



Climate Adaption, Livelihoods and Gender

The case of the mountainous regions of Thua
Thien Hue, Vietnam

Nora Karlsson

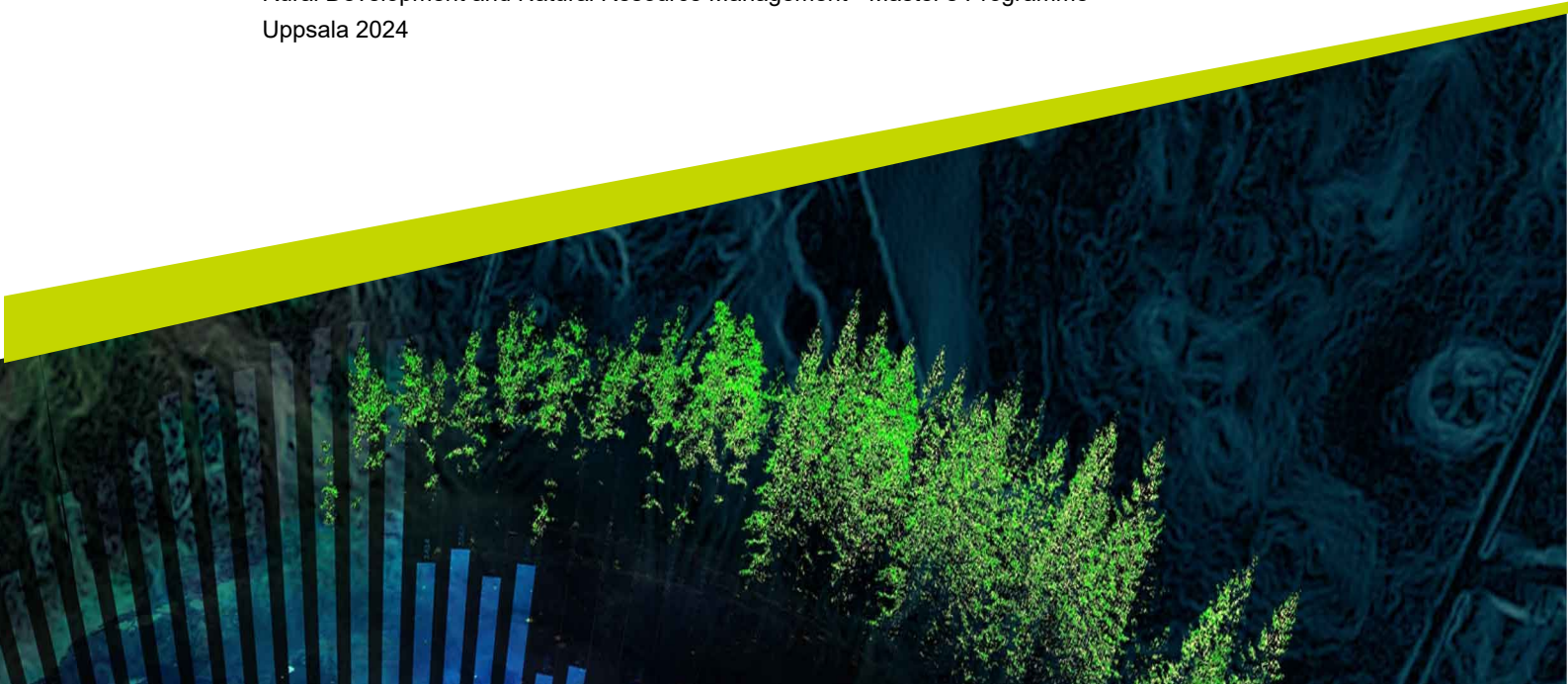
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Climate Adaptation, livelihoods and gender. The case of the mountainous regions of Thua Thien Hue, Vietnam

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Abstract

Vietnam is a country which is viewed as one the most vulnerable in the world to the impacts of climate change. However, the main focus of many stakeholders have been on the country's coastal regions, neglecting the effects of climate change on the mountainous communities. As the effects of climate change are becoming more severe, extreme weather-patterns such as drought, storms and floods are becoming more common. Climate change is impacting the livelihoods of people in the mountainous region, who are primarily dependent on forestry for their livelihoods, by disturbing production, creating increased risk for investments and economic loss. Therefore, people need to adapt to these changing circumstances in various ways to minimize risks to their livelihoods.

For a long time, women's perspectives and circumstances have been missing from the research on adaptation in the mountanoius regions of Hue, which is the area of study for this thesis. Thus, half of the population's perceptions and interests are missing from the analysis and solutions. This paper explores issues connected to livelihood strategies, gender and adaptation in the mountainous communities of Thua Thien province, in Hue, Vietnam.

The findings of this study shows that the livelihoods of the rural communities in the mountainous villages of Khe Tran, Doi and A Sap are diverse, and changing in response to the effects of climate change. People are adjusting the agrarian production, but also shifting part of their income from natural-based sources to non-agrarian practices. Furthermore, this study shows that women and men are impacted differently by climate change because of prevailing norms in regard to production, environmental protection and domestic labor.

Keywords: Livelihoods, climate change, adaptation, vulnerability, resilience, gender

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Abbreviations

| | |
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| DARD | Department of Agriculture and Rural Development |
| FAO | Food and Agricultural Organization of the United Nations |
| FDM | Department of Forest Management |
| FOSDA | Forest Owners Sustainable Development Association |
| FPDF | The Forest Protection and Development Fund |
| FSC | Forest Stewardship Council |
| HUAF | Hue University of Agriculture and Forestry |
| VND | Vietnamese Dong (the national currency in Vietnam) |

1. Introduction

Vietnam is one of most vulnerable countries in the world to the effects of climate change (USAID, 2022). The focus from international aid and policies in Vietnam have long been on the coastal areas, which are seen to be most affected by climate change (USAID, 2022; World Bank, 2021). One perspective that is under-researched is that of the mountain communities. Therefore, this study has chosen to focus on the effects of climate change and adaptation efforts in mountainous communities.

As the effects of climate change are becoming more severe, extreme weather-patterns such as drought, storms and floods are becoming more common. These changes in weather patterns affect people's livelihoods and well-being in several ways. One group who is particularly vulnerable to changes in climate are the rural poor who are dependent upon agriculture and forestry. Drought, fluctuating in temperature or in rainfall poses new or increased risks for cultivation and living conditions (FAO, 2024). Therefore, people need to adapt to these changing circumstances in various ways to minimize risks to their livelihoods.

This paper explores issues connected to livelihood strategies, gender and adaptation in the mountainous communities of Thua Thien province, in Hue, Vietnam. Specifically, I look at three mountainous villages: Khe Tran, Doi and A Sap.

People's livelihoods are secured by various assets, or capitals, that an individual or household needs to survive. The access to these capitals are an important part of analyzing livelihoods. Access can, depending on the setting, come either from social networks or be mediated by some form of institution, be it official or not. Climate change is affecting both the access to various capitals, the need for them and the supply of them.

As circumstances change, so does human behavior. People and society adapt to new realities. Mitigation and adaptation strategies are being discussed on both local and global levels (UNEP, 2024; Tall, Arame & Brandon, Carter J., 2019; Ha, Tran Hong, 2022). However, in order for policies to be effective it is necessary to understand what is happening on the ground in affected regions. What are the needs of the local inhabitants in the villages? In what way are they affected by climate change? What are their perceptions of these issues? Which strategies are they already implementing? Only by understanding what is happening on the ground and understanding the challenges from their perspective, can policies more accurately target their needs. Thus, this thesis strives to understand the perceptions and actions of the people in the selected field sites.

These issues also highlight that environmental problems are also societal problems which are rooted in the structures of societies. Here issues of politics, institutions, economics, technology and social norms are all important, which is something that Nightingale (2015) addresses in relation to adaptation research.

Finally, there appears to be a gap in the research of climate adaptation in this region regarding gender issues (Le, 2024). Without proper insight into how women's livelihoods are built-up and how they adapt, our understanding of climate adaptation and resilience is lacking an important perspective. This paper therefore aims to understand the context in which people are living and making a living, how people try to mitigate risks posed by climate change and how this changes their livelihood strategies. A special focus is put on understanding climate adaptation from a gender perspective.

1.1 Aim and Research Question

The overall aim of this study is thus to explore how people living in rural areas, women in particular, adjust their livelihood strategies when facing climate change and how they try to mitigate risk. Furthermore these actions and perspectives ought to be placed in a social, economical and political context.

In regard to the gender perspective, there are many issues that this thesis explores. What does it mean for our understanding of resilience if gender-issues

and the perspectives of women are missing from the analysis? Does women's access to certain assets or their roles in the household impact their ability for mitigating risk from climate change, and in what way? Do women have another perspective on what climate adaptation means? These insights are important to understand how women's livelihoods are built-up and how they can adapt. Therefore, this thesis strives to compare differences and similarities in the male and female perspective.

In order to understand climate adaptation in this context, it is important to first understand what their livelihood strategies are overall and in what way climate change affects them. Therefore, this paper aims to understand people's own experiences, perceptions and struggles connected to their livelihoods and the impact of climate change on these activities.

Research questions

- What are people's livelihood strategies?
 - Does it differ for men and women?

- From the villagers perspective, what aspects of their livelihoods are affected by climate change?
 - Does it differ for men and women?

- In what way are people trying to adapt to changes caused by climate change?
 - How does it relate to their livelihood strategies?
 - What factors are most relevant for people when choosing methods of adaptation?
 - Does it differ for men and women?

2. Theoretical framework and literature review

In order to investigate the existing field of research, I have reviewed scientific studies linked to the concepts and theories related to my research. In this section I will provide an overview of relevant perspectives in this field, in the nexus between climate change adaptation, livelihoods, food security and gender. These will serve as the foundation for my own research, not least in shaping my research questions and the design of the matrix ranking.

2.1 Livelihoods, gender and access

The livelihood concept is a broad and complex one. Ellis (2000) suggests a framework which incorporates five essential capitals: financial/economic, social, human, natural and physical, which determines the living of an individual or household. An additional important aspect of this livelihood framework is access to these capitals, which can come through social networks or be mediated by institutions. Institutions are systems that structure social interactions and that are established on prevalent social rules, and can be both informal and formal (Hodgson et al., 2006). These institutions, such as norms, laws, firms or organizations, can both constrict and enable behavior (ibid.).

Ellis (2000) writes that many rural households cannot solely depend upon farming for their survival, but instead have to rely on a diverse portfolio of strategies. Thus, the livelihood framework and consequently the diversification of livelihoods has both social and economic dimensions. For this reason, Ellis's livelihoods framework is a good tool for analyzing livelihoods in a context specific setting where one can take into account these various dimensions.

Examples of financial or economic capital include financial services, capital investment, sources of income and bank-or-micro financing. Physical assets could include irrigation, water gates, roads and public spaces. Natural assets are the ones we most commonly connect to rural livelihoods, such as fisheries, forests, soil and water volume. Social assets are dependent on trust and connections and include the

support of various networks, community meetings and forms of participation and decision making. Human capital is what allows people to realize their potential and increase their productivity, it includes formal education and other types of knowledge or skills (Sok, et al 2015).

Additionally, as Ellis notes, the framework can also work as an anchor when analyzing rurality and gender. This is because both the access to assets and the division of labor within a household's, in other word's their livelihoods strategy, can be gendered. Women often have less access to formal networks and instead rely on informal networks for their livelihoods. This can depend on a number of factors such as patriarchal norms, constraints in regard to reproductive work or high costs (Arora-Jonsson, 2008). Furthermore, Krishna (2012) argues that gender concerns should be better highlighted and that the livelihoods approach must address the control over resources and subsequently the conflicts that arise from this. The backdrop of this reasoning is similar to Arora-Jonsson in terms of acknowledging patriarchal and hierarchical structures which govern the control of resources in local communities. These power structures, which Krishna wants to promote in analysis, also pertain to other things than gender, such as ethnicity, geography and class, which affects a person's position in a group. To add to this, Delisle (2016), who studied ethnic minorities in the uplands of Vietnam found that longstanding culturally rooted ties, networks and social capital was critical for people's ability to adapt.

Because of this, all activities in a household, be it off-farm, non-farm or on-farm, and the outcomes of these are relevant to analyze when looking at gender issues and livelihoods.

2.2 Climate adaptation

Climate adaptation is about coping with the shocks and stresses posed by climate change. The Intergovernmental Panel on Climate Change (2007) defines adaptations as “The process of adjustment to actual or expected climate and its effects.” Furthermore the IPCC (2007) states that “In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities.” Climate

change leads to increased climate hazards, such as flash floods, droughts, storms and insect attacks. The extreme temperature variability of both heat and cold creates problems for agriculture and animal husbandry. Adapting to these climate related threats entails reducing risk by various tools - adapting to the new circumstances. This can for example include changing crops or diversifying crops, improved infrastructure, or using new methods for animal husbandry. However, given the broad definition by the IPCC this thesis also includes non-agrarian actions, such as altering one's livelihoods portfolio and focusing on other sources of income, as a form of adaptation.

2.3 Cash crops vs. subsistence crops

An important aspect to keep in mind when addressing agricultural issues is that the purpose of crops are diverse. One way to distinguish between crops is by classifying them as either cash crops or subsistence crops. Cash crops are defined as “agricultural crops that are planted for the purpose of selling on the market or for export to make profit” (EUROSTAT, 2023). Common examples of such crops are fruit trees such as bananas or oranges, vegetables such as tomatoes and cucumber or more luxurious items such as coffee and sugarcane. Subsistence crops however are “planted for the purpose of self-supply of the farmer” (EUROSTAT, 2023). This self-reliance includes family consumption, feeding livestock or sharing with relatives. Typical examples of subsistence crops are rice, cassava, corn and potatoes.

The choice between planting these two types of crops doesn't have to be either or for the farmers. However, in many poor rural areas households do not have enough land to cultivate both cash crops and subsistence crops. Therefore, households have to make a choice. One thing to note is that the cash crops, though potentially lucrative, entail an additional dimension of risk that subsistence crops do not: market risk.

The issue of cash crops or subsistence crops also has a gender dimension. There are generally seen to be ruling gender norms within agriculture, one of which is that cash-crops are male-coded (Kilimo Trust, 2012). On the other hand, the gender

norms dictate that women are the ones who are responsible for feeding the family (ibid). Thus, when land is scarce and a choice has to be made between cash-crops and subsistence crops, women tend to favor subsistence crops (ibid). Therefore, the issue of women's power to make decisions within the household affects the outcome. However, the tendency for women to gravitate towards lower-value subsistence crops might not be the result of priorities but rather their lack of access to information, markets or input (Doss (2001). Thus, another issue which is relevant to the outcome is to what extent women are educated about issues such as markets, which are typically seen to be a male domain. Thus, the gender-dimension of the decision of production is context-specific. Therefore, norms or other restrictive perspectives need to be analyzed in each case.

2.4 What affects adaption and resilience?

Numerous articles have studied the connections between livelihoods and climate adaptation in various case studies across the world, mainly in Asia and Africa. The researchers come to various conclusions on what factors determine the outcomes for adaptation. They also focus on different aspects of these mechanisms and come from different perspectives. A few of these aspects, which I find convincing, are elaborated on in the following sections.

2.4.1 Food security

One aspect that is researched in this field is in the nexus between climate adaptation and food security. The definition of food security is “having a reliable access to a sufficient quantity of affordable, nutritious food” (FAO, 2008). This definition includes several dimensions that the Food and Agricultural Organization of the United Nations addresses - Physical availability of food, economic and physical access to food, food utilization and the stability of the other three dimensions over time (ibid). These dimensions include the “supply side” of food, the availability for households which also relates to market and prices, the intra-household distribution of food as well as economic, political and environmental factors over time (ibid).

One article from 2011 which was based on a case study in Ethiopia found that climate adaptation indeed does increase food productivity and thus the households food security (Di Falco, 2011). Furthermore, the results indicate that it is the poorest and most vulnerable farmers who benefit the most from adaptation strategies. In other words, the household with the least means and capabilities to produce food productively are the ones who need adaptation strategies the most. Furthermore, the article states that these adaptation strategies can close the productivity gap between vulnerable and less vulnerable households (ibid.). However, the article also notes that households' access to credit, extension services and information were driving factors for adaptation. Thus, only households with access to these actually implemented adaptation strategies. These were often households which were better off, and thus had less gain from adaptation (ibid). In other words, even though the

poor have more to gain from adapting, it is often more challenging for them to implement adaptation practices because of a lack of resources.

In addition, another article from 2015 concludes that a household's capacity to adapt is linked to their degree of human capital and physical and social assets (Sok, 2015). The likelihood of adaptation, leading to increased resilience, is higher when households have higher education and larger plots of land (Naqvi et al, 2020). The likelihood of adaptation is negatively correlated with larger family sizes, which in turn also minimizes the welfare gains of adaptation (ibid). Thus, these articles also highlight that adaptation strategies are easier to implement in households that are more well-off.

2.4.2 Gender and climate change

A variable that can be closer examined in the scope of welfare, in terms of access to livelihood assets and adaptation, is that of gender. One researcher found that women were vulnerable in different ways than men under climate variability (Asaduzzman, 2015). Namely, women were more vulnerable than men in terms of income, food security, education and access to water and sanitation, affecting also their life and health (ibid.). Asaduzzman (2015) contributes the difference between men and women in this regard to existing inequalities between men and women, which are exacerbated by climate change. To deal with this, women also had their own coping strategies to adapt to the new circumstances posed by climate threats, some strategies more demanding than others. Their coping strategies were, as opposed to men, based on having relatively less resources than men. For instance, many women would reduce their food intake during and shortly after a climate disaster such as droughts or floods. Many women would also sell what assets they have, use the household's savings or try to receive credit but this option was more demanding and difficult. A more sustainable adaptation practice that women also implemented was to engage in alternative livelihood practices as a new source of income. These activities were often off-farm activities, such as construction work or working at a wealthy household (ibid). Here, one could question the reasons why all these adaptation methods for women were outside the scope of agricultural

practices. Does that mean that they have a limited role in the active agriculture practices? If so, why?

Furthermore, another study found that women were more vulnerable and exposed to climate impacts and that they had a lower capacity for adaptation (Basiru, 2022). Basiru (2022) identifies a wide variety of causes for this, including that women have less education, have more dependents and were limited by their adversely large roles in domestic labor in the household. In addition, Sujakhu (2019) found that women-headed households were disadvantaged and more vulnerable than their male-counterparts. To add to this Le et al. (2020) found that a key element of a household's choice of adaptation strategy was the household head's education level, as well as knowledge and awareness of climate change risks. Thus women's lack of formal education and access to information weakens their adaptive capacity.

2.4.3 Natural-based solutions or technical solutions

The types of adaptation schemes that are implemented seem to matter in regards to a household's level of food security. A case study of Nepal concluded that adaptation measures that focus on improved productivity and access to markets through technical inputs are inaccessible for marginalized rural households. Many of these households were already food insecure and these types of adaptation strategies did not mitigate that (Nagoda, et al., 2017). This is also in line with findings that suggest that climate adaptation strategies can also create new risks, depending on the method. The more technology-based strategies require higher input-costs and investment-costs, which makes it more risky for poor rural people (Beckman, 2006). Therefore, nature-based adaptation methods may be more attainable and beneficial for poor rural households.

Nature-based solutions to adaptation entails bolstering human well-being and resilience by means of ecosystem abilities. In other words, strengthening ecosystem services by preserving, creating or restoring ecosystems and managing them (Swedish Environmental Protection Agency, 2021).

In an article by Beckman (2011), she articulates how policies of forest conservation and the building of hydroelectric dams which were meant to

contribute to regulating flooding in lowland areas of Vietnam actually weakened the capacity for adaptation for the people living in the upland areas. By introducing these policies the communities living in the mountainous areas lost natural capital in forms of access to land and forest resources. The forest resources had been an important buffer for these people when coping with crises caused by climate shocks, such as floods and drought. The loss of these resources limited the communities possibilities for their livelihoods. In addition, the land that these communities had for agriculture was already small but as it diminished so did the opportunities for crop diversification and flexibility- creating more risk for these people. This policy also had additional negative impacts for adaptation. When the community could no longer access forest products, they were moved into developing input-intensive farming which they needed to take loans to maintain. In other words increasing the use of fertilizers, pesticides and other things needed to increase productivity. This new practice increased their risk because the economic consequences of crop loss increased as it meant going into debt. Thus, this policy which in part was aimed at strengthening climate adaptation in fact negatively impacted the mountain communities capacity to manage risk and adapt to environmental change (ibid).

As can be seen in the examples above, adaptation is not a ‘one size fits all’ nor is it a singular action. What may benefit some groups may endanger others and actions that may be beneficial for one area of a household's livelihood may weaken resilience in another. Sufficient to say, adaptation is complex and thus needs to be studied in a contextual setting, where their specific circumstances are analyzed.

3. Methodology and limitations

3.1 Selection of field site and research questions

The chosen study sites for the field work are three mountainous villages: Khe Tran, Doi and A Sap, which are located in the Thua Thien province, in Hue. The province consists of an urban district and eight rural districts and is very diverse in terms of landscape, containing both coastal areas and mountainous areas. In this region, most people are dependent on agriculture, aquaculture and forestry for their livelihoods as well as off-farm labor. The three selected villages have different economic and natural conditions, in terms of land availability, soil quality, forest cover, gender- and age make-up of the village and distance to the city. The inhabitants of the villages at large belong to different ethnic minorities; specifically Pa Hy and K'tu. A Sap is the most remote of the three villages and Khe Tran the least. Yet, they are all mountainous communities who lack coast and heavily dependent upon forestry for their livelihoods.

The chosen villages exemplify the broader circumstances for the mountainous areas in central Vietnam, in terms of trends, policies which target them and conditions of the inhabitants.

3.2 Field work

In order to address my research topic and the research questions, I collected data of a qualitative nature. I have chosen to use a qualitative method in the form of semi-structured interviews. To complement this method, I have also used matrix rankings in a group interview setting. The data for this master thesis was collected during a field study in rural areas of Thua Thien Hue province in Vietnam, between the 27th of February 2024 and 16th of March 2024.

During the forming of my research as well as in the data-gathering stages I cooperated with a research team at Hue University of Agriculture and Forestry (HUAF) and SLU. I came in contact with them through my supervisor, who is

involved in a joint research project with them. They had their own research-study in the area and had previously studied the mountainous areas, thus they acted both as cultural brokers as well as a sounding board. In addition I was able to join discussions about their aim, method and questions for their research. This collaborative process was helpful in shaping my own research, rethinking different aspects and being able to discuss strengths and weaknesses of it.

The stakeholders that were the focal point for this study were both subnational agencies which work with rural development and agriculture and forestry, as well as authorities within the village and its locals. Specifically, I collected data from seven provincial agencies which included the Department of Agriculture and Rural Development (DARD), Department of Rural Development, Department of Animal Husbandry, Department of Extension Services, The Department of Forest Management (FDM), Forest Owners Sustainable Development Association (FOSDA) and the Forest Protection and Development fund (FPDF). The four first mentioned agencies were interviewed together on the same occasion. Furthermore, I, together with the research team from HUAF and SLU, collected data from the Department of Agriculture and Rural Development at the district level in the three districts I worked in. At the village level, I worked separately from the core research team, in order to conduct my own data collection. Sometimes, researchers from HUAF also took part in “my” team. I interviewed the village head, the head of the women’s union and inhabitants in the three villages.

The village-head is a person within the village who is in charge of organizing village meetings, helping the village inhabitants with various tasks and is the person who has the most contact with local agencies. It is an elected position which is temporary. The women’s union is a national women's organization whose purpose is to represent and defend the rights and interests of women. The organization exists on several levels, but each village’s women’s union is quite autonomous. The head of the women’s union is the person in charge of the local organization in the village and tends to the interests of these women. They organize various activities, enable micro-loans for women in the village and represent the women at village meetings. Both the head of the village and the head of the women’s union are themselves inhabitants of the village.

In order to collect my data I spent 13 days in the field, divided by provincial level, district level and village level. For the provincial level, I utilized one day. The data was collected through being present for the face-to-face interviews conducted by researchers from Hue University of Agriculture and Forestry in cooperation with my supervisor at SLU. I was also able to ask questions myself. At the district level, I spent one day at each district that I planned to visit. Since there were three districts it took three days. Also here the method consisted of being present for the face-to-face interviews.

These two levels are responsible for policy creation and policy implementation. Thus, their perspectives and actions affect the village-level. From these interviews I also got a better understanding of various projects that have been undertaken. I therefore found it vital to interview and understand them in order to better grasp the subsequent conversations at the village-level.

However, my main interest is in the data collected from individuals and households at the village-level and thus the majority of my time was spent there. I visited three villages and stayed in each for three days, making it a total of nine days. It is in this setting that I used the matrix rankings in addition to doing semi-structured interviews. The aim is to understand the context specific circumstances and better identify factors which determine the people's choices for livelihoods and adaptation.

Through understanding the different stakeholders perceptions and awareness of climate change, risks and potential responses to this, I am able to pinpoint potential discrepancies between them. These varying perceptions and understandings can depend on cultural aspects, gender, wealth or other aspects. These aspects are explored through the perspectives of the stakeholders. These aspects also aid in understanding the factors that determine people's choice of adaptation strategy.

The number of individual interviews conducted was 16, of which 8 were women and 8 were men. The amount of group matrix rankings which were carried out was 8, consisting of four groups of women and four of men. The people who were interviewed ranged in age from 23 to 70.

The reason for choosing to interview people of different economic standing, despite it not being the focus of my study, was to try and distinguish between

socioeconomic factors and gender affecting the perception of the issues relevant for this thesis. There were also three interviews conducted with the heads of the women's union, but only two with the different village heads.

| | Khe Tran | Doi | A Sap |
|--|---|--|--|
| nr of interviews | 8 (6 women, two men) | 4 (3 men and one woman) | 4 (3 men and one woman) |
| nr of matrix-rankings | 2 (one group of men and one group of women) | 3 (poor women, medium women, well-off men) | 3 (poor women, medium women, medium men) |
| Interview with head of village | yes | no | yes |
| Interview with head of the local women's union | yes | yes | yes |

Table 1: data collection per village

3.3 The different levels of stakeholders

In order to understand the context in which this study was conducted, this section provides an overview of the different political and administrative levels which are relevant for the study.

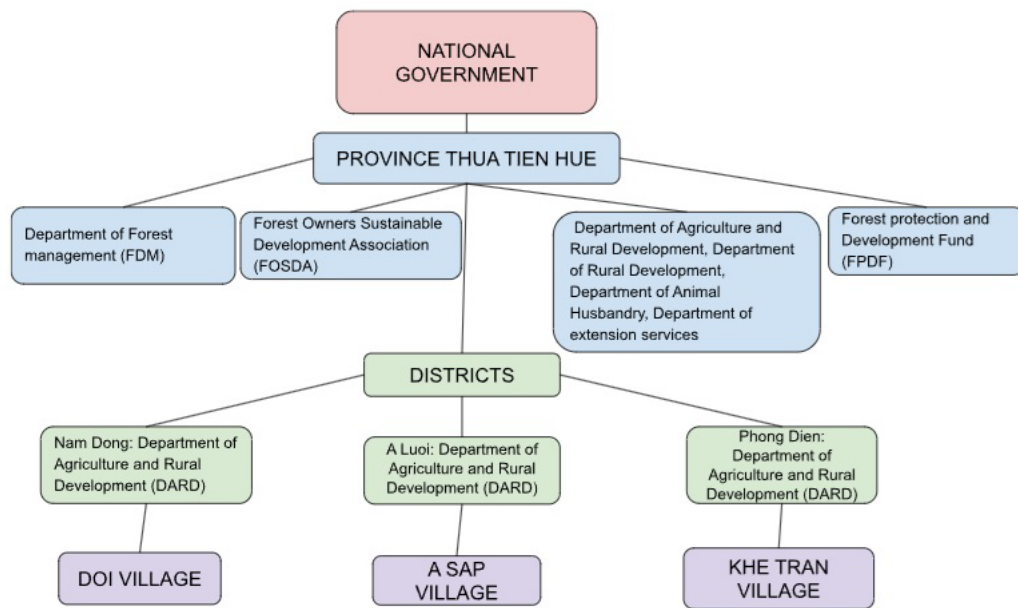


Figure 1. Mapping of stakeholders

3.4 Semi-structured interviews and ethical considerations

When conducting this study, I used semi-structured interviews with open-ended questions to allow for the participants to reply openly with no restrictions other than the subject area. At the same time, as a researcher I was able to determine the line of questioning so as to not get too off-topic. During the interviews, some additional questions were added to build upon information that I received and others were retracted due to time restrictions or them simply not being relevant. Furthermore, I used probes to get more information or to have the participants explain their thought-processes in more detail. However, the predetermined questions laid the foundation for the interviews. The list of questions which were used in the villages can be found in appendix 2.

During the interviews it was important that the participant felt as comfortable as possible in the situation. I started each interview by introducing myself and providing instructions to the interviewee in addition to stating the purpose of my study. Furthermore, I described the structure of the interview and allowed the participant to ask questions. Before beginning the interview I also asked the

participants for oral consent for participating in the interview and allowing me to use their answers in my thesis. To follow up on this at the end of the interview, I thanked them for participating in my study and assured them that their answers will be confidential and that they will be anonymous.

A barrier which had to be worked around during the interviews was the fact that I had to use a translator as I do not speak Vietnamese. On the one hand, this was a drawback as I did perhaps not get the full interpretation of their answers and it made it more difficult to make a connection with the person I was interviewing or gain their trust. However, on the other hand, the translator also worked as a sort of cultural broker which was an advantage. In addition, the translators which helped me also had a role as a researcher which was very beneficial as they also understood the context of the questions I had.

For the interviews I used an observation protocol which included overarching information, such as the place, time, date and setting of the interview. It also included descriptive notes and reflexive notes such as my impressions, ideas and speculations. This was a good way for me to organize the data. However, I did not record the interviews. This was firstly because I did not intend to transcribe all the interviews because it was too time consuming and did not add enough value to my study as I am more interested in the overall messages. Secondly, because I do not know the language my focus would be almost entirely on the translator in the recording, which would mean that I wouldn't get the actual phrasing of the participant regardless.

The sample of people interviewed was not random; instead they were chosen based on an intention to view various perspectives based on their positionality. In other words, they were chosen from the population of the villages based on gender and economic status. There were also key informants chosen, based on their position in the village. These were the head of the village and the head of the women's union. The aim of interviewing the two key informants was to get their perspective as well as to get an overview of the issues in the village. The head of the village and the head of the women's union were interviewed separately.

The interviews with the individuals living in the village were conducted individually, with both men and women, to identify differences and similarities in

regards to perspectives, chores (both in the everyday but also in the more long term and seasonal), needs and struggles. The duration of the individual interviews was approximately one hour.

At the higher levels of political organization, the provincial and district level, I took part in interviews with people who represented different departments of the government. These people were not chosen for their own characteristics, but rather because of their position in the state. Thus, they were seen as representatives of the interests of the different departments.

This case study does not claim to be generalizable and thus a randomization is not as important. Furthermore, all contexts have specific issues and mechanisms which affect them and thus doing a deep-dive into this specific context gives a better understanding of these people's needs as opposed to some generalized view of adaptation or livelihoods. For this reason, it was important that I got several perspectives from the specific context studied.

3.5 Matrix ranking and ethical considerations

The Matrix ranking was conducted in a group setting, where participants were asked to rank and discuss the importance of different assets for their livelihoods. As with the interviews, I explained the purpose of the study and any practical details before the exercise began. Furthermore, I also asked for oral permission and informed them that they would be anonymous.

The groups were separated by gender and economic status classified by “poor households”, “middle-income households” or “well-off households”. The village head in all three of the villages helped me to identify the different economic levels of the households. Each group consisted of five to seven people. The duration of the matrix ranking and subsequent group discussion was approximately one hour.

The purpose of the ranking exercise is to have a more bottom-up approach where the focus is on local people's perception and accounts of their own struggles. Additionally, this method allows for the local people to be the experts of their own context and situation and allows me as a researcher to learn from them.

In practice, the matrix-ranking exercise was divided into several sections. I asked the participants to prioritize and rank a set list of assets based on their importance for their 1) food security, 2) ability for adaptation, and 3) household income. The focus on food security is used as a proxy for a broader livelihoods estimate, as it relates to a plethora of issues with economic, political and environmental aspects. The assets were based on the capitals proposed by Ellis (2000): physical capital, social capital, economic capital, natural capital and human capital. Within these categories of capitals, there were several different assets.

For physical capital the options were irrigation systems, roads and finally access to community spaces. Social capital was divided into farmers union, women's union, access to extension officers, neighboring households, community leadership and lastly community forest groups. The options for economic capital were access to loans/credit, the ability to sell produce, off-farm and non-farm labor, remittances, government programs and ecotourism. Natural capital contained natural forest, planted forest, access to water, crops and livestock. Finally, the last grouping of capitals- human capital, contained options of formal education, knowledge about crops and livestock, knowledge about forestry, knowledge about climate change and lastly adaptation programs from external sources. The choice of these assets was based on previous literature and theory identifying these as important aspects for rural livelihoods, as described in section 2 of this thesis.

Concretely, the groups first ranked the individual assets corresponding to each bundle of capitals, in regards to their importance for the challenges mentioned above, i.e food security, adaptation and households income. They then were asked to rank the importance of the different capitals as a whole against the others first with the lens of food security, then ability for adaptation and finally household income. A note to add here is that not all group discussions ranked all the capitals in regard to all the challenges, because of time restrictions. However, as a whole they gave input on all these different aspects.

One drawback of this exercise was firstly that the set list of assets were not exhaustive and perhaps there were assets which the group, or individuals in the group, deemed as more important than the options they were provided with. Secondly, it is difficult to draw a clear distinction between food security,

households income and adaptation - as they are very connected and mutually reinforcing.

For this exercise it is therefore not only important that they rank these capitals but that they explain their reasoning and justification. This will tell me more about their circumstances, perceptions and realities than the number-ranking alone. Though everyone in the group had to agree on the number to add to the matrix, their individual perceptions within the groups of the issue was still important data that was collected. The results from the matrix ranking can be found in appendix 1.

3.6 Dealing with the data

Before the actual analysis work can begin I organized and prepared the data (Creswell, 2018). This included sorting out my notes from the interviews and sorting out the results from the group matrix-rankings. Concretely, I divided the individual interviews by villages, and divided the interviews from the “regular” inhabitants and the village head and head of village union. The next step was then to read and look through all the data. For my research the design was flexible as I started my initial analysis at the same time as I collected the data.

The data itself was analyzed relative to my research questions. The theoretical concepts and discoveries of the previous literature served as a basis for finding themes in the data. For instance, when asking about people’s daily activities I separated the women’s and men’s answers to identify divisions of labor within and outside the household, which the literature pointed to as being an important variable for a persons adaptative capacity. In addition, this data also showed access to different capitals such as natural capital which affects ability for adaptation, but also social capital which reserachers point out differs for women and men. Furthermore, previous research identified awareness as an important aspect of adaptation, thus looking for patterns for how men and women describe climate change and risk, and what their focal point within this is, was another focus when analyzing the data.

3.7 Validity of the study

This study has strived to understand and present the participants' perceptions and understanding of the issues of livelihoods, climate change and adaptation, in a meaningful and trustworthy way. In order for this study to achieve that goal, the research method and the structure in which the study has been conducted has to be transparent. In addition, the presented data and conclusions have to be accurate reflections of the studied group (Creswell, 2016).

It is therefore I have sought to present a detailed explanation of my method in addition to presenting extensive data from my interviews and matrix rankings, in order for the readers to be able to follow my interpretations and make their own judgements on its validity. By conveying my findings in a rich description, the readers can partake in a shared experience, making it easier to understand and analyze the findings for themselves (Creswell, 2016).

Although, this has been the aim there are circumstances which affect the internal validity of this study which have to be acknowledged. Firstly, as partially addressed in section 3.4 I used a translator for the interviews. During the course of the field work, I used two different translators, both of which were researchers. As such, the quotes in this thesis are not literal but a translation of the actual quotes made by the participants. This is a disadvantage as the information has been passed through additional actors, with possible own interpretations, reducing the accuracy of their statements. On the other hand, the translator's knowledge of the cultural context could also help in the interpretations of their answers. Furthermore, the translator's role as a researcher provided more opportunity for me to explain the purpose of my study which made me more confident in their translations as well as their interpretations. Finally, establishing a relationship with the translator where we could continuously talk about the interviews and the meanings of the answers aided in the reliability of the translations.

Secondly, although the purpose of the semi structured interviews was to allow the participants to more freely express their perceptions of the issues and add their perspectives on which aspects were important, there is still a power imbalance in this setting. That is to say, inevitably the participants in the interviews are not able to control nor decide the broader subject matter of the interviews or my

interpretations of their answers. Thus, me as the interviewer and the informants are not equal participants. The same is true for the matrix-ranking exercises. Furthermore, one has to be aware of the fact that as a researcher one has the ability to shape and impact the answers of the participants based on how the questions are formulated. Thus, reflecting on my own actions and positionality in the interview setting, and how this might have shaped the outcome, is important. In the same way, it is important to reflect on which biases I hold based on my background, culture and gender and how this affected my interpretation or the actual answers of the participants due to their level of comfortability with me (Creswell, 2016). During the process of the field work I tried to reflect on these issues.

Furthermore, as briefly discussed in section 3.5, the interpretations of the matrix ranking might be difficult as the assets they were given as alternatives to rank were not exhaustive nor was it easy to draw a distinction between their purposes for food security, household income and ability for adaptation. However, these methods did overall provide adequate focus on the participants' views and opinions in a way that more structured methods could not. Thus, I am confident that the chosen method most accurately provided me the opportunity to answer my research questions.

Moreover, as explained in section 3.4 this study does not claim to be generalizable. As Creswell (2016) writes, the purpose of qualitative research is seldom to be generalizable but rather to be particular in the descriptions and themes of a certain context. This study has aimed to describe the context of three villages in the mountainous areas of Hue: Khe Tran, Doi and A Sap. Yet, knowledge about specific context can still be valuable and help broaden the discussion about a topic. In this thesis, I hope my findings can contribute to both a deeper and broader understanding of climate adaptation issues and how it affects people's livelihoods.

4. Empirical findings

This chapter addresses the empirical findings from the interviews and matrix rankings based on the research questions of this study.

4.1 What are people's livelihood strategies?

In this chapter I present results pertaining to people's overall livelihood strategies in the three villages of Khe Tran, Doi and A Sap. The purpose of this section is for the reader to understand the context in which this study is conducted. This data is gathered from the individual interviews in the three villages, from the matrix rankings and from the higher administrative levels. Understanding their current livelihood strategies is the basis for further analysis on climate change, adaptation and gender.

The communities which are the focal point of this study are all primarily dependent on forestry for their livelihoods.

In order to understand the setting in which people make a livelihood, the social context of the villages are important. During the ranking exercise all three villages ranked the women's union as one of the most important social connections for their food security, for both men and women. The local women's union mediated micro-loans from the banks and organized women's savings- and credit groups, organized people to assist with households forests and gardens who needed help, and in other ways tried to assist its members. The union also had more formal roles, as described below.

In Khe Tran, the head of the women's union was part of the village administration, which also included the village head. In Khe Tran, this community leadership was very important for the people of the village. They organized activities of both a social nature and in terms of production. However, the head of the women's union told me that she is often the only woman present for village meetings. To ensure that the women of the village are informed, she goes around

and relays the information to her members. This is quite different from the situation in A Sap, at least according to the head of the women's union there, because she says that 80% of the participants in the village and commune meetings are women. In Doi, I'm told that the number of women in village meetings have been increasing and that women now often make up half of the meeting. The head of the women's union in Doi also tells me that women step in and represent the households at the meetings whilst the husbands are unable to attend.

There were also other important groups in the villages, mainly the farmers union and community forest groups, which many people felt were important for their livelihoods. However, apart from the more structured organizations nonformal interpersonal relations were also *vota*. During the matrix ranking exercises one result that stuck out was that neighboring households were perceived as quite important for the poor women's food security.

Moving on to their production activities, people in the villages of this study have small plots of land, between 1-5 hectares, depending on economic status, most of which are used for tree plantations. Households also have small gardens for cultivation of other trees or vegetables and crops, predominantly for household consumption.

The predominant forestry revolves around acacia plantations. The acacia is primarily planted to be sold as wood chips and are usually harvested before the 5th year. For most households, this activity is the primary source of income. However, many households also have rubber trees and collect the rubber milk to sell. Both the men and women in households work with acacia, but they have different roles. Both plant the trees, although the men are typically the ones who dig the holes for the trees. Furthermore, the men tend to organize the sales of acacia and are the ones who harvest the trees.

Several women I spoke to, who ran female-headed households since the passing of their husband, also talked about giving up their land to their adult sons. Through this act the women wanted to aid their sons in their future livelihood by providing land for their cultivation. As a result, this meant that the women did not have enough land themselves to be able to plant acacia or rubber for income. Thus, they became very dependent on their children for income and food.

Furthermore, fruit trees are common in peoples gardens, including jackfruit, different variants of pomelo, oranges and bananas. The fruit is used both for household consumption and to put up for sale. A few households also have indigenous plants that are used for a number of reasons, such as for medicinal purposes. These plants are collected from the forest, and some are also returned. In most households, both men and women tend to the gardens.

Natural forests with their supply of non-timber forest products such as fish, frogs, honey and rattan also play some role in people's livelihoods, but are not the predominant source of income or food security for households. Collecting non-timber forest products is an activity that was more popular in the past, but that most households have given up for other avenues of income. The gender-division of labor in the collection of non-timber forest products depends on the product in question. The head of the women's union in Doi said that:

“Men collect the honey because it involves hard work, such as climbing trees, which is hard for women.”

At the same time, many women in the villages described how they gather rattan and fish or frogs. One woman described how she used to collect rattan leaves to make hats to sell.

Livestock also plays a role in people's livelihood, although fewer households are able to afford them. Households in the villages have about 10-30 chickens from which they collect eggs and meat. Primarily, these are for household consumption. Some households also have pigs and cows, but they are less common as they are more expensive. These assets are not for household consumption, but rather to sell on the market. Many households which have pigs also breed and raise piglets which are sold on the market. Both men and women tend to the livestock to varying degrees. A older woman in Khe tran said that:

“Both my husband and myself feed the chickens twice a day”

However, in A Sap the difference in how the groups ranked the importance of livestock for their food security and livelihoods did not depend on gender, but rather

economic status. In other words, the poorer groups did not rank livestock as vital for their own livelihoods - however, predominantly this was because they couldn't afford to have livestock. One of the poorer women, who did not have livestock herself, said that:

“My dream is to be able to buy livestock to improve my income and be able to pay off debt”

The head of the women's union in A Sap furthered this argument and said that livestock is a valuable buffer for many households, and women in particular. They generate more income for people, whilst presenting less risk than crops and oftentimes less intense labor.

The role of crops are limited in these mountainous villages surrounded by forest, but some households do grow crops. The primary crop is rice, although some also grow cassava and corn. One woman in A Sap who planted cassava said that whilst both her and her husband share the work, she had to take on more responsibility when he was away in the forest or working in bigger cities.

The village's degree of self-sufficiency is low and therefore they are reliant on monetary income to purchase food.

“We only produce 1-2 saos* of rice, which equals the ability to be self-sufficient for 2-3 months of the year. The rest of the year we have to buy rice”, said a man in Doi during the group interviews *1 sao= 500 square meters

“We are not severely food insecure, but around the months before and after Tet, which is the rainy season, we do not have sufficient food. We then have no choice but to use our savings and wait for job opportunities to arise”, said another man in A Sap

Therefore, multiple sources of income are important for the households in the village - and they do have a quite diverse portfolio. Whilst forestry, raising livestock and cultivating crops are the backbones of the rural livelihoods in these villages - non-farm and off-farm labor also play a part.

For two out of the three villages, Doi and Khe Tran, eco-tourism was an important new income revenue which many households invested quite heavily in.

The government has also helped in investing in this practice. In the villages that had ecotourism, women were the ones predominantly in charge of taking care of customers, cooking, performing for the guests and making traditional dresses to sell. The head of the village in Khe Tran said that a majority of people working in ecotourism are women.

The new tourism tied in relatively closely to agricultural practices, not least animal husbandry. In particular, one of the villages was well known for a local breed of chicken which was an important part of attracting tourists, which led to many households breeding them. Cooking meals for the tourists was one of the main tasks in the tourism-field, and the preparation of this chicken was a special part of it.

During the interviews I also heard of many examples of women utilizing the tourists for selling a number of agricultural products.

“The eco-tourism also gives women an opportunity to sell more of their produce to the guests”, said the head of the women’s union in Khe Tran

“I used to collect snails in the river and sell them to tourists”, said another woman in Khe Tran

“I sell the cassava and corn from my garden to the tourists”, said a woman in Doi.

In Doi, the women explained that the eco-tourism in the village is run as a cooperative where everyone pays to participate. The money in turn goes to the women’s union to fund microloans. Of the 33 members 23 are women. One of the women in Doi explains

“We are divided into different teams with varying responsibilities, such as cooking, performing, guiding the tourists and so on”

This avenue of income is seasonal due to weather conditions, and therefore not as sustainable as other activities, yet it seems to be an important additional income for households in the village. One woman in Khe Tran said that:

“I work in eco-tourism for three months of the year, and during these months I make 15-20 million VND after expenses. This is good money for me.”

In addition, many people, especially the poor, also do off-farm labor in which they work on other peoples plantations. One younger man in Khe Tran said that the amount of land he had was too small to cultivate enough income to support him, his wife and their two children. He said that:

“I get my main income from daily labor on other peoples forest land, where I harvest and clear the forest”

Moreover, men make more money from working with acacia than women do. According to the head of the women’s union in A Sap, men make about 50 000 VND more a day than women. The reasoning is that they do more of the heavy manual labor. She adds that the wages for off-farm labor with acacia have risen lately. According to her, this is because of the increase in demand and that the price for acacia has increased and thus the laborers also want increased pay.

Some people in the villages also migrate to bigger cities to find work, mainly in construction. Their relatives who stay behind in the villages receive remittances from their income. The money which is sent back is commonly used to pay back debts or pay for the children's education. However, it is also especially important for older people. One lady in Khe Tran said:

“I am too old to work and am dependent on financial support from my family. My son works in Ho chi Minh and sends me 4-5 million VND per year”

However, this is also a risky avenue. According to the head of the women’s union in A Sap:

“It is difficult for the men and women who work in town to send back money because they have extra expenses there that they have to pay, so there is usually not a lot of money left.”, she said

“They often have uncertain working conditions and the work is not stable, sometimes they get to work and sometimes not. Therefore, the income is unstable as well. So, sometimes the families back in the village actually have to send money to the person in the city instead”, she added.

During the matrix rankings exercise, a difference between men and women which emerged in all three villages, was their perception of the importance of non-farm and off-farm labor, where women favored it more than men. Whether this depends on women's reliance on remittances, on their more limited role in the agricultural and forestry practices, or on their focus on their roles in eco-tourism - or all of the above- is hard to say.

Tying in to the subject of off-farm labor, but also to the overall production, there was also a discrepancy that showed between men and women in regards to their perception of the importance of infrastructure for their livelihoods. Men focused on roads and other types of infrastructure as an important component for their food security, in other words being able to transport themselves and goods. For women, this aspect was less important for their food security and livelihoods. Perhaps, this shows that men are more mobile whilst women spend more time at home or in the village.

Furthermore, there are official programs from the government which are additional sources of income for people in the villages. For instance, the Department of Forest Management (FDM) works with a national target program for ethnic minorities which includes financial resources available to strengthen the livelihoods of people in the mountainous areas who rely on forestry. Another such program which many households address is the compensation from The Forest protection and Development Fund (FPDF) to take care of and monitor the natural forest. This task is done by village forest groups who divide the labor between them and subsequently the income. This is very hard work as it can take several hours to get to the forest and the terrain is rough. Participants in the interviews said that they often spend at least 2 nights out in the forest per month. This is, generally speaking, a male domain. Several participants in the interviews, as well as the Forest protection and Development Fund themselves, say that women participate in monitoring the forest closest to the village but that the men are the ones who venture further in. The head of the women's union in A Sap, who is the only women in her forest protection group consisting of 9 people, explained that:

“It is more unusual for women to take part, but if a man is ill or can't participate his wife will take over”

Another man in A Sap who was involved in one of the forest groups told me that women were not allowed in his forest group, not even to replace the men when they are ill. Thus, woman's role in the forest protection groups seems to depend on the norms and wills of the particular groups. Furthermore, their role in the groups also seems to vary between the villages. According to the village head in Khe Tran, the households often appoint the woman to the community forest groups, unlike the norms in Doi and A Sap.

“We have a community forest protection group that consists of 49 households. There is one person per household, most often the woman”, he said.

Apart from the income generating activities there are other aspects of people's livelihood, most notably the domestic labor. This is a task that seems to be clearly gendered within households. Women are the primary caregivers to their children and are responsible for taking them to school, cooking and cleaning. Many of the women I spoke to also take a large responsibility for their grandchildren. Two women which I spoke to in Khe Tran exemplified the impact of childcare on their income-generating activities:

“I do not have time to go into the forest and collect such products [non-timber forest products] because I have to take care of my grandchildren”

“I used to have a shop near the tourist-house where I would sell produce to visitors, but now I take care of my grandchildren and don't have the time”

This was also notable from observations during the course of the field work. For instance, many of the women who attended the interviews or matrix-rankings were accompanied by their children and grandchildren, whilst the men were not. However, many of the interviewees, from all villages, economic classes and different ethnic groups, perceived a slow change to these gender roles, both pertaining to the role in domestic labor and in the production.

“Traditionally in the Paco community women tended to the farm and the men to the forest, but this has changed over time.”, said a woman in Khe Tram

“In Cá Tu customs, women have historically done a lot more than men. Since the women's union formed in 1975 this has led to more gender equity and division of labor both in the household and the production”, said a man in Doi

The head of the women’s union in Doi strengthened this perceptions and added:

“In general, gender equality has improved in the village and men and women share the responsibility. Women used to be quite limited in what they could do, and now they have options”

Moreover, one woman from Khe Tran made the observation that the male role in the domestic sphere depends on his ability to do other tasks.

“Now that my husband is older, it is harder for him to do heavy manual labor so he helps more around the house and with cooking and cleaning”

Lastly, women also have other tasks in the household. As the head of the women’s union in A Sap tells me, women are usually the person in the household responsible for managing the money in the household. From her perspective, women also tend to save more money than men who tend to spend more. At the same time, men generally earn a bigger income than women. Many of the men spend a significant sum of their income from non-farm and off-farm labor on beers, and never bring that money home. Thus, women control the expenditure in the household but can’t control the money that never makes it to the household. One interesting aspect of this labor division is connected to the off-farm labor, where the head of the women’s union in A Sap claimed that:

“Many women usually get a better economic condition after their husband leave, because the expenditure of the households decreases”

Overall, from the data collected in the matrix rankings and interviews, gender seems to be more influential in one's perception of food security issues, and livelihoods, than socioeconomic status.

4.2 What are the stakeholders' view on the effects of climate change and its impact on peoples' livelihood?

In this section I present the stakeholders perceptions of climate change and their views on how it impacts their livelihoods. A special emphasis is put on identifying gender-related issues in relation to livelihoods and climate change.

All stakeholders, at the village-level, district-level and province-level identified similar problems connected to climate change. All stakeholders agreed that the unpredictable and rapidly changing rainfall, causing both drought and flooding, was a major concern for people's livelihoods. In addition, an increase in intense storms was also highlighted as a negative impact of climate change that negatively affected rural livelihoods. The storms damaged the acacia and rubber trees and the drought reduced the crop harvest. Furthermore, an increase in disease in crops and livestock and landslides were also mentioned as issues connected to climate change.

However, the overall perception of the province level is that the mountainous areas are less affected by climate change than lowland areas who are particularly prone to flooding. To add to this, the DARD in Phong Dien district, in which Khe Tran village is located, mostly focused on the effects of the low-land areas when talking about climate change impacts. Thus, from the start it was clear that the mountainous communities were not the focal point for the climate change mitigation and adaptation work of the departments.

The departments on the provincial level also argued that human error on the part of the local villages was to blame for exacerbating the negative impacts, especially in the cases of drought and landslides. Here, deforestation, lack of crop variety and excessive harvesting of their plantations was mentioned as actions which further contribute to the issue of drought. From their perspective, it seems that a lack of knowledge is the contributing factor for people's actions.

“We provide guidance for locals, yet there is still drought in some villages due to human error”, said provincial DARD.

Although this sentiment was not as widespread in the villages themselves, one older woman who lived close to the river did address the human factor worsening the conditions for her livelihood. From her experience, she claims that the increase in heavy rain has led to more flooding and landslides. But she also thinks that human action has contributed to this phenomena:

“People in the village take sand from the riverbanks to build their houses, and this creates even more landslides. Another reason for increased landslides is that people have cut down too much of the forest”

For the people in the villages there was no clear distinction between the effects of climate change compared to effects of overexploitation of resources, loss of biodiversity or infrastructure projects that affected and changed the environment around them. For most people, it was not relevant exactly why their circumstances had changed rather that it indeed had and affected their production and livelihood activities.

Thus, the perceptions of the effects of climate change and the outcome for their livelihoods which is presented below is based on this understanding, where climate change impact and other factors impacting their surroundings are intertwined.

Many people in the villages personally experience changes to their surroundings and new challenges for their livelihood. They connected some of these challenges to climate change and others to broader changes in human behavior and degradation of nature.

In Khe Tran village, people predominantly focused on storms affecting the rubber tree plantations. The village head of Khe Tran said that recently the amount of storms that hit the village has increased.

“This has resulted in huge economic loss for people, because the majority of the inhabitants rely on treeplanting for their livelihoods.”

One woman testified that she had lost two thirds of her rubber trees to storms. This was a recurring focal point during the interviews in the village. This issue was also prevalent in A Sap, where the head of the women’s union stated:

“The storms damage the acacia and banana plants and destroy peoples investment and ability for income.”

In addition, the village head of Khe Tran talked about how local people experience the effects of climate change in other ways, such as the change in seasons. He said that they used to have four distinct seasons, and now there are only two, one sunny and one with strong winds. In central Vietnam the summers are often dry and hot and the winter is cool and rainy. The storms often come during the fall and winter. This affects the possible timeline for planting and harvesting crops and trees.

“Households used to plant the trees and crops in December, but now they plant them during mid-february.”, he said.

Another factor of climate change which makes production more difficult was raised by the head of the women’s union in Doi.

“Storms and landslides are recurring issues which negatively impact production”

The storms breaks the trees and the landslides reduces the available land area for planting. The broken acacia can be sold for less money whilst the rubber trees loose their worth as they then stop producing rubber.

“The summer has gotten hotter and the winters cooler and drought is now a big concern. An effect of this is increased disease in livestock.”, added the head of the women’s union in Doi.

The DARD in A Luoi also highlights how climate change has led to an increase of disease in crops. When rain did not cease, harvesting was delayed and funghi bgean to form.

“In 2022, 70% of the corn in this area was affected by fungi”, said DARD A Luoi.

Drought however also affects people financially. According to the DARD in A Luoi, there is now no rain between June and July. In A Sap, a man talked about unusually hot weather that causes drought. During these periods he said that people

have to use both water from the stream as well as clean water provided by the government. He added:

“We prefer natural water because it is free.”

According to A Luoi DARD, a majority of people in the city uses clean water from the government. However, people who live in rural areas such as A Sap, and even more remote villages use water from the streams.

Furthermore, these struggles of production also increases peoples food insecurity and lowers their degree of self sufficiency. On man in A Sap told me about how the drought affects him:

“We have 1000 square meters for rice production, but no water to cultivate it. Therefore we have to buy food, but when we don’t have the money we borrow food from other villages and pay back when we can.”, he said.

The effects of climate change also increases the risk for new investments. One man I spoke to in A Sap had borrowed 20 million VND in order to pave his road and create a pond for which he also bought fingerlings. The flooding that year was, according to him, one of the worst in a long time, resulting in the destruction of the pond and the loss of all fish. Now, two years later, he has only managed to pay back two million VND and is still in debt, now without income from the investment.

Moreover, the depletion of the natural forest presents a major concern for peoples livelihoods in the villages. The forest has in recent years become protected, as so it’s quality has improved. But for many years, the forest quality and size was diminishing.

“Without the natural forest, there is no planted forest. Taking care of the natural forest prevents erosions and landslides”, said woman in Doi

“The access to non-timber forest products have become more difficult”, said a man in Doi

He said that the collection of honey in particular is more difficult because the amount of large and robust trees in the natural forest has decreased. Thus, people have to climb more fragile trees which is more dangerous.

This sentiment carried over to other villages as well. In Khe tran, an older woman said that:

“I collect fish from the river three times a week but the fish stock is reducing due to overexploitation, illegal catching and more intense techniques”

The effects of climate change on livelihoods also seem to have a gender-perspective. According to the head of the women’s union in Doi, women are more affected by climate change than men.

“Climate change and changed weather patterns are a major concern for women’s livelihoods.”

The head of the women’s union in A Sap echoed this concern. She explained that there are three consequences of climate change which are a problem in the village, which particularly affect women. These are flooding, storms and droughts. She said that:

“The flooding has the worst effect. It usually lasts 7-10 days and makes the women very isolated as there is no possibility to work, go to the market or sell any services or products. Furthermore, the children can’t go to school during the flooding which puts an additional strain on women in the household.”

She adds that during times of drought people in the village have to collect water from the stream, which is usually the women’s job.

“The stream is 10 minutes away by motorbike. The water is very heavy but it can usually fit on the bike and women can then collect 40 liters of water. However, sometimes the women have to walk and carry all the water. This is very heavy and then they can only collect 20 liters.”

The head of the women’s union i Khe Tran also addressed a palette of issues connected to women and climate change. Overall, she said that women are more severely affected by the effects of climate change than men and less able to cope with the after-math. She exemplified this by saying that storms and hurricanes often damage the houses of the village, which affects the women who spend a lot of time in the house cooking, cleaning and looking after they children, but they are unable

to reconstruct the houses themselves as the men are the ones who do the heavy manual labor. As such, from her perspective, women are more vulnerable.

In sum, the three villages which are the focal point of this study are experiencing the negative impacts of climate change on their livelihoods in several ways, both pertaining to production and to social aspects. Due to men and women having different roles in the household and in the villages, they also experience different effects of climate change.

4.3 In what way are people trying to adapt to climate change?

In this section, I present the observed ways in which people adapt and minimize risk in their livelihood strategies as well as their own perception of adaptation - what adaptation means to the inhabitants, how they view their actions in connection to adaptation and their thoughts on present and past adaptation strategies. In addition, this section details how the subnational agencies at the province and district level discuss the topic of adaptation. Furthermore, I acknowledge the gender perspective of these various activities.

Overall, adaptation as a term is of little significance to many of the people in the village. Instead, the actions which may be considered adaptation are woven into their normal livelihood struggles and activities. With new circumstances people change certain aspects of their behavior, be it slight changes to production or entirely new income avenues. As will be described below, people change their behavior based on how they can maximize their livelihood, by learning from neighbors and other villages, through various projects or simply by trial and error.

In order to better structure the findings, the empirical evidence will be divided up by sections based on different adaptation methods. Firstly, various practices connected to forestry, secondly various new types of natural capital, thirdly non-agricultural practices followed by social interactions.

4.3.1 Forestry

The local DARD in the Phong Dien district reflected over the villages adaptation efforts and concluded that:

“People's adaptation efforts and policy implementation is a mix between awareness and economic opportunity.”

They expand upon this by saying that most farmers only base their decisions on economic aspects. At the same time they say that:

“If you change the mindset and awareness of the farmers they can do a lot themselves.”

As an example they address the planting of mangroves along the coastal area in Phong Dien. Although the coastal areas are not of interest in this study, the example they gave highlighted broader issues which are also connected to my geographical area of study. The DARD in Phong Dien say that people's reasoning behind planting the mangroves was purely economic, even though the effect was beneficial to withstand storms. In other words, the planting of mangroves protected their agricultural investments against storms, and the knowledge that this was an option aided in their financial decision to plant them. Their conclusion of these two aspects is that even though many farmers only think about the economic aspect when making decisions, the risk of storms and other natural disasters which are made worse by climate change, also has to be weighed in their economic decision-making. DARD in Phong Dien pinpoints that this is why training and spreading knowledge is so important.

In the mountainous villages I visited, there is a similar pattern to that of the coastal region. One clear example is that local people created a border of indigenous trees to surround the rubber trees in order to protect them from storms, in order to protect their investments.

“This allows the trees in the plantation to grow bigger”, said the head of the village in Khe Tran

This perspective of mixing the natural forest, or indigenous trees, with the acacia plantation was also raised by the subnational Department of Forest management.

This department has an initiative targeting the mountainous communities where the idea is to combine the indigenous forest with planted forest, to increase biodiversity and sustainably recover forest. From their perspective, this diversification of trees would be beneficial for adaptation as it would make the trees more resilient towards storms and decrease the risk of landslides. In this regard, the village's action and province level perspective on what should be done overlap - but the motivation behind the action is not necessarily one and the same.

Another decision connected to increasing the resilience of the tree plantations was to switch the rubber trees for a tree which presented less risk during storms - Acacia. In Khe Tran, many households have reduced the amount of rubber trees and replaced them with Acacia. Once again, there was a clear economic factor in the decision.

“The income for local people is better with Acacia than rubber at the same time as the time from planting to harvest is shorter for acacia than rubber”, said the head of the village in Khe Tran

Although the Acacia is also damaged by storms, people are still able to sell the fallen trees whilst as rubber trees become useless if lost to storms. Thus, Acacia trees increase the resilience of people's investments.

However, economic factors were also a reason why many households did not follow this trend. Even though one of the women I talked to had two thirds of her rubber plantation damaged or destroyed by storms, she still chose to replant rubber trees rather than switch over to Acacia.

“It is easier for me to earn money from rubber than acacia”, she says

This is dependent on several factors, such as her age making it more difficult to harvest acacia and the actual price to purchase the acacia trees was higher than rubber. In addition, once the rubber trees are mature and produce rubber, they provide more consistent income than the acacia that lasts for many years.

A clear example where the economic consideration was a dividing factor between the will of higher levels of policy making and the actions of the village, was the push for FSC certification. All departments at the provincial level as well

as at the district level were concerned with enabling households in the village to produce timber via FSC-regulation - which entailed managing the plantation forests with strict environmental, social and economic standards. The key issue for this certification was that people had to wait to harvest the acacia trees for at least seven years. Most households in the villages today cut the trees after 3-4 years. The longer time would allow the trees to mature further and be made into timber.

One of the departments who are particularly invested in the push for FSC is the Department of Forest Management (FDM). The FDM wants to increase the amount of FSC-certified forests and the goal is certification of 1/3 of the forests in the province by 2030. Furthermore, their goal is for the households to increase the time frame of harvesting to 10-12 years. This type of production would, according to the FDM, allow the trees to become bigger and better withstand storms, would help with groundwater levels and thus lessen the effects of drought in addition to preventing landslides.

“FSC is a promising avenue for climate adaptation”, said the FDM.

A note to add here is however that Acacia is a tree which requires a lot of water, thus its effects on drought are unambiguous. Although the FDM primarily discussed FSC through the lens of adaptation and protecting ecosystems, they also highlight the fact that FSC certifications lead to an increase in export. One problem which the FDM identifies for the goal of increasing the amount of FSC-certified forest is the perception of the local forest owners.

“People simply do not have information about the certification, so we instruct and teach locals about FSC and the benefits of waiting to cut down the trees.”

Another agency which was also concerned with spreading knowledge about FSC was the Forest Owners Sustainable Development Association (FOSDA). They provide training in addition to facilitating information exchange between different communities around the FSC implementation. In addition Both FOSDA and FDM cooperate with the local DARD in the three districts to further this push for increasing the FSC-certifications.

“There are several issues with FSC forestry in this province including the perception and lack of knowledge of the farmers...”, said FOSDA.

FOSDA therefore provides training for forest management, protection and monitoring of FSC certified forests. Though they did not address the issue of gender themselves, when asked they said that women make up about 30-40% of the participants in the FSC-certification programmes. Another topic that was raised in regard to women’s involvement was the design of the membership in FOSDA since this was based on “forest ownership”, as men generally hold the rights to land use. To this, FOSDA answered that the “Ownership” refers to who is given a certificate, but that it is based in households, and thus both the man and the woman's name are on the certificate.

Although a lack of knowledge seems to be identified by the subnational agencies as the key issue for expanding FSC in the province, the village-level perspective appears to be different. Whilst there were people I interviewed who were not aware of the FSC-certification, most people had heard of this project and some had even participated in the training, yet many choose to not go down the route of actually following the FSC regulations to get the certification.

The reasoning behind this decision to not use FSC-methods for their forestry, which is viewed as an climate adaptation tool by the subnational agencies, appears to be economic factors. A man in Doi told me that FSC is not very popular as a means of adaptation in the village because people are worried about postponing income by postponing the harvest of timber. This sentiment echoed through many of my interviews in all three villages.

“Many are scared of getting the certificate because it is mandatory to keep the trees for seven years, and many need income before that”, said the village head in Khe Tran

“I cut the acacia trees down after 4 years, even though the price is lower then, because I need income to feed and clothe my children”, said one woman in Khe Tran.

However, some households had gotten the certification. In Khe Tran, the village head estimated that about 1/5 of the households, 10 in total, have this certification. He also told me that there is an ongoing project where FOSDA is training the local

women in FSC. In A Sap, the head of the women's union told me that people in the village know about the FSC-certification but they do not take part. The head of the village in A Sap informed me that two households had received the certification, however they both sold the timber sooner than their commitment. In Doi, I was told by an older man who used to work for the commune, that even though the village does not have the necessary land-use certification to be able to get the FSC certification, some households have received training from FOSDA including the man himself. In this training they were taught to cut the branches without damaging the tree and its bark and learnt the spacing between the trees so they can grow bigger and thus generate better income but also be more resilient towards storms. However, he was unsure if any of the households in the village actually followed through after the training.

On the other hand this economic reasoning around cutting down the timber prematurely could also be viewed as a form of adaptation in the sense that they are lowering the risk of losing their income to storms and other weather events exacerbated by climate change. For instance, in Doi village a man talked about the prevalent risk of storms which have been increasing in intensity and frequency and that by cutting down the trees as soon as possible, people are safeguarding their livelihoods. Even FOSDA acknowledges the risks involved in forestry, especially in central Vietnam which is often hit by storms which destroy the forests. In this way, the FSC certification could exacerbate this risk, as the trees have to stay longer in order for the households to receive income, exposing them to more storms and risk of losing or damaging the trees.

The agencies are aware of this paradox where the village's mode of adaptation and risk management is in contrast to their preferred methods, due to the economic aspects of the decision. There are attempts to combat this issue in order for people in the village to strive for FSC-certification. These projects include a short-term fund set up by the FDM, which offers payments to improve people's livelihood in the short term, giving them more incentives to put off harvesting the timber. The idea is that forest owners can get money in the short term to have FSC trees in the long term. A similar scheme is also put in place by FOSDA which offers participants in their FSC programs to get paid after six years, instead of seven or

above which is typical for the certification, if they wait an additional year to cut the trees. Furthermore, FOSDA is trying to cooperate with insurance companies with the hopes of providing their members with insurance for the trees to minimize risk. So far however, this is not a reality which means that people are still risking a lot by postponing harvesting of acacia.

4.3.2 New types of natural capital

New tree varieties and forestry methods

The example of the FSC projects and its complexity and opposition based on economic factors is not to say that knowledge does not play an important part in people's adaptation choices. During the interviews conducted for this study, knowledge was an important issue. A man in Doi, who had previously worked for the commune, discussed several of the projects which have been introduced in the village over the years and he had one clear conclusion: knowledge is a more important factor for success than financial reasons.

“Giving us the different varieties of trees [cinnamon and fruit] and money, was not enough. The success of projects depended on them providing training for the people to continue on”, he said.

As will be shown below, there is a wide variety of agrarian and forestry projects and initiatives targeting the villages with varying degrees of success.

The DARD at the province level views increased investments in agriculture as an important issue connected to adaptation. They are involved in several projects aiming to increase productivity and income in agricultural practices, some of which will be described below, however the department added that

“Some areas upland are too small to be able to invest in high-technological agriculture”

Thus, limited land size seems to constrain options for adaptation and diversification, at least with the high technological approach which the DARD sees

as important. Nevertheless, there were some agricultural projects which also targeted the small mountainous villages.

The province level departments were not alone in their push for more advanced production techniques, the lower administrative levels also pushed for various new techniques for agriculture. However, this harmonization of policy is not coincidental - the local DARD in all three districts follow national and provincial plans and aims.

“Our main responsibility is to adopt and implement adaptation plans, most of which come from the provincial level”, said the representative from DARD in Phong Dien.

“Our duty is to follow national programs and policies. Therefore, our main task is to focus on technical issues connected to the national policies”, said the representative from DARD in Nam Dong.

However, the district levels did attempt to adjust the national plans to better fit the circumstances of the district.

“We adjust them a bit to fit the reality of the local circumstances”, said representatives from DARD in Phong Dien

“Generally, we follow provincial guidelines for adaptation, however there is quite a bit of difference in the weather conditions here compared to other places, so the national plan does not always work here.”, said representatives from DARD in A Luoi

One of the more advanced adaptation practices was connected to an increase in the production of fruit. The DARD at the province level told me about a big push for people to invest more in fruit production, especially pineapple. The idea is to use more advanced technology for this production which the DARD thinks is good for climate adaptation purposes. Their justification is that as the production becomes more efficient, people’s livelihoods will increase despite more difficult weather circumstances.

The DARD in A Luoi have also been involved in a project to utilize new techniques where they combine wild plants with domestic varieties to better adapt and be more productive. This initiative was started with the background that there

is a special variety of fruit that grows wild in this area, but selling it on the market was very difficult. Therefore, they hope to combine this wild fruit with a domesticated variety, making it more beneficial for the market.

Market risk is one of the downsides of cash-crops, like fruit, which is not a dimension of subsistence farming. To try and mitigate this risk, DARD in Nam Dong have encouraged organic fruit farming. The purpose is to try and decline the market risk associated with agricultural products, which is exacerbated by new climate conditions. From their perspective, the market for organic fruits is more stable. The local DARD gives advice on what types of crops are beneficial based on the market, the environmental local conditions and national plans. Specifically, they push for guava and specific orange varieties.

One of the local women in Khe Tran talked about how she has increased her production of fruit. She was not part of the department programs and did therefore not receive training or financial support, however her neighbor did.

“My neighbor attended the training and passed on the information to me. My neighbor could also purchase fruit trees at a reduced price for me, due to the training”

Apart from fruit trees, other households have also tried other new species. In Khe Tran, the village head told me that, to some extent, he has also switched from Acacia to Macadamia-trees.

“I am the first person in the village who started planting Macadamia nuts. It is sort of a ‘pilot program’. I researched information about it online”, he said.

Following the village heads' example, other people in the villages had followed suit and also planted some Macadamia. These types of stories also showed how important information and transfer of knowledge is for people's agricultural decisions.

Furthermore, The local DARD in A Luoi also addressed agroforestry models and integrated agriculture which they said are models that have been used in this district for a long time. Agroforestry is a collective term for combining forestry and agriculture. However, the popularity of this practice has decreased because people's incomes are better with monoculture - focusing on solely planting acacia. Even so,

DARD has a big program where they have selected five types of plants to grow under the forest canopy in order to diversify and strengthen livelihoods, including ginger and medical plants which are important in the local customs among the indigenous people. Fruit trees are also included in the program to diversify the trees.

There were also other types of advantages that were raised in connection to fruit trees that did not predominantly pertain to market value. An older resident in Doi mentioned fruit trees in connection to adaptation. He said that planting trees in the gardens of households creates shade and makes it cooler as the temperatures increase. He particularly mentioned jackfruit as beneficial because it creates a big cover. He also added:

“It is even more beneficial if these trees are fruit trees as they then serve multiple purposes, shade, income and food”

Furthermore, individual households also had other ways of trying to become more resilient in the face of climate change apart from the methods of harvesting the acacia or fruit trees. For instance, a man in Khe Tran told me that he covers the vegetables and crops with grass and leaves to minimize the water evaporation during hot periods. Another man in Doi told me how he uses a “net roof” over the indigenous trees and medicinal plants in the garden.

“It protects them from the burning sun and mimics the canopy of the forest in which they are naturally grown.”

The DARD in Nam Dong also encouraged the use of greenhouses and nethouses for vegetables and flowers in the district. This was both to raise productivity and create shelter from the weather. However, this is an expensive mode of production which none of the households in the villages which are explored in this thesis can implement - therefore this is not a form of adaptation seen on a large scale.

One type of adaptation to agriculture which on the other hand was widespread and not costly was the change in harvesting times. The DARD in Nam Dong said that they try to assist with solutions, such as changing the time of harvest for oranges, vegetables and flowers to better match new conditions. Many agencies contributed to this spread of knowledge, including the women’s unions. The head

of the women's union in A Sap cooperates with the women unions on the district level. She said that:

“We have gotten several ideas and implemented some of them. For instance, they [the women's union at the district level] are the ones who have helped change the seasonal calendar of rice from planting and harvesting to better adapt to the new weather conditions”

The role of livestock

Livestock plays role in people's adaptation strategy. As previously mentioned, livestock is viewed as presenting less risk than crops, especially due to the new weather conditions. They therefore also generate more income and security for households. DARD in A Luoi also highlights the importance of livestock in the context of limited land area where the land productivity is low. From their perspective, livestock is therefore vital to ensure people's continued livelihoods.

Many subnational and local agencies also aided in the household's endeavors. For instance, the DARD in Namn Dong attempted to help with adaptation through pig-raising, with the purpose of reproduction. This was also based on policies by the national government.

The FPDF instructs villages on how to use the payments they receive for these ecosystem services. Their recommendation is often to create local micro-financing institutions, from which people can borrow money for livestock. Preferably varieties of pigs and chickens which are native to the climate in the village.

The Women's unions also played a major role in promoting and enabling more women to have livestock production. There has been an initiative by the women's union at the district level to help provide funding for households to purchase pigs or cows. Another project connected to adaptation and livestock, which is supported by the commune in A Sap and researchers, has been a pilot model for pig raising. In this project they provide enclosures for the pigs and help households rearrange the pig sties to be more efficient. They also give the pigs vaccine, help in the selection of breed and give training about the usage of manure.

The DARD in A Luoi also focus on fertilizer and have a program where they are training people on fertilizers and trying to push for the use of natural manure from

the livestock. However, the DARD say that people prefer to buy chemicals from stores than to use manure from livestock, because it is cheaper and easier. In addition there is a cultural custom that manure from animals is dirty.

DARD in A Luoi was not the only stakeholder working with this issue of fertilizer. The head of the women's union in Doi talked about how women now use organic fertilizer from cows in the village for their vegetables and rice.

“We learnt it from a help organization which had a project where we received training”, she said.

However, the head of the local women's union in A Sap also mentioned the difficulties of animal husbandry. There is limited space in the village, and most people have to keep their livestock far away from their homes.

“In order for me and my husband to get to our cows, we have to walk two hours through the forest. The acacia plantations are very dense and have made it harder to keep livestock and made it impossible to use the motorbikes to get to them.”

4.3.3 Non-agricultural practices

The previously mentioned adaptation practices utilized by the villages are alterations to production modes of their natural assets, however they also had other ways of coping and adapting their livelihood strategies to deal with new circumstances. One of these methods is to diversify the income sources, and for many villages this meant expanding eco tourism.

“Ecotourism is an important new income revenue for people in the rural areas who depend primarily on agriculture or forestry. It is a sustainable and beneficial new economic activity for them”, said a representative from DARD in Nam Dong.

Although this practice was not necessarily sprung from the idea of adaptation, its implications are that people minimize the risk to their livelihoods by not being solely dependent on agricultural practices which are dependent on the weather and climate, which is changing.

This new practice also requires more investments in infrastructure. The village head of Khe Tran informed me that the village receives monetary support from the commune every year as part of the National target program, which particularly emphasizes ethnic minorities, such as the people living in the mountainous communities in this study, and infrastructure. As previously mentioned, women are the primary actors in this new economic practice, however during the matrix rankings it was apparent that men are the ones who value road infrastructure more for their livelihoods. The importance of infrastructure also increased for men when reflecting about adaptation rather than just everyday livelihood activities. The same was not true for the women.

Furthermore, another activity which villages partake in which can be viewed as a sort of adaptation is the off farm labor.

"Many young people move to bigger cities like Hue, Hanoi or Ho Chi Minh for work, to avoid the volatile conditions of the village," said the village head of Khe Tran.

This form of adaptation which the village head mentioned, has less to do with natural based solutions, or the adaptation of agriculture and forestry, and instead shift from these. Yet, some of the remittances from such off-farm labor is used by the families to invest in their agriculture and forestry practices. The shift to off-farm labor can not strictly be correlated to adaptation to climate change, though it is one factor. Other factors include shortage of available land which is subsequently too expensive for young people, a longing for education or just the hope of better income.

4.3.4 Social relations

The importance of social capital for adaptation is viewed by the villagers as vital. From the matrix ranking it was clear in all three villages that the importance of social capital increased when reflecting about adaptation rather than food security. In Khe Tran, the ranking shows that for women, social capital increases in importance in the aftermath of a climate disaster. In Doi, social capital by and large ranked as most important to cope and adapt to threats posed by climate change. In A Sap, social capital was considered a lot more important for recovery and

adaptation than for food security. Yet, as reflected upon in the method section – the distinction between adaptation and food security is not clear-cut. In these cases, adaptation was often understood as actions taken in the direct aftermath of some natural disaster.

This was also exemplified in various ways during the interviews. In Khe Tran, the head of the women's union talked about how the village organized activities to help the most vulnerable households, which are often women. One widow in the village talked about how important the women's union had been for her.

“They have supported me with food and medicine in the aftermath of natural disasters, as well as with health insurance”, she said.

Another woman, who was also a widow, talked about the difficulties she faced as a woman-headed household:

“I feel limited in my contacts with people and authorities outside the village. However I feel support within the village and especially from the women's union.”

This support was most vital to her after natural disasters in addition to making decisions about agricultural practices.

Another woman in Khe Tran, who was widowed, talked about how she relied on relatives during and directly after natural disasters.

“I have to move in with relatives during the worst storms and floods for the safety of me and my children”, she said.

In Doi, a woman talked about how people help each other cope with natural disasters by handing out raincoats and flashlights during the flood.

Being able to get information before a heat wave, storm or flooding helps people to be able to cope with its effects. Early warning systems, or warning systems, give people time to anticipate and act- whether that is by piling up on food, leaving the house or attempting to protect one's assets. The informants in the three different villages spoke to this in various ways.

“A positive thing for resilience is that everyone has access to technology and can get warnings about natural disasters and weather patterns”, said the village head in Khe Tran.

“We receive information about upcoming events through the speakers located around the village. The village head or a worker from the commune informs us”, said a man in Doi.

“Local meetings are organized before floods to give people information and advice them to move to a safer place”, said a man in A Sap

Overall, adaptation seems for most people to be a very broad topic, with many different factors influencing their resilience.

5. Analysis and discussion

In this section, the empirical findings are analyzed based on the thesis' research questions and theory.

5.1 Overview of peoples livelihood strategy, the effects of climate change and adaptation

The empirical findings from the interviews shows that people have diverse livelihood strategies. Ranging from their main activity forestry of acacia and rubber, to agricultural where they grow rice, corn and cassava, to fruit tree cultivation, to raising of livestock. In addition, they engage in various forms of off-farm labor such as working in construction or in other peoples forests and providing ecotourism services. For the people who stay in the villages, the remittances from these individuals is also an important part of their income. Furthermore, people depend on social networks such as the women's union who provide support and micro-loans or neighboring villagers from whom they borrow money and food.

Though there is some degree of self-reliance with subsistence farming, most people engage in income generating activities to purchase food. The degree of food security is varied, but many households testify to being food insecure during certain times of the year. Thus, people's livelihoods are volatile.

In peoples livelihood strategies, men and women have some joint responsibilities but also some different roles. Notably, women are predominantly responsible for domestic labor and are to a higher extent engaged in eco-tourism. Both the men and women tend to the gardens where fruit trees and crops grow and tend to livestock. Whilst both men and women engage in forestry, men have more responsibilities in this domain than women, especially connected to acacia. In addition, more men

than women leave the villages to engage in construction work or in factories in bigger cities.

Climate change affects the people in the villages by disturbing production of forestry and agriculture which creates economic loss. Climate change also restricts the ability to do off-farm labor, such as working in other peoples acacia plantations. In addition, flooding and landslides damage roads which restricts peoples movement, for instance going to the market to sell their products. The threat posed by the effects of climate change also makes investments in agriculture and forestry more risky. Yet, people's awareness of climate change is intertwined with impacts on their livelihood and surroundings from other activities such as overexploitation of resources and infrastructure projects.

As Di Falco (2011) notes it is the poorest households who would benefit the most from adaptation. This sentiment seems true in the case of Khe Tran, Doi and A Sap as people who have less land, struggle with food insecurity and have volatile income to a greater extent have to worry about safeguarding and utilizing the forests and crops that they do have - making the need for limiting risks greater. Yet, the push for FSC by the subnational departments is not targeting the most vulnerable since participating in this practice is viewed as a risk in itself.

However, the recent attempts to provide poorer households with financing and insurance in connection to FSC are possible ways forward to make this adaptation strategy more beneficial and accessible for poorer households. Following this, further knowledge about FSC has been highlighted as important by the subnational agencies. Subsequently, the knowledge of FSC and its potential for sustaining the livelihoods of people in the village by these new means, is probably also an important part of the puzzle for this to take off.

However, people also take independent actions to minimize risk from the effects of climate change and to safeguard their livelihoods. A few examples were shown in the empiric section, such as covering up the gardens with canopies to minimize water evaporation during heat waves.

5.2 Climate adaption and gender

The effects of climate change are affecting women and men in different ways due to their roles in the villages and within the household. For instance, flooding leaves women very isolated, making them unable to go to the market, in addition to exacerbating the duties of household work. The drought also means that women have to gather more water from the stream, which is a hard task. Drought is also one of the factors contributing to food insecurity, for instance as seen when people cannot cultivate rice on the land they do have due to lack of water. However, men are also affected as storms, heavy rains and landslides make it more difficult to plant, harvest and tend to the forest, which for many is their main source of income.

Although women also rely on forestry for their livelihoods they are to a greater extent skewing their livelihood activities, incorporated with adaptation efforts, towards non-farm activities. Although eco-tourism is still only a seasonal income, many women see a bright future in this activity. One possible explanation is perhaps women's more limited role in the acacia plantations - although they are also involved, men have more tasks and get paid more. Thus, acacia, which is in all essential a cash-crop, is in these villages a male domain. This seems to stem from social norms about a woman's and man's role, being that the men are the ones who do heavy manual labor such as digging holes for the trees. However it seemed that many women wanted a greater role in the acacia plantations as they discussed investing in them and saw their value to their livelihoods. At least they viewed the acacia plantations as an important part of the households income. Thus, as Doss (2001) argues, the women's underrepresentation in cash-crops is probably not due to a lack of interest by the women but rather a limitation. However, the DARD in Phong Dien argues that women's priorities for their livelihood activities are determined by two factors: labor intensity and market risk, which they want to avoid. Therefore, another possible explanation for women's limited role in acacia is not due to restricting norms, but simply preferences. The acacia plantations require heavy manual labor and the activity is prone to market risk as acacia's value for people is its ability to be sold. Yet, at the same time the acacia has less market risk than many of the other varieties of trees and crops which are pushed on the the villagers by policies created at higher levels of organization.

As seen in the chapter above, FOSDA and other agencies reach out to women for the training of the FSC certification in an effort to involve them. However, in addition to adopting and learning about this new practice, they also have to ensure the implementation of it with a more limited role in the plantations.

Additionally, in many of the villages women are not as welcomed in the community forest groups as the men. In addition to being a source of income whilst they monitor the forest, it also means that women have a lesser role in protecting the forest - which is important both to increase reliance against storms and landslides, but also for ensuring non-timber forest products as part of their livelihoods.

Another reason why women might focus their adaptation strategies on non-farm labor has to do with the land availability. As both Naqvi (2020) and Beckman (2011) write, less land leads to less ability for diversification, which is important to increase resilience. Many of the widowed women I spoke to had given land to their sons, leaving them with very little for themselves. Therefore, they may be more prone to explore income revenues that are not dependent on land availability.

Nevertheless, women found another domain which was theirs, ecotourism. In many ways it includes less manual labor and market risk but it also provides women with a new income opportunity. This new activity also benefited the communities as a whole and gave additional opportunities for the households to sell goods and thus also diversify their income, even if it was still agricultural products, such as selling chickens or crops. All in all, this means that people in the village have diversified their livelihoods portfolio and thus spread risk, which is exacerbated by climate change. Therefore, women's empowerment has a clear instrumental value in the villages.

Additionally, the matrix rankings and interviews showed that social capital was more important for women than men, especially as it pertains to adaptation. The cooperatives which form ecotourism are an important basis for women's livelihoods. This social bond seems to be particularly important for women, perhaps because the women's union is such a strong actor in the village or because women have more limited roles in other social networks such as the forest groups where they do not venture out as far and as long as the men.

Furthermore, Di Falco also notes that access to credit was a main factor for people's ability to adapt. In the three villages which I visited, credit and loans were primarily accessed through the women's union and targeted poorer households. The loans from the women's unions were relatively small, although they seemed to play an important part for many women, not least to use it for livestock and add a buffer to the households income and resilience.

The livestock is also interesting because it serves a dual purpose for households, both for their own consumption and for income. A clear income generating activity in regards to livestock is the push for women to raise pigs for breeding, whilst a clear household consumption aspect is gathering eggs from the chickens. Whilst livestock in several ways differs from crops, the idea of cash-crops and subsistence crops, may still apply in principle to livestock. In other words, the decision on whether to invest in livestock for household consumption or as an income may be influenced by one's perception of food security, gender norms or one's knowledge. Whilst cash-crops have been seen as male-dominated, Doss (2001) points out that women's focus on subsistence farming is due to a lack of input needed for income-generating activities. In the case of the three villages researched in this thesis, the women's union and other agencies seem to be bridging this gap by promoting livestock to women as a revenue source rather than subsistence. However, unlike certain cash crops, livestock is more versatile and the initial plan for the livestock, selling or eating, may change depending on the household's current situation and needs. This aspect also entails less risk, as households are not bound to their decision.

The department's promotion of organic crops, such as fruit trees, has a dual effect on poorer households. The push for organic manure from livestock could be beneficial as it makes the households more self-sufficient, given that they are in position to have livestock in the first place. However, the idea of organic fruit as adaptation stems from seeing it as a cash crop to sell rather than as subsistence for the family, creating an additional market risk which also may be negative for their livelihoods. Furthermore, the conditions for organic crops can be difficult. As many households talked about an increase in disease in crops and trees due to climate change, the ability to use chemicals and pesticides may be vital to protect their

investments and livelihoods, but the organic certification does not allow this practice. Furthermore, this initiative challenges prevailing norms of natural manure as something dirty, which may be a perception which is hard to break. Even so, it has been done such as the case with the women in Doi where a project from an outside organization was successful in implementing the use of manure by them.

A key issue then, apart from the clear economic driver, is knowledge about the effects of climate change and alternatives for adaptation. Knowledge about climate change, crops, livestock or alternative livelihoods can come from many different sources. One obvious source is through training connected to various projects by subnational agencies or by external organizations. This method can be effective, but it has to be a solution which overall benefits people's livelihoods if they are to continue the practice independently. Information can also come from social interactions with neighbors and people in other villages who by various means have acquired information. Information about immediate danger is also shown to be important for people, where the village leadership plays an important role in informing the inhabitants of upcoming weather events, such as floods.

Overall, our understanding of how to strengthen the resilience of these communities have to account for women's and men's different methods of adaptation. Therefore, adaptation needs to be understood in a broader context than changes to agricultural production but as a whole if livelihood improving activities in a social and political context. As shown above, women and men's access to various livelihood capitals do affect their adaptation methods. For instance, women use their social network through the women's union to increase resilience whilst men invest in forestry to increase their livelihoods. The perceptions of what adaptation entails for men and women are similar to the extent that they include adaptation strategies as an intrinsic part of their overall livelihood activities. However, as their livelihood portfolios are somewhat different, the risks they identify and subsequently try and mitigate are a bit different, resulting in the different strategies explained above.

6. Conclusion

The findings of this study shows that more light needs to be shed upon the mountainous communities in Vietnam who also experience the negative effects of climate change.

This thesis aimed to answer the questions of people's current livelihood strategies, the perceived effects of climate change and finally in what way people adapt to climate change. The gender perspective has permeated all questions. The first two questions of livelihoods and the impact of climate change have acted as stepping stones to the final question on why people choose various methods of adaptation.

The study has shown that the livelihoods of the rural communities in the mountainous areas of Khe tran, Doi and A sap are diverse, and changing in response to the effects of climate change. These action include changes to production of natural assets in order to strengthen resilience but also actions which are not necessarily within the scope of agrarian and forestry practices, such as eco-tourism and construction work. The individuals or households choice of which activities in engage in are tied into economic actors as well as knowledge and awareness.

When examining the gender perspective of climate adaptation, this study shows that women and men are impacted differently by climate change because of prevailing norms in regard to production, environmental protection and domestic labor. Because of this, women's and men's responses to mitigating the negative impacts of climate change differ in certain regards as the risks to their livelihoods differ. When shaping policy for adaptation efforts, this is something which has to be addressed.

Ultimately, policies for adaptation need to combine ways to strengthen people's livelihoods in the short term and long term if they are going to be successful.

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Appendix 1

Results from the matrix ranking

Tables 1.A-1.F concern food security in Khe Tran village

Table 2 concern adaptation post natural disaster in Khe Tran village

Tables 3.A-3.F concern food security in Doi village

Table 4 concerns adaptation post natural disaster in Doi village

Table 5 concerns household income in Doi village

Tables 6.A-6.F concern food security in A Sap village

Table 7 concerns adaptation post natural disaster in A sap village

TABLE 1.A

Rank from 1-3, 3 being the most important for your food security and 1 being the least

| Physical capital | Irrigation systems | Roads and infrastructure | Access to community spaces |
|------------------------------------|--------------------|--------------------------|----------------------------|
| <i>Group women</i> | 1 | 3 | 2 |
| <i>Group men</i> | 2 | 3 | 1 |
| Score total | 3 | 6 | 3 |
| Diff- women compared to men | -1 | 0 | +1 |

TABLE 1.B

Rank from 1-6, 6 being the most important for your food security and 1 being the least

| Social capital | The farmers unions | Women's unions | Access to extension officers | neighboring households | community leadership | communityforestry groups |
|-----------------------------------|--------------------|----------------|------------------------------|------------------------|----------------------|--------------------------|
| <i>Group women</i> | 2 | 4 | 1 | 3 | 5 | 6 |
| <i>Group men</i> | 5 | 4 | 1 | 3 | 6 | 2 |
| Score | 7 | 8 | 2 | 6 | 11 | 8 |
| Diff-women compared to men | -3 | 0 | 0 | 0 | -1 | +4 |

TABLE 1.C

Rank from 1-6, 6 being the most important for your food security and 1 being the least

| Economic capital | Access to loans/credit | Ability to sell produce on the market | Off-farm labor | Remittances | government programs | Eco-tourism |
|-----------------------------------|------------------------|---------------------------------------|----------------|-------------|---------------------|-------------|
| <i>Group women</i> | 3 | 5 | 6 | 1 | 4 | 2 |
| <i>Group men</i> | 5 | 6 | 2 | 1 | 3 | 4 |
| Score | 8 | 11 | 8 | 2 | 7 | 6 |
| Diff-women compared to men | -2 | -1 | +4 | 0 | +1 | +2 |

TABLE 1.D

Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Natural capital | Natural forest | Planted forest | Access to water | Crops | Livestock |
|------------------------------------|----------------|----------------|-----------------|----------|-----------|
| <i>Group women</i> | 3 | 5 | 5 | 1 | 2 |
| <i>Group men</i> | 2 | 5 | 3 | 1 | 4 |
| Score | 5 | 10 | 8 | 2 | 6 |
| Diff- women compared to men | +1 | 0 | +2 | 0 | -2 |

TABLE 1.E

Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Human capital | Formal education/schooling | information about crops and livestock | Information about forestry | Information about climate change | Adaptation projects from NGO:s or state |
|------------------------------------|----------------------------|---------------------------------------|----------------------------|----------------------------------|---|
| <i>Group women</i> | 5 | 3 | 2 | 1 | 4 |
| <i>Group men</i> | 5 | 4 | 3 | 2 | 1 |
| Score | 10 | 7 | 5 | 3 | 5 |
| Diff- women compared to men | 0 | -1 | -1 | -1 | +3 |

TABLE 1.F

Overall, which of these groups of capitals are most important for your food security?
Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Capitals | Physical capital | Social capital | Economic capital | Natural capital | Human capital |
|------------------------------------|------------------|----------------|------------------|-----------------|---------------|
| <i>Group women</i> | 4 | 1 | 5 | 2 | 3 |
| <i>Group men</i> | 2 | 5 | 3 | 1 | 4 |
| Score total | 6 | 6 | 8 | 3 | 7 |
| Diff- women compared to men | +2 | -4 | +2 | +1 | -1 |

TABLE 2

Overall, which of these groups of capitals are most important for your ability to recover after a natural disaster? Rank from 1-5, 5 being the most important and 1 being the least

| Capitals | Physical capital | Social capital | Economic capital | Natural capital | Human capital |
|------------------------------------|------------------|----------------|------------------|-----------------|---------------|
| <i>Group women</i> | 2 | 5 | 4 | 1 | 3 |
| <i>Group men</i> | 5 | 2 | 3 | 1 | 4 |
| Score | 7 | 7 | 7 | 2 | 7 |
| Diff- women compared to men | -3 | +3 | +1 | 0 | -1 |

TABLE 3.A

Rank from 1-3, 3 being the most important for your food security and 1 being the least

| Physical capital | Irrigation systems | Roads and infrastructure | Access to community spaces |
|---------------------------|--------------------|--------------------------|----------------------------|
| <i>Group poor women</i> | 3 | 2 | 1 |
| <i>Group medium women</i> | 2 | 3 | 1 |
| <i>Group non-poor men</i> | 2 | 3 | 1 |
| Score | 7 | 8 | 3 |

TABLE 3.B

Rank from 1-6, 6 being the most important for your food security and 1 being the least

| Social capital | The farmers unions | Women's unions | Access to extension officers | neighboring households | community leadership | communityforestry groups |
|---------------------------|--------------------|----------------|------------------------------|------------------------|----------------------|--------------------------|
| <i>Group poor women</i> | 3 | 6 | 1 | 4 | 2 | 5 |
| <i>Group medium women</i> | 5 | 6 | 3 | 2 | 4 | 1 |
| <i>Group non-poor men</i> | 6 | 5 | 4 | 1 | 2 | 3 |
| Score | 14 | 17 | 8 | 7 | 8 | 9 |

TABLE 3.C

Rank from 1-6, 6 being the most important for your food security and 1 being the least

| Economic capital | Access to loans/credit | Ability to sell produce on the market | Off-farm labor | Remittances | government programs | Eco-tourism |
|---------------------------|------------------------|---------------------------------------|----------------|-------------|---------------------|-------------|
| <i>Group poor Women</i> | 6 | 4 | 5 | 1 | 3 | 2 |
| <i>Group medium Women</i> | 5 | 4 | 6 | 2 | 1 | 3 |
| <i>Group non-poor men</i> | 6 | 5 | 3 | 1 | 2 | 4 |
| Score | 17 | 13 | 14 | 4 | 7 | 9 |

TABLE 3.D

Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Natural capital | Natural forest | Planted forest | Access to water | Crops | Livestock |
|---------------------------|----------------|----------------|-----------------|----------|-----------|
| <i>Group Poor women</i> | 5 | 4 | 1 | 2 | 3 |
| <i>Group medium women</i> | 1 | 5 | 4 | 2 | 3 |
| <i>Group men non-poor</i> | 5 | 3 | 4 | 1 | 2 |
| Score | 11 | 12 | 9 | 5 | 8 |

TABLE 3.E

Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Human capital | Formal education/schooling | information about crops and livestock | Information about forestry | Information about climate change | Adaptation projects from NGO:s or state |
|---------------------------|----------------------------|---------------------------------------|----------------------------|----------------------------------|---|
| <i>Group poor women</i> | 5 | 1 | 2 | 4 | 3 |
| <i>Group medium women</i> | 1 | 5 | 2 | 3 | 4 |
| <i>Group non-poor men</i> | 5 | 3 | 1 | 2 | 4 |
| Score | 11 | 9 | 5 | 9 | 11 |

TABLE 3.F

Overall, which of these groups of capitals are most important for your food security?
Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Capitals | Physical capital | Social capital | Economic capital | Natural capital | Human capital |
|---------------------------|------------------|----------------|------------------|-----------------|---------------|
| <i>Group poor women</i> | 1 | 3 | 2 | 4 | 5 |
| <i>Group medium women</i> | 2 | 3 | 1 | 4 | 5 |
| <i>Group non-poor men</i> | 5 | 2 | 1 | 4 | 3 |
| Score | 8 | 8 | 4 | 12 | 13 |

TABLE 4

Overall, which of these groups of capitals are most important for your ability to recover after a natural disaster? Rank from 1-5, 5 being the most important and 1 being the least

| Capitals | Physical capital | Social capital | Economic capital | Natural capital | Human capital |
|---------------------------|------------------|----------------|------------------|-----------------|---------------|
| <i>Group Poor women</i> | 4 | 3 | 5 | 1 | 2 |
| <i>Group medium women</i> | 2 | 5 | 3 | 1 | 4 |
| <i>Group non-poor men</i> | 3 | 5 | 2 | 1 | 4 |
| Score | 9 | 13 | 10 | 3 | 10 |

TABLE 5

Overall, which of these groups of capitals are most important for your household income?
Rank from 1-5, 5 being the most important and 1 being the least

| Capitals | Physical capital | Social capital | Economic capital | Natural capital | Human capital |
|---------------------------|------------------|----------------|------------------|-----------------|---------------|
| <i>Group Poor women</i> | 2 | 1 | 4 | 5 | 3 |
| <i>Group medium Women</i> | 2 | 3 | 1 | 5 | 4 |
| <i>Group non-poor men</i> | 2 | 3 | 1 | 4 | 5 |
| Score | 6 | 7 | 6 | 14 | 12 |

TABLE 6.A

Rank from 1-3, 3 being the most important for your food security and 1 being the least

| Physical capital | Irrigation systems | Roads and infrastructure | Access to community spaces |
|------------------------------|--------------------|--------------------------|----------------------------|
| <i>Group poor/near women</i> | 3 | 2 | 1 |
| <i>Group medium women</i> | 3 | 2 | 1 |
| <i>Group non-poor men</i> | 2 | 3 | 1 |
| Score | 8 | 7 | 3 |

TABLE 6.B

Rank from 1-6, 6 being the most important for your food security and 1 being the least

| Social capital | The farmers unions | Women's unions | Access to extension officers | neighboring households | community leadership | communityforestry groups |
|------------------------------|--------------------|----------------|------------------------------|------------------------|----------------------|--------------------------|
| <i>Group poor/near women</i> | 1 | 6 | 3 | 4 | 5 | 2 |
| <i>Group medium women</i> | 3 | 5 | 2 | 1 | 6 | 4 |
| <i>Group non-poor men</i> | 3 | 6 | 2 | 1 | 4 | 5 |
| Score | 7 | 17 | 7 | 6 | 15 | 11 |

TABLE 6.C

Rank from 1-6, 6 being the most important for your food security and 1 being the least

| Economic capital | Access to loans/credit | Ability to sell produce on the market | Off-farm labor | Remittances | government programs | Eco-tourism |
|------------------------------|------------------------|---------------------------------------|----------------|-------------|---------------------|-------------|
| <i>Group poor/near women</i> | 3 | 1 | 5 | 4 | 2 | - |
| <i>Group medium women</i> | 4 | 3 | 5 | 1 | 2 | - |
| <i>Group non-poor men</i> | 3 | 5 | 4 | 1 | 2 | - |
| Score | 10 | 9 | 14 | 6 | 6 | |

TABLE 6.D

Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Natural capital | Natural forest | Planted forest | Access to water | Crops | Livestock |
|------------------------------|----------------|----------------|-----------------|----------|-----------|
| <i>Group poor/near women</i> | 3 | 5 | 4 | 2 | 1 |
| <i>Group medium women</i> | 5 | 2 | 4 | 1 | 3 |
| <i>Group non-poor men</i> | 5 | 3 | 4 | 1 | 2 |
| Score | 13 | 10 | 12 | 4 | 6 |

TABLE 6.E

Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Human capital | Formal education/schooling | information about crops and livestock | Information about forestry | Information about climate change | Adaptation projects from NGO:s or state |
|------------------------------|----------------------------|---------------------------------------|----------------------------|----------------------------------|---|
| <i>Group poor/near women</i> | 5 | 3 | 4 | 2 | 1 |
| <i>Group medium women</i> | 5 | 2 | 3 | 4 | 1 |
| <i>Group non-poor men</i> | 5 | 4 | 2 | 3 | 1 |
| Score | 15 | 9 | 9 | 9 | 3 |

TABLE 6.F

Overall, which of these groups of capitals are most important for your food security?
Rank from 1-5, 5 being the most important for your food security and 1 being the least

| Capitals | Physical capital | Social capital | Economic capital | Natural capital | Human capital |
|------------------------------|------------------|----------------|------------------|-----------------|---------------|
| <i>Group poor/near women</i> | 5 | 2 | 1 | 3 | 4 |
| <i>Group medium women</i> | 4 | 3 | 1 | 2 | 5 |
| <i>Group non-poor men</i> | 4 | 1 | 3 | 2 | 5 |
| Score | 13 | 6 | 5 | 7 | 14 |

TABLE 7

| Capitals | Physical capital | Social capital | Economic capital | Natural capital | Human capital |
|------------------------------|------------------|----------------|------------------|-----------------|---------------|
| <i>Group poor/near women</i> | 4 | 5 | 1 | 2 | 3 |
| <i>Group medium women</i> | 3 | 1 | 4 | 2 | 5 |
| <i>Group non-poor men</i> | 4 | 5 | 1 | 2 | 3 |
| Score | 11 | 11 | 6 | 6 | 11 |

Appendix 2

The questions- households level

INTRO

- Tell me about yourself, what does your household look like?

LIVELIHOODS

- How much land do you have and what type of production do you have?
- Do you have livestock, and if so what kind?
- How much of your food is bought and how much is produced by yourself?
- What is your main source of income?
- Can you describe your everyday life and what type of activities you do on and off the farm?
- Can you talk about your social network or connections, and how they aid you?
- What are your main concerns when it comes to your livelihoods?

ADAPTATION

- In what way have you noticed a change in the climate?
- How has your daily routine changed due these events (eg. to drought, flooding or landslides)?
- Apart from the everyday, what kind of additional work have you had to do, due to the destruction by climate change?
- Have your sources of revenue to the household changed since the effects of climate change have increased?

- Have you taken part in any projects or initiatives on climate adaptation? How has that affected you?
- What type of support do you think is most important for your community and your household in order to adapt?

The questions- head of the village

INTRO

- Tell me about yourself, what does your household look like?
- How long have you been head of the village?

LIVELIHOODS

- What are the main struggles and opportunities of people living in this village in terms of agriculture and forestry?
- Are people in this village engaged in other alternative livelihood activities besides agriculture and forestry?
- Do people in the village have sufficient food in their households?

ADAPTATION

- In what way have you noticed the effects of climate change in the village?
- Do people in the community change their behaviors and patterns as a result of the change in weather?
- How does the community try to minimize risks from changed weather patterns?
- How does the community work together, and with potential external actors, to increase your resilience?
- What kind of policies or programmes for adaptation have been implemented and how have they affected the community? What are their positive and negative impacts?

The questions- head of women's union

INTRO

- Tell me about yourself, what does your household look like?
- How long have you been head of the women's union?

LIVELIHOODS

- What kind of social network do women in these rural communities have?
- From your experience, what are the major concerns for women when it comes to their livelihoods?
- What hazard is the most problematic for women's work load, food security and possibility for income?

ADAPTATION

- What are your experiences and thoughts on climate change?
- Which effect from climate change is most difficult to deal with? Why?
- From your experience, are the men and women affected differently by storms, drought and land slides? In what way?
- From your perspective, what are possible changes that can be made to lessen the damage and make recovery easier?
- Are the women's voices, thoughts and concerns heard in regard to adaptation strategies in the village and in the households?
- Are you aware of any adaptation projects or initiatives that are being implemented in the village? If so, what are your thoughts on them? Do they differ from the suggestions raised at the village meetings?

Appendix 3

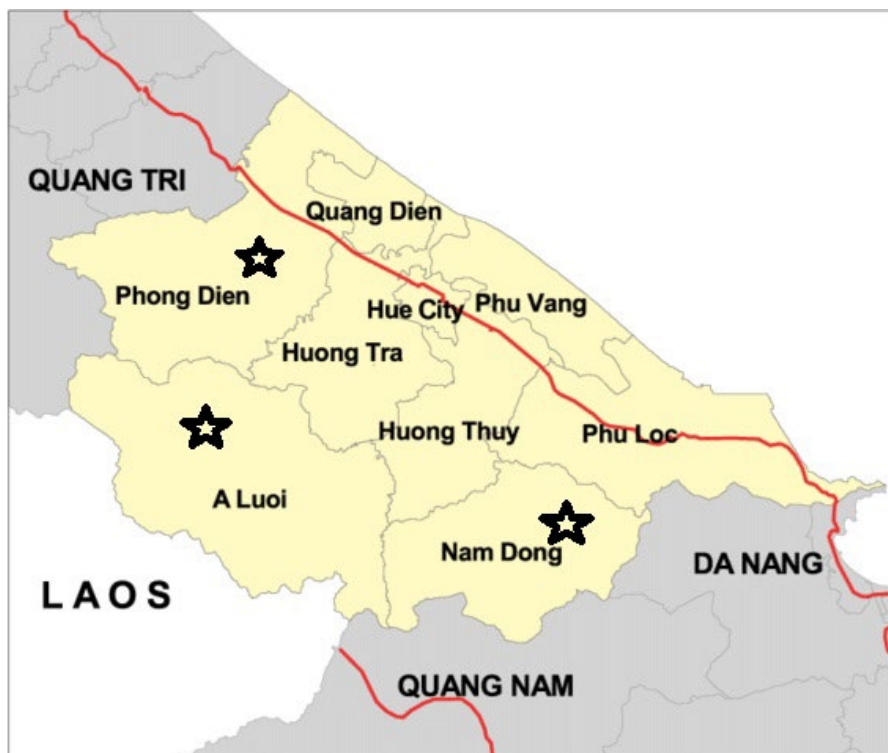


Figure 2. Map of Thua Thien Hue province. Original photo from CIFOR (2005), reproduced with the area of study marked with a star.

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