the area are long rain periods, floods and in the cold season frost which was claimed to destroy the crops.
As part of climate-smart agriculture the main services provided are crop diversification, home-gardening and seeding tools for the main products rice and different vegetables and animal vaccinations.

The interviews were held in all cases in the house of the village head. Following interview results with the communities measuring the project progress can be summarized with positive

and negative valuations. Additional observations were added based on contribution to positive or negative project outcome.

+	-
o 100 % of the interviewed villagers responded to be generally happy and satisfied with the projects. o The socio-economic livelihood has improved since the project implementation. o Environmental training in new crops and seeding and animal vaccination is considered as very useful. o The communities are willed to continue to use the introduced techniques in a post-project future. o Participation: Villagers stated to be integrated into decision-making in form of a pre-meeting with the village head, a district officer from the government and the project implementers to discuss the project elements.	o Project sustainability: projects are planned and implemented too short-term (on average two to three years). The villagers requested to prolong them. o Climate variability in form of changing weather is noticed by all villagers. But it is not considered as a long-term change. o Many small-scale farmers stick to their agricultural techniques they traditionally used over generations and are proven to be the best ones for them and do not trust new project based techniques. o Community members requested more training on tool maintenance and disaster risk reduction. o Project managers are hard to reach in cases of emergencies.

Figure 21: Group discussion with villager in Luang Namtha

Observations during the interviews showed that the hierarchical structures inside communities are very strong, since the village heads were always the first person in charge to answer the interview questions. Most women, could be noticed sitting in the backside of the house and not in the inner

interview circle, not taking part in the conversation. This stands in contrast to the founded women unions in the region. Respect to governmental authority could be noticed by letting the district officer answer questions instead of the villagers.

Even though the villagers stated to be very satisfied with the project implementation, they requested to receive more aid in form of animal distribution as cows, or the integration into renewable energy projects as solar home system installations. It was observed that receiving aid seemed becoming normality for the villagers. They see the possibility in improving their livelihoods if these elements are added to the project. The villagers were asked if they use pesticides as fertilizer for their agribusiness since they are taking part in the climate-smart agriculture in which pesticides are replaced by other natural fertilizers. It turned out that for the crops sold to Chinese investors pesticides are still used due to higher yields. This finding underpins the ProCEEd study's result, mentioned in chapter 3, that the environment is still perceived mainly as provider for human needs.

Next to the current project targeted issues villagers were asked what they see the as the biggest issues for them. In all six villages education of the children and no access to electricity was mentioned. Keeping the little budget in mind most NGOs implement these development projects as a starting point for the marginalized communities to be capable to self-sustain themselves after the project ends. Questioning a sustainable outcome of these adaptation projects brings the debate up if the provision of free aid is the panacea of helping marginalized communities.

Nevertheless, some communities manage the jump off to self-sustaining adaptation. One of the visited communities can be highlighted as an example for a successful community project outcome.

The case of Pathe

Pathe is an ethnic minority village in Luang Namtha province with 22 households and was introduced as the best-practice village for sustainable project implementation. Next to a well going health and educational program, with regularly controls and an own school, the cow raising and small business revolving fund was implemented plus a turbine as electricity provider.

The village's main produced products are sugar cane, mushroom and cassava, which are sold to Chinese customers. The village presented its climate change awareness raising posters. With reforestation and the renounced use of pesticides Pahte is a pioneer in the region on the acknowledgement of their environment as not only a provider of human's needs.

The cow raising and small business revolving fund was a success in terms of livelihood improvement of the participants. They can afford animal vaccinations and new cows and have established a community-based micro credit lending system with a committee being in charge of administering the fund.

(For the whole story of Pathe see appendix.)

5.4 Perceptions of the Lao government

Based on the experts' interview, the district officers' interview and observations during the research being in contact with ministries and public offices and functions patterns in the government's efforts for climate change adaptation can be observed.

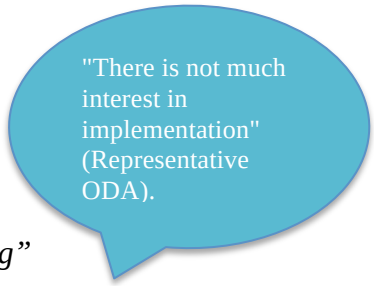
"Bureaucratic processes with governmental involvement are taking long time and because of low capacities coordination and communication is lacking" (Representative NGO).

ODA representatives who advise MONRE on climate change policy-making stated that the working methods of MONRE and the National Climate Change Action Plan lack effectiveness. The sub-working groups, which consist of one person per ministry, have meetings on regular basis but do not enforce clear decision-making and are therefore not effective. Due to young, inexperienced employees working in the ministries the knowledge of how to implement policies are quite little as also the knowledge of climate change science. The low level of environmental education of the government personnel on national and local level was confirmed by all experts. Since the *"the level of government capacity is far less than 0"* (Representative Private Sector) the implementation and maintenance in form of evaluation, monitoring and reporting remains difficult.

Most organizations stated as the main limitations for their work, besides a lack of funding, the political system in Lao PDR. High bureaucracy, slow operations and corruption are characteristics perceived. The government of the one-party state monitors projects at all stages. NGOs have to announce field visits to the project sides and are always accompanied by governmental agents. Strict hierarchal structures in the government are noticed by all interviewees and were confirmed even by the governmental district officers. The government is claimed to have different priorities. Economic growth through hydropower, mineral extraction or land leases to Chinese investors has highest priority over development issues and stands therefore with its environmental impacts as a conflict of interest against climate change adaptation efforts. *"They are selling the country to a low interest rate"* (Representative NGO). During the MRC conference journalists asked representatives of the Lao government several times how the impacts of excessive hydropower development will be aligned with climate change. No comments were given. This reflects the sensitivity but also the recognition of this controversial issue. Climate change is perceived as a topic apart from development issues and is not highly prioritized on the development agenda of the Lao government due to general priority given to social service, health care and education system improvement instead

of mainstreamed into development. It is recognized by a representative from the private sector that climate change adaptation has to be recognized as a part of sustainable development as *"reducing poverty is the most efficient way of reducing climate change impacts"*.

10 interviewed experts mentioned the run for international development aid by the Lao government. It was stated that the government has realized to use climate change as a *"buzzword"* for monetary help. As an example for climate change mitigation *"REDD+ projects are great cash, but nothing is happening"* (Representative Private Sector).



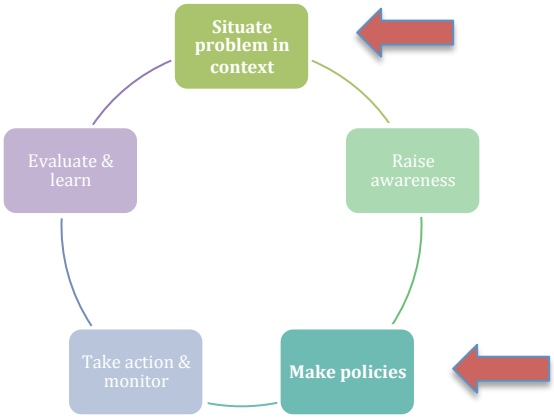
In regards to information sharing the government is perceived as lacking in distribution and communication of the newly adopted climate change policies to provincial and district level officers. Little data is available. Also the decisions made are generally very little distributed to the local population. Lao National Television and Radio broadcasts a weekly magazine on environmental issues though. Two NGO representatives stated that the newspaper articles of the Vientiane Times are printed in a less controversial tackling version in Lao language than in English. The assumption is therefore that the local population is on purpose less informed about the country's development to eventually avoid civil society movements. The conclusion is that the communist state tries to keep social capital low by not communicating information, which might be interpreted as harmful for the population to hinder potential collective action in form of protests against the regime.

Through the interview with the district officers it became clear that information channeling from central to district level is insufficient. Also the documentation of project outcomes is not satisfying complained by the district officers losing information by changing personnel. The interview clarified that the interviewees are aware of the operational weaknesses of the state apparatus and that these are blocking implementation but mention lacking financial resources of the government as the main reason for it. Nevertheless, climate change adaptation projects are recognized as important for long-term development. However, the strong hierarchal structures limit the action-taking incentives on district level next to lacking financial and human capacities.

5.5 Sustainable climate change adaptation: Performance check

The research findings initially presented the climate change adaptation actions implemented in Lao PDR. Interviews with the participating stakeholders were held and field sides of two adaptation programs and two international events on climate change were visited. Based on the research findings and supportive country context literature a clearer picture can be drawn now where Lao PDR stands in its progress of climate change adaptation. As illustration the model of the adaptation plan as a pathway to resilience from chapter 2.2.1 will support the analysis of Lao PDR's status quo.

Figure 22: Adaptation plan for Lao PDR



The transparently colored steps in the adaptation cycle were identified to be still in a weak status of implementation. Internationally led adaptation projects make an effort for rising awareness between the government ministries and the local population and taking action to promote adaptation between the most marginalized ones in the rural areas. Adaptation projects are very often still in their pilot phase so that an evaluation for lessons learned is so far rare. The strong role of the Lao government requests also stronger governance and engagement activities. So far the issue of climate change has been identified in the local context and drafted policies promise high competency in the future. However, initial steps are made in the right direction to achieve climate resilient development through sustainable adaptation.

The findings gathered in the field are also able to give now estimation on the determination of the independent variables on adaptive capacity and sustainable adaptation.

The sustainable adaptation premise would be fulfilled with its best-case scenario if following were given:

$$F(x) = m*x + c_1 + c_2 + c_3 + c_4 + c_5 + c_6 + c_7 + c_8 + c_9 + c_{10}\,.$$

The tested independent variables seem to all shape the outcome of sustainable climate change adaptation but the strength is differing.

C_1: Level of democracy (Public rights, information and participation) = weak

Lao PDR is a one-party autocratic state and not a democracy. It starts opening up economically, although limited land rights for local small-scale farmers were mentioned in case of the large-scale Chinese investors leasing the land. Public communication of information to the local population is still weak and the prohibition of civil society groups limits the possibilities for participation.

C_2 : Free market and resource access = limited to certain groups

The booming industries as hydropower, mining, mineral extraction or land acquisitions bring large international investors into the country. For them the access seems to be open, less for the consequently displaced local communities. The question about resource access raises issue on conflicting interests of the government.

C_3 : Financial resources = very limited

The district officers and the NGO representatives stated lacking financial resources as limitation for implementation. For the government case the literature affirms the statement, although the economic benefits of the resource intensive industries could be invested in climate resilient development. So it is rather a question of allocation and distribution.

C_4 : Social capital, networks = very limited

The INGO is a network of operating NGOs in Lao PDR, which organizes subdivision meeting for groups working on the same development issue. Yet, there is no climate change division. Also see c_1. Joint projects between NGOs were not found.

C_5 : Social learning/Participation = almost not existing

The promotion of climate change adaptation projects always contains participatory approaches with local communities. The field side visits could not confirm any participation above the village heads confirmation for participating in the project activities. Social learning process of implementers and villagers together could not be noticed but also needs further elaboration.

C_6 : Cultural tradition/Spiritual beliefs awareness = very limited

Culture and spirits were perceived by the experts as a main limitation for the project implementation. There is awareness but it is interpreted as only a negativism.

C_7 : Education and knowledge (Environmental) = low

The experts stated that the government and the population have very limited environmental and especially climate change knowledge.

C_8 : Information sharing (between project implementers) = almost not existing

Through the interviews with different development organizations it was observed that there is rather a competition for funding than any information sharing between the project implementers.

C_9 : Communication (between all stakeholders) = low

The communication of information for possible cooperation is low between the development organizations and government with the local population. Since adaptation projects are cooperation's with the government a certain amount of communication is need. In the same way communication is anticipated with the target communities.

C_{10} : Cooperation (between all stakeholder) = low

The cooperation is lacking between the organizations. It is noticeable that efforts for international cooperation and commitments are made by the government.

The chosen attributes of the independent variables were focal points of this research projects but require more testing on larger samples and with an extended list.

Based on the theory used for this research the analyzed variables enhance the adaptive capacity if they are strongly present but their absence can prolong the process of sustainable adaptation or hinder it completely. Since most climate change adaptation projects in Lao PDR are still in the pilot phase further evaluation has to take place in the upcoming years to identify a holistic picture of success and failure. However, the results can already serve as guideline for improved project sustainability.

6. Discussion of findings

The relevant determinants for sustainable climate change adaptation have been estimated in the Lao PDR case and will be discussed in a broader context for the country's development.

The lack of environmental education including climate change can be seen as a reflection of a general low education system and information distribution in Lao PDR. However, the government made initial steps to strengthen administrative capacities by restructuring their ministries, taking part in environmental training programs and founding climate change projects in their educational institutions. Combined with weekly broadcasts on environmental issues awareness raising efforts are showed to be made. The fact that Lao PDR is still a least developed country should be taken into account when measuring the speed of its transformative processes.

With cultural traditional beliefs development organizations find themselves in difficulties to implement climate change adaptation projects. What the stakeholders seem to underestimate by bringing new technologies into the field is the knowledge of the local population, living in remote areas, already has. These communities established a way of living and dealing with changing weather patterns for many years before any development agencies settled in Lao PDR. Their local knowledge paired with the innovative technology brought from abroad could be the key for long-term sustainable climate change adaptation but asks for more cooperation and flexibility from the international developer's side. It is a process of mutual information of both parties, so that participation can be encouraged through social learning.
The theoretical literature stated that adaptation is also a process of revisiting traditions and as a part of social learning the "recognition of imperfect knowledge and also socially constructed values" to make possible changes (Cundill et al., 2011).

The observed demand for more development aid from the interviewed villagers can be discussed under the argument if development aid is really helping the poor or if a stronger focus should be taken on for instance business and entrepreneurship trainings without direct cash or good transfers.

The single-handed approach of most interviewed organizations might be caused by low budget and a possible conflict of interest with the donor but limits climate change adaptation

on large-scale for Lao PDR and can just be overcome by more cooperation between all stakeholders. Climate change adaptation has become a hot topic on most development agendas and reaches globally high rates of funding by international institutions. The noticed competition for funding can explain the lack of sharing information between stakeholders but can also be seen as economically not sustainable. If every organization offers a wide range of development services over education, health, climate change and sustainable business development but denotes a too small budget, the implementation is likely to leak. Specialization might be the key to a successful implementation. Joint projects with cooperation at different project stages and parts could help to democratize implementation processes and share value.

Lao PDR struggles with a dilemma, which most developing countries are facing. Large numbers of foreign investors are leasing the land for their own agricultural use and exploiting natural resources, which on the other side should be protected for a sustainable long-run development of the country. Next to environmental damages local farmers mostly do not have land rights and can be displaced easily. It is in the hands of the Lao government to find a way of generating economic growth by a sustainable consensus without exploiting the local population. A strong governance approach demands a democratization process with distributed rights through which stakeholders can interact in an equalized way.

The political system of Lao constrains climate change adaptation efforts. However, observations during the research clarified that civil society action is very weak compared to neighbor countries as Thailand and Cambodia. The state power with its laws and constrictions is accepted by the majority of the population with low numbers of collective action leaded protests and demonstrations in which people could express their will. The roots of this weak social capital formation might lay in a certain path dependency of a population. In the Lao case people are very much used to restrictions of showing their own opinion fearing the consequences for many decades. Adaptation can thereby be seen, not just for climate change but also in a more transformative process a pathway to change.

Regional cooperation’s as between tropical countries of the ASEAN region and Mekong sub-region should be enhanced since they have many similar geographical, socio-cultural and economic structures. Strengthening of regional cooperation can make technological transfers and knowledge exchange more practical, applicable and cost-effective.

7. Recommendations

Recommendations are to use practical examples from other countries and consider them as lessons learned. The dynamical changes of climate variability should be taken into account and a science-policy dialogue is important for more innovative approaches.

Joint projects

The organizations involved into climate change adaptation projects are carrying out similar projects but individually with small budget and limited capacity for up scaling. A key to this could be the consideration of building alliances between the stakeholders to form joint projects. The existence of the INGO network is already an initial starting point but should be further developed. Shared capacities and budgets are economically beneficiary for all stakeholders but request communication and coordination efforts to avoid conflicts out of differing interests. It bears the opportunity to replicate and up scale successful evaluated projects to higher level. Next to the possibility to connect similar projects between different organizations it is also possible to combine different projects inside an organizations development work. The project monitoring of a few organizations and the interviews with the target villagers showed that climate change adaptation cannot be targeted as a separate issue apart from other development issues as health or education. Therefore mixing programs, as WASH, renewable energy provision, microfinance product as crop insurances or water/sanitation loans with climate change adaptation should be considered by development organizations since best-practice examples for this are present. Most target villages that lack the financial resources for climate-smart agricultural cropping also do not have the resources for a healthy electricity source or a well-established sanitation system. Since climate change impacts all the other issues, climate resilient development strategies should be initiated for a long-term sustainable development with also longer project phases in the field.

Nexus-approach

A nexus and transboundary dimension of these region wide issues ask for well-established government structures so that an active interaction and collaboration with e.g. the other riparian states is possible to find solutions with which all involved stakeholders are compromised. Like this long-term commitments can be ensured and a science-policy dialogue can innovate and fasten up the operations and tackle climate change adaptation with an integrated nexus view on issues as water, energy and food security. Through agencies as the

MRC this regional governance approach is already taking place but with limited success due power and sanctioning restrictions. Regulation and measures are officially adopted but for now the final decisions maker stays the national state.

Private sector involvement

An important part of innovative methods is the engagement with the private sector. The local governments in cooperation with already involved non-profit oriented organizations should find strategies for creating an incentive system, which is beneficial for private companies to support rural climate change adaptation projects with technical knowhow. To bring local suppliers and small-scale farmers together bears expanding business opportunities for both sides, promotes SME development and drives the local economy. Nevertheless, the whole process should be monitored on criteria for a sustainable supply chain and inclusive business model.

Adaptation as innovative process

Climate change adaptation is understood as a process of constantly adapt newly to climate variability and uncertainties. It is a short-term solution and tries to solve the current impacts of climate change and can change methodological by adapting to new climatic changes. It should be seen as an always-changing trade-off between a built and natural environment and operating organizations in climate change adaptation have to integrate this to create innovative real-time adaptive solutions. Sustainable adaptation should be realized as a pathway for transformative change for local and global climate resilient development. The utilization of participation through social learning in local climate change adaptation projects should become more of a focal point by analyzing the outcome of community resilience building.

Evaluation and lessons learned

To innovate the adaptation processes lessons learned from other projects and countries should be considered and evaluated for an effective implementation, replication potentials and dissemination. With a constantly continued reflection of success stories and challenges the sustainability of climate change adaptation can be approach paired with prolonging successful applications. Best-practice examples were given through the organization of a lessons learned workshop of the NGO ADRA who asked for am external evaluation of their pilot project (see appendix).

8. Conclusion

Successful sustainable adaptation is dependent on the adaptive capacity and vulnerability of a system, region, country or community. The goal is to be resilient against climate change impacts. What makes this transformative process of an adaptation pathway sustainable is determined by stakeholder engagement and governance practices. An successful adaptation plan in a developing country with many issues as poverty, food security or fragile governments requests seeing adaptation as a development approach, which will tackle all these issues. A stakeholder analysis was undertaken through a three-months field research in Lao PDR to evaluate on climate change adaptation interventions. Doing research on a meso-level involved interviewing all stakeholders including the government, ODA organizations, NGOs, private companies, university and local communities to get a holistic picture of the possible drivers of sustainable adaptation. Determinants for sustainable adaptation were identified and discussed in a theoretical model. Taking the regional context and the specialty of Lao PDR into account economic, political, cultural and social forces were tested on their relevance for climate change adaptation project outcomes and their influence for sustainable implementation. The dilemmatic situation of an autocratic country, which wants to develop quickly but might has to sacrifice its richness of natural resources to gain economic benefits, pays also the costs of social and environmental impacts and it remains usually the burden of the local population. Displacements and degraded land lowers the community's adaptive capacity and makes them more vulnerable to climate change impacts.

Non-democracy and differing interests in terms of limited access represent two external forces, which can make the building of local resilience difficult, and demands resulting more governance together with a better allocation of financial resources. Social capital built up by social learning and participation through the active involvement of local knowledge is a necessary process to enhance local capacities. More stakeholder engagement and networks can support the socio-cultural development.

There is a call for stronger information sharing, communication, participation and cooperation between the stakeholders. However, it remains questionable by whom incentives can be created to ensure a strengthened stakeholder dialogue if it is not recognized as a chance to format social capital for collective action. Newly built alliances between the stakeholders could reduce the issue of lacking financial resources to implement climate change adaptation initiatives with a longer project phase. With this approach there would be time to create the basis for a community-based adaptation by a profound environmental education program in

first place. Technical tools for e.g. climate-smart agricultural methods can be introduced with the acknowledgement and integration of local and regional knowledge.

Suggestions for a higher international monitoring and intervention in national issues can role up the debate of autonomy and (in-) dependency of developing countries from western nations and supranational institutions. Therefore it might be just the second-best solution.

It remains the most difficult part to transform a global issue as climate change into local context and find local solutions, which can then be up scaled to global level again.

Climate change is global public good and suffers the free rider problem. The very first ground base step has to be made on local level to communicate the message that the environment is not mainly there to serve human needs. Otherwise the premise of sustainable development to not compromise the future generations needs, will not be fulfilled.

This research exploratory combined different drivers of sustainable adaptation to estimate their influence in the country case of Lao PDR. For a profound measurement more factors have to be taken into account and observed over time.

A further key research relevant to reflective activities might be to find out how people will be able to recognize, evaluate, and when potentially transcend, or break with, existing social norms, group thinking, and personal biases.

9. References

Adams, W. (2009): Green Development, Environment and Sustainability in a Developing World, 3rd Edition, Routledge, London, Pp. 362-380.

Adger W., Barnett J., Brown K., Marshall N., O'Brien K. (2012): Cultural dimensions of climate change impacts and adaptation, nature climate change, Pp. 1-6.

Adger W., Dessai S., Goulden M., Hulme M., Lorenzoni I., Nelson D., Naess L., Wolf A., Wreford A. (2008): Are there social limits to adaptation to climate change?, Climatic Change (2009) 93:335–354, Springer Science + Business Media B.V. 2008, Pp. 1-20.

Asian Disaster Preparedness Center (2012): Image, http://www.adpc.net/audmp/images/Laos-map1L.jpg, accessed 06.06.2014.

Agrawal A. (2001): Common property institutions and sustainable governance of resources, World Development 29:1649, Pp.72.

Anshory Yusuf, A., Francisco, H. (2009): Climate Change Vulnerability Mapping for Southeast Asia, IDRC CIDR, Pp. 7-28.

Asian Development Bank (1999): Summary Initial Environmental Examination of the Proposed East-West Corridor Project (Lao People's Democratic Republic and Socialist Republic of Viet Nam), Manila: ADB, Pp. 2-24.

Association of Southeast Asian Nations (2014): Laos Economic Situation, http://www.asean.fta.govt.nz/laos-economic-situation/, accessed 08.07.2014.

Baird I. (2011): The Don Sahong Dam, Critical Asian Studies, 43:2, Pp. 211-235.

Barr R., Fankhauser S., Hamilton K. (2010): Adaptation investments: a resource allocation framework, Mitig Adapt Strateg Glob Change, Springer Science+Business Media B.V. 2010, Pp. 1-16.

Bassett, T., Fogelman, C. (2013): Déjà vu or something new? The adaptation concept in the climate change literature, Geoforum, Elsevier, Pp. 42-51.

Bastakoti R., Gupta J., Babel M., van Dijk M., (2013): Climate risks and adaptation strategies in the Lower Mekong River basin, Reg Environ Change, Pp. 1-11.

Bättig, M. and Bernauer T. (2009): National Institutions and Global Public Goods: Are Democracies More Cooperative in Climate Change Policy?, International Organisation, 63(2), Pp. 3-25.

Benjaminsen, T., Rohde, R., Sjaastad, E., Wisborg, P., Lebert, T., (2006): Land reform, range ecology, and carrying capacities in Namaqualand, South Africa. Annals of the Association of American Geographers, 96(3), Pp. 524 –540.

Bernard, H. (2006): Research methods in anthropology : qualitative and quantitative approaches (4th edition), Lanham, MD: AltaMiraPress, Pp. 156-355.

Bickersteth, S. (2010): Climate compatible development, Climate and Development Knowledge Network, Pp. 1-23.

Bonacich P. (1978): Power and Centrality: A Family of Measures, American Journal of Sociology, Vol. 92, No. 5 (Mar., 1987), Pp. 1170-1182.

Brockhaus, M., Kambiré, H. (2009): Decentralization: a window of opportunity for successful adaptation to climate change?, In Adapting to Climate Change: Thresholds, Values, Governance, Cambridge University Press, Pp. 399-407.

Castells M. (2007): Communication, Power and Counter-power in the Network Society, International Journal of Communication 1 (2007), Pp. 238-266.

Center for International Forestry Research (2012): What is adaptation, http://www1.cifor.org/trofcca/forest-and-adaptation/what-is-adaptation.html, accessed 20.06.2014.

Collins, K., Ison, R. (2009): Jumping off Arnstein's Ladder: Social Learning as a New Policy Paradigm for Climate Change Adaptation, Environmental Policy and Governance, Env. Pol. Gov.19, Pp. 358–373.

Cotula, L. (2012): The international political economy of the global land rush: A critical appraisal of trends, scale, geography and drivers, The Journal of Peasant Studies. Pp. 656-671.

Cundill, G., Cumming, S., Biggs, D., Fabricius C. (2011): Soft Systems Thinking and Social Learning for Adaptive Management, Conservation Biology, Volume 26, No. 1, Pp. 13-20.

Delang C., Toro M. (2011): Hydropower-induced displacement and resettlement in the Lao PDR, South East Asia Research, 19, 3, Pp. 567–594.

Department of Forestry (DOF), Ministry of Natural Resources and Environment (2010): Forest Carbon Partnership Facility Readiness Preparation Proposal (R-PP). Pp. 8-12.

Desai, V., Potter R. (2006): Doing Development Research, London: Sage, Pp. 113-155.

Eakin, H., Tompkins, E., Nelson, D., Anderies, J. (2009): Hidden costs and disparate uncertainties: trade-offs in approaches to climate policy, Adapting to Climate Change, Thresholds, Values, Governance, Cambridge University Press, Pp. 212-226.

Eriksen, S., Aldunce, P., Bahinipati C., D'Almeida Martins, R., Molefe, J., Nhemachena C., O'Brien K., Olorunfemi F., Park J., Sygna, L., Ulsrud, K. (2011): When not every response to climate change is a good one: Identifying principles for sustainable adaptation, Climate and Development, 3:1, Pp. 4-13.

Few R., Brown, K., Tompkins, E. (2007): Public participation and climate change adaptation: avoiding the illusion of inclusion, Climate Policy, 7:1, Pp. 46-59.

Foppes, J., Ketphanh, S. (2004): Symposium on biodiversity for food security, Ministry of Agriculture and Forestry Vientiane, Lao PDR. Pp. 16-22.

Giddens, T. (2008): The Politics of Climate Change, Cambridge: Polity, Pp.75-86.

Grumbine E., Dore J., Xu J. (2012): Mekong hydropower: drivers of change and governance challenges, Front Ecol Environ 2012; 10(2), Pp. 91-98.

Held D., Hervey, A. (2009): Democracy, climate change and global governace, Democracy agency and the policy menu ahead, Policy Network Paper, Policy Network, Pp. 4-9.

Hinkel, J., (2011): Indicators of vulnerability and adaptive capacity: towards a clarification of the science–policy interface, Global Environmental Change 21, Pp.198–208.

Hobday, A., Okey, T., Poloczanska, E., Kunz, T., Richardson, A. (2006): Impacts of climate change on Australian marine life: Part B. Technical Report, Report to the Australian Greenhouse Office, Pp. 19-26.

Holden, B. (2002): Democracy and Global Warming, London and New York: Continuum, Pp. 81-83.

Huong, H., Pathirana, A. (2011): Urbanization and climate change impacts on future urban flood risk in Can Tho city, Vietnam. Hydrology and Earth System Sciences Discussions 8 (6), Pp. 10781–10824.

International Finance Cooperation (2011): Climate Change PPPs, handshake, IFC's quaterly journal on public-private partnerships, Issue #2, IFC Advisory Services in Public-Private Partnerships, Pp. 9-33.

International Rivers (2012): Nam Theun 2 Dam, http://www.internationalrivers.org/campaigns/nam-theun-2-dam, accessed 02.06.2014.

International Rivers (2008): Power Surge, The Impacts of Rapid Dam development in Laos, Berkeley, USA, Pp. 1-88.

IPCC (2013): Climate Change 2013, Working Group I Report, "The Physical Science Basis", Pp. 14-205.

IPCC (2001): Climate Change 2001, Working Group II: Impacts, Adaption and Vulnerability, Pp. 15-307.

IVM, Institute for Environmental Studies (2014): Global and European Environmental Governance, http://www.ivm.vu.nl/en/Organisation/departments/environmental-policy-analysis/EPA-Research-themes/Global-and-European-Environmental-Governance/index.asp, accessed 17.08.2014.

Joy, C. (2012): The Impact & Management of Floods & Droughtsin the Lower Mekong Basin & the Implications of Possible Climate Change. Working Paper 2011-2015, Mekong River Commission, Pp. 1-130.

Jusi S. (2012): Integrated water resources management – a paradigm to sustainable development in Lao PDR?, Progress in Industrial Ecology – An International Journal, Vol. 7, No. 4, Pp. Pp. 307-321.

Kenney-Lazar, M. (2012): Plantation rubber, land grabbing and social-property transformation in southern Laos, The Journal of Peasant Studies. Pp. 1019-1027.

Klein, R., Eriksen, S., Næss, L., Hammill, A., Robledo, C., O'Brien, K. (2007): Portfolio screening to support the mainstreaming of adaptation to climate change into development, Climatic Change, 84(1), Pp. 23-44.

Klein, R., Persson, A. (2008): Financing adaptation to climate change: issues and priorities, ECP Report No. 8, European Climate Platform, Stockholm, Pp. 2-5.

Kyophilvong, P. (2008): Mining Sector in Laos, Pp. 70-97, http://www.ide.go.jp/English/Publish/Download/Brc/pdf/02_ch3.pdf, accessed 27.06.2014.

Lobell D., Burke M., Tebaldi C., Mastrandrea M., Falcon W., Naylor R. (2008): Prioritizing Climate Change Adaptation Needs for Food Security in 2030, Science 1 February 2008: Vol. 319 No. 5863 Pp. 607-610.

Locatelli, B. (2011): Synergies between adaptation and mitigation in a nutshell, COBAM, Climate Change and Forests in the Congo Basin: Synergies between Adaptation and Mitigation, Pp. 1- 4.

Matthews, N. (2012): Water Grabbing in the Mekong Basin – An Analysis of the Winners and Losers of Thailand's Hydropower Development in Lao PDR, Water Alternatives V5 (2), Pp. 392 – 411.

McGray, H., Hammill, A., Bradley, R., Schipper, E.L., Parry, J.E. (2007): Weathering the Storm: Options for Framing Adaptation and Development, World Resources Institute, Washington, DC, Pp. 29-30.

Menon, J., Warr, P. (2013): The Lao Economy: Capitalizing on Natural Resource Exports, Asian Economic Policy Review 8, Pp. 70-89.

Ministry of Natural Resources and Environment (2013): Second National Communication on Climate Change in Lao PDR, Lao People's Democratic Republic, Peace Independency Democracy Unity Prosperity, Pp. 1-127.

MRC-GIZ (2013): Comparison of key drivers regarding their significance for hydro-meteorological extremes and their impacts on selected hotspots within the Mekong River Basin, Pp. 7-80.

Nguyen H. (2007): Flooding in Mekong River Delta, Vietnam, UNDP (United Nations Development Programme), Pp. 2-13.

Olmos S. (2001): Vulnerability and Adaptation to Climate Change: Concepts, Issues, Assessment Methods, Climate Change Knowledge Network, Pp. 2-15.

Olsson, P., Folke, C. (2001): Local ecological knowledge and institutional dynamics for ecosystem management: a study of Lake Racken Watershed, Sweden, Ecosystems, 4(2), Pp. 85-104.

Orr S., Pittock J., Chapagain A., Dumaresq D. (2012): Dams on the Mekong River: Lost fish

protein and the implications for land and water resources, Global Environmental Change, Elsevier, Pp. 925-932.

Oxfam (2014): Impacts of mining, https://www.oxfam.org.au/explore/mining/impacts-of-mining/, accessed 24.07.2014.

Pattberg, P., Stripple, J. (2007): Remapping Global Climate Governance. Fragmentation beyond the public/private divide, Global Governance Working Paper No 32, Pp. 3-25.

Pelling, M. (2011): Adaptation to Climate Change: From Resilience to Transformation, Routledge, London, Pp. 1-9.

Penalba L., Elazegui D. (2013): Improving Adaptive Capacity of Small-Scale Rice Farmers: Comparative Analysis of Lao PdR and the Philippines, World Applied Sciences Journal 24 (9): Pp. 1211-1220.

Peace Independence Democracy Unity Prosperity, Lao PDR (2010): Strategy on Climate Change of the Lao PDR, Pp. 3-15.

Potter, R. (1985): Urbanisation and Planning in the 3rd World: Spatial Perceptions and Public Participation, Croom Helm, London, Pp. 5-6.

ProCEEd (2014): KAP Survey, Low Environmental Awareness in Laos, http://www.laos-proceed.com/kap-survey.html, accessed 04.04.2014.

Ruchiwit, M. (2013): Determinants affecting the well-being of people in the Greater Mekong Subregion countries, Nursing and Health Sciences, 15, Pp. 94-100.

Smit B., Wandel, J. (2006): Adaptation, adaptive capacity and vulnerability, Global Environmental Change 16 (2006), Elsevier, Pp. 282–292.

Social Accountability International (2012): How Companies Can Implement the UN Guiding Principles for Business & Human Rights, http://www.sa-intl.org/index.cfm?fuseaction=Page.ViewPage&PageID=1316, accessed 13.07.2014.

Stern, N. (2006): What is the economics of climate change?, World Economics, Vol. 7, No. 2, Pp. 1-10.

Steves F., Teytelboym A. (2013): The Political Economy of Climate Change Policy, Smith School of Enterprise and the Environment, University of Oxford, Pp. 1-22.

The Mekong River Commission (2012): Transboundary River Basin Management: Addressing Water, Energy and Food Security, http://www.mrcmekong.org/assets/Uploads/M2R-report-address-water-energy-foodsecurity.pdf, accessed 10.01.2014.

Tschakert, P., Dietrich, K. (2010): Anticipatory learning for climate change adaptation and resilience, Ecology and Society, 15(2). Pp. 10-11.

Tsebelis, G. (2002): Veto Players: How Political Institutions Work, Princeton University

Press, Princeton, NJ, Pp. 4-8.

Umweltbundesamt (2013): Stakeholder Participation in Adaptation of Climate Change Lessons and Experience from Germany, http://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/climate_change_12_2013_stakeholder_participation_in_adaptation_to_climate_change_bf_0.pdf, accessed 14.08.2014.

UNDP (2013): About Lao PDR, http://www.la.undp.org/content/lao_pdr/en/home/countryinfo/, accessed 10.06.2014.

UNDP (2012): Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts, http://undp.adaptationlearning.net/ldcf_laos, accessed 19.07.2014.

UNDP (2012): A small country with a big climate change plan, http://www.tl.undp.org/content/timor_leste/en/home/ourwork/environmentandenergy/successstories/TL_NAPA_aileu_farmers/, accessed 14.08.2014.

UNFCCC (2014): Full text of the climate change convention, http://unfccc.int/essential_background/convention/background/items/2536.php, accessed 14.07.2014.

UNFCCC (2014): National Adaptation Programs of Action (NAPAs), http://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/2679.php, accessed 15.08.2014.

UNFCCC (1992b): The United Nations Framework Convention on Climate Change.

UXO Lao (2013): The unexploded ordnance (UXO) problem, http://www.uxolao.org/index.php/en/the-uxo-problem, accessed 01.07.2014.

Vajpeyi, D. (2001): Deforestation, Environment, and Sustainable Development: A Comparative Analysis. Praeger: Westport, Connecticut and London, Pp. 111-137.

Wise, R., Fazey, I., Stafford Smith, M., Park, S., Eakin, H., Archer van Garderen, E., Campbell, B. (2014): Reconceptualising adaptation to climate change as part of pathways of change and response. Global Environ. Change, Pp. 1-12.

World Bank (2012): Governance and Management, http://siteresources.worldbank.org/EXTGLOREGPARPROG/Resources/grpp_sourcebook_chap12.pdf, accessed 15.08.2014.

World Bank, GFDRR, Climate Investment Funds (2011): Vulnerability, Risk Reduction, and Adaption to Climate Change, Lao PDR, Climate Risk and Adaption Country Profile, Pp. 1-17.

World Bank (2009): Water and Climate Change: Understanding the Risks and Making Climate-Smart Investment Decisions, Pp.10-39.

World Bank (2005): Global Development Challenges Facing Humanity, Seminar Number 6, Global Public Goods and Development- A Guide for Policy Makers, Pp. 1-13.

World Commission on Environment and Development (1987): Our common future, Oxford: Oxford University Press, P. 43.

Yohe, G., Strzepek, K., Pau, T., Yohe, C., (2003): Assessing Vulnerability in the context of changing socioeconomic conditions: a study of Egypt. In Climate Change, Adaptive Capacity and Development, Imperial College Press, London, Pp. 3-8.

10. Appendices

Survey for field visit in Mok Mai, Xiengkhuang (21.04-24.04)

Questions for community members of 3 target villages

1. Knowledge about in project raised issues

   1.1 Which issues do the project implementers tackle?

   1.2 Are the tackled issues the biggest ones in your opinion (climate change/variability)?

   1.3 Are there others?

2. Inclusiveness of project implementation

   2.1 How do you participate in the project?

   2.2 Are you involved into the decision-making referring to the project implementation?

3. Effectiveness of project

   3.1 Which introduced agricultural techniques are showing the biggest project success?

   3.2 Which ones not and why?

   3.3 Do you think the pilot project will be successful?

   3.4 Would you change any project components?

   3.5 Will you carry on using the introduced agricultural tools after the project organisation leaves the field?

   3.6 How do you experience the introduced techniques in comparison to traditional agricultural methods to combat climate variability?

   3.7 Do you have any further suggestions/ideas on how projects like this one could be implemented more efficiently?

Questions for district officers

1. You are providing training to local villagers on crop production/diversification and livestock raising techniques.
Where did you receive your training on these topics?

2. Which taught techniques are showing the biggest project success?

3. Which ones not and why?

4. How do villagers participate in the project implementation?

5. Which issues/problems with the implementation of the pilot project can be identified?

6. What issues did community members raise?

7. What are the lessons learned so far?

8. Do you think this pilot project is replicable for other districts and provinces?

ADRA Lao PDR

Monitoring and Evaluation Report: SEA: REACTi Project in Mok Mai District

(By Esther Ujj)

1. Project Overview

The South East Asia: Regional Environmental Adaptation to Climate Change Training and Implementation (SEA: REACTi) initiative is a pilot project in cooperation with the local government for facilitating training in sustainable agriculture and natural resource management climate change adaptation techniques. The district Mok Mai in Xiengkhuang Province suffers from heavy rainfall and flooding, which has caused severe loss of crops, low rice yields, and poor vegetation for livestock. The project goal is to ensure the capability of rural communities to cope with climate change impacts by providing the necessary tools for it. It aims to create a dialogue between the target villages and the local private sector to design an effective community based climate change adaptation model, with a specific focus of scaling it up and integrating it at the conclusion of the project. The pilot project was implemented in five villages in Mok Mai district with either five households and will be terminated by the end of April 2014 after a 15-months implementation phase.

On the 22nd/23rd of April the project team, the district officer and an external researcher visited three of the target villages namely Xiengmenh, Namone and Mor to monitor and evaluate the project's implementation stage and outcome.

2. Project activities implemented

Improved livestock raising techniques as veterinarian (animal vaccination) and feeding training and forage growing (Napier grass for cows, pigs and chicken) were carried out in all three villages.

In **Xiengmenh** improved crop production in form of home garden activities (bok choy, bear foot leaf vegetables, coriander, green onion, cabbage, chinese mustard) were additionally introduced to the participating households.

In **Namone** households were trained on soil conservation techniques as the usage of natural fertilizer and on how to cultivate new rice varieties for an improved rice yield.

In **Mor** improved rice production techniques were launched next to the new seeding practices.

3. Village talk: success stories and facing challenges

Interviews were carried out in the three visited villages with the village members participating in the pilot project. The interview consisted survey questions for the villagers to find out about their knowledge and awareness of the issues targeted in the pilot project, the inclusiveness in the project implementation in form of participating decision-making and the effectiveness of the project.

The villagers were generally highly optimistic about the SEA: REACTi project success and are hoping for a continuation and up scaling to integrate more households into the project for an overall sustainable livelihood improvement in the whole community. Reflecting on the different project activities the community members of all three villages stated to be highly satisfied with the improved livestock raising techniques. Especially the animal vaccination plus the Napier grassing keeps their animals healthy and secures therefore socio-economic stability for the owners. The use of natural fertilizer increased yields of the villagers rice harvest although the longer period of cold weather and rainy season with resulting floods challenges the benefits making of rice harvesting. The same problem occurs with the home gardening activities. The growing vegetables are not resistant against long cold, rainy spells coming along with fog and frost.

The villagers raised the issue of annual flooding, which destroys crops and due to a missing sewing and water regulation system villagers are forced to resettle in the upper lands for the rainy season. Next to the economical loss of crops, appearing health issues and the impossibility to pass through the flooded area has negative impacts for the villagers, as e.g. children are unable to attend school (Mor Village as particularly affected).

The villagers made the impression to be generally aware of a changing climate especially in the last decade coming along with natural hazards and weather extremes. The terminology of climate change, its long-term impacts and needed adaptation are less familiar. The villager's concern is more of short-term climate variability impacts.

The communities are willed to continue to use the introduced techniques in a post-project future. Nevertheless, all interviewed villages requested more environmental education and training on disaster management.

In Namone the villagers went beyond the actual project components and requested the implementation of an "Animal Raising Revolving Fund". The villager's idea is to start the project with the provision of a certain amount of cows for one village by ADRA. The cows represent the initial capital for the villagers' cow raising business. The offspring of these cows has to be passed on from the initial beneficiaries to other villagers as soon as benefits are generated.

4. LESSONS LEARNED: OPPORTUNITIES FOR THE FUTURE

The project was originally set up for 12 months but because of a delay in the starting phase, the project duration was prolonged to 15 months. Considering rainy and dry seasons in Lao PDR, certain project activities as vegetable and rice cropping can only be implemented in seasons without floods. The project delay influences therefore the potential success for the project outcome by changed cropping times. Short-term projects as SEA: REACTi require hence a precise timely planning and meeting the schedule for a maximum success.

The new rice production techniques along with the home gardening are highly depended on regional climate and its variability. Regions with long cold and rainy periods might be less suitable for these project components than provinces with a longer dry season.

The interview with the district officer showed the difficulties to involve the private sector into the pilot project. He stated that several requests were sent out to local companies for technical assistance but turning down the request due to high costs of delivering and maintaining in very remote areas the technical inquiry was turned down. The solution so far was therefore to provide technical assistance through governmental agents, which are lacking financial capacity and have a stuff shortage.

5. REPLICATION AND UP SCALING POTENTIALS

The participating communities experienced the project successfully in terms of knowledge gain, improved animal raising and crop yields. They expressed their interest for a continuation and extension of the pilot project. Non-participating families who were able to observe the project's outcome would like to take part in it from now on.

The project management team and the district government together with the villagers discussed the different project components so that they were an active part of the decision-making.

As the livestock raising and soil conservation techniques showed successful results there is an over regional potential for up scaling these project elements and even a replication to other provinces of Lao PDR might be considered. For this a high flexibility in the project structure and adaption to local climatic conditions has to be taken into account.

For an up scaling and regional spreading further investments need to be done what requests continuous funding in first place.

6. RECOMMENDATIONS FOR FUTURE PROJECTS

Animal Raising/Community Revolving Fund

The Animal Raising Revolving Fund requested by the villagers of Namone should be taken into consideration for future projects. The entrepreneurial spirit for establishing a business solution with benefits making and sharing between the villages could be a first step out of development aid to a self-sustaining future after the project termination.

An added Community Revolving Fund can go a step further and based on a community-organized micro credit lending system small businesses (e.g. shops and other local supplies, machines and labor for agricultural use) can be supported. Community-based capacities to administer this kind of fund have to be built by creating roles of e.g. a fund manager and credit officer next to community trainings on loan systems.

For establishing a revolving fund first financial resources need to be invested to provide the initial capital to start the fund.

Mixing existing programs: SEA REACTi and WASH

The interviews with the participating communities showed a lacking access to water facilities. For a beneficial agricultural use of water, water storage and regulation facilities as water tanks or pico-hydropower systems are possbilities to be installed. A missing sewage and sanitation system risks health issues for the villagers.

ADRA has already established a WASH (Water, Sanitation and Hygiene) program with improved access to water in combination with an intensive health education and promotion campaign to prepare families to take action on sanitation matters.

A piloting combination of the climate change adaptation and the WASH program in the target villages could improve the livelihoods of the communities sustainably by using the expertise of ADRA in both programs.

Adding activities: Disaster Risk Reduction (DRR)

The target villages suffer every year from flooding with resulting damaged crops, health issues due to a missing sanitation/sewage system and infrastructure to pass on flooded roads. The socio-economic impacts force the villagers to a seasonable resettlement to the upper lands.

With climate change the uncertainty of weather changes and extremes is rising. To combat these natural hazards a disaster risk reduction program should be integrated and linked with the climate change adaptation work of ADRA. As risk prevention early-warning systems can be installed as well as offering disaster management training and tecniques to cope with potential damages.

Private sector involvement

ADRA integrated the opportunity for private sector involvement into the SEA: REACTi project. During the pilot phase no cooperation with local companies for technical support could be established. Due to infrastructural limitations private companies' cost to access the target villages to provide technical assistance are not cost-beneficial. The supply and maintenance of agricultural equipment, tools and techniques through the private sector bears opportunities for long-term development in future times when development aid could be replaced by self-sustaining market mechanism.

For instance the IFC works together with the Lao government on guide lining and strengthening the private sector and also involve them more into development work to build local capacities.

It is in the government's responsibility to promote private sector involvement financially through e.g. possible subsidies or private-public partnership contracts.

Project extension for long-term development and success

The climate change adaptation pilot project SEA: REACTi has come to the end of its test phase. First lessons learned and future opportunities have been identified and need to be elaborated for a sustainable project success. For a long-term livelihood improvement and poverty alleviation of the target communities it is recommended to enter the project into a second phase of implementation with considering the effective results of the first phase.

For further initiatives budgeting and future funding plays a key role. Building cooperation and partnerships with other stakeholders involved in development work might be a possible scenario to continue ADRA's humanitarian work successfully.

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Community Revolving Fund 2.0: Scenarios for sustainable community development in Luang Namtha, Lao PDR

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Microfinance has been an innovative mechanism in development work reaching the poor by giving them access to the financial market for the past three decades. Especially in South and South-East Asia Nobel Pease Prize winner Yunus' concept to encourage micro entrepreneurship between the very poorshowed a revolutionary success. "People were paying back 100 percent without a problem.", was Yunus conclusion and the foundation for his own micro-lending Grameen Bank. Today the bank has five million borrowers, 95 percent of whom are extremely poor women, and has given out more than $4 billion worth of loans at a 99 percent recovery rate.[1]

The government of Lao PDR has set the goal of leaving the status as a least developed country by 2020. Therefore economic growth is critical. Much of this has already been ignited through revenues on the back of natural resource extraction and exports, on a large scale, mostly through Chinese investors. Due to low capacities on provincial and district level triggering-down effects of development interventions to the local level through governmental agencies have not taken place on a sufficient scale.Consequently, if communities are looking for change, it is likely they will need to look within and find their own resources, or leverage these with other organisations that support community-led transition.In Lao a few large development organisations as GIZ have started to establish microfinance as a development tool in remote communities to encourage small-scale farmers into doing business and thereby improve their livelihoods. However, so far there is no evidence of a self-sustaining community-integrated approach, for providing microfinance services.

The Luang Namtha Province, located in the north of the country neighbouring China and Myanmar, is home to one of the most diverse indigenous ethnic minority groups as e.g. the Khamu, Akha and Hmong. Located with the largest sugar cane and rubber producing plantations of Lao (mainly Chinese ownership) the region also owns a past as formerly a main opium producing area accompanied by a high rate of local opium users and addicts.

[1] https://www.gsb.stanford.edu/news/headlines/2004globalconf_yunus.shtml.

To address this issue the community required other options for generating income and seeing a future in their community. In order to provide the local communities with business solutions for alternative cropping products, Norwegian Church Aid (NCA) introduced its "Livelihood and Trade" program. The program works with indigenous communities providing opportunities for income generation and access to credit and markets.

In 2008/2009 NCA established, as a part of the "Livelihood and Trade" program, a "Community Revolving Fund" based on a community-organized micro credit lending system. NCA endowed the funds with initial capital of 700.000 LAK (87 USD) and ran a test phase in 13 villages divided into two prototypes, the animal raising (cows, pigs, goats) and the small business (e.g. shops and other local supplies, machines and labour for agricultural use) revolving fund.

After initial scepticism of the villagers to take loans, due to the fear of a possible debt trap, the small business program turned out to besuccessful in most of the villages by encouraging the entrepreneurial spirit. The animal raising revolving fund was however, not successful in many villages. This has been attributed to low capacity village committees and their understanding of development, lost continuity with migration to other villages not targeted by the project and, cases of selling the entire production of cows to Chinese markets demanding beef. As a consequence most project-failed villages fell back to opium production and in several cases abused opium.Unfortunately, NCA has limited capacity to rebuild failed programs once the animals have all been sold.

Case Study – Pathea Village, Luang Namtha

Pathea Village has a small population of 133 people comprising 56 women and 21 households. The village can confidently claim success in terms of its community revolving fund, active since 2013. NCA started the program by providing eight cows for the entire villageas initial capitalfor the villagers'cow raising business. The community itself then decided which 8 families would receive the cows. The offspring of these cows had to be passed on from the initial beneficiaries to other families. With growing turnover, farmers were able to invest in rice, cassava, mushroom and sugar cane production.

To extend the small businesses and invest in other critical wellbeing indicators, such as health care and education, the community revolving fund follows the micro credit concept. Loans are providing for agricultural use and business development, health care and education with interest rates of between one and two per cent. To guarantee the reimbursement the household members have to bail for each other in case of defaulted payments. In Pathea the fund has been running for one year with a successful default rate of zero per cent so far. The fund is installed with 9.700.000 LAK (1,120 USD), comprising of: 700.000 LAK (87 USD) from NCA; and 270.000 LAK (33 USD) paid back in interest rates. The Community Fund has provided six households with loans between 200.000 and 2.000.000 LAK. Reimbursement has to take place between six-months and one-year after the loan has been received.

If the loan is reimbursed on time, the household can apply for a new loan. Pathea has established a financial committee to administer the fund and ensure correct book-keeping practices. It includes the Village Head, an accountant team including a chief accountant, a supportive accountant and a cashier, one governmental agent on the district level and the village teacher. To secure that the given loan is invested for its purpose and paid back on time (animal raising/small business/healthcare/education), a credit officer makes household visits on a regular basis.

Photo: Mr Asoo, Village Head, (holding map top) & Mr Thou Pa, Deputy Village Head, (holding map bottom)

Taken By: Esther Ujj, March, 2014

Developing sustainable communities

NCA operates in all its projects with the aim of developing sustainable communities. A sustainable community is generally one that is economically, environmentally and socially healthy and resilient. It takes a long-term perspective by managing its human, natural and financial assets to meet current needs while ensuring that adequate resources are equitably available for future generations.

The example of Pathea shows this development through active, organized and informed citizenship and responsible community institutions as the work of the village head, his deputy, the women's union or the financial committee managing the community revolving fund. The village's prioritizing of education and health, equal access to school for both boys and girls, vaccinations and health controls, shows a sophisticated level of social cohesion and engagement. In addition, sustainable agricultural cultivation by avoiding pesticides while up scaling reforestation efforts, demonstrates the farmer's sensitivity toand responsibility for, his/her environment and community. The success of the community revolving fund and the sustainable business solutionsthat the farmer's have been established through cow raising, takes Pathea on a trajectory towards an integrated sustainable community.

To continue on this path Pathea's villagers requested the participation in NCA's solar energy program. With the installation of solar home systems (SHS) clean, climate neutral, cost-beneficial and stable electricity can be provided for domestic and educational use.

The idea has been raised to integrate this energy supply project into the community revolving fund by requesting loans on household levels to fund the provision of SHS on a large scale. The creation of a renewable energy fund bears the opportunity to involve local suppliers for the provision and maintenance of the SHS, but also demands for further training on village, district government and NCA project officer's internal level. Private-public-partnership projects on small-scale community level bear the possibility for closer integration of the private sector into development work and to create shared value and new sustainable business solutions. Further elaboration on possible pilot renewable energy fund projectsand replication potentials is being undertaken.

Development projects in Lao PDR have started to take place on large-scale aiming to reach the country's development goals for 2020. Evaluating lessons learned and up scaling potentials of success stories will contribute to a continuous acknowledgment of future opportunities and challenges.

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