

Impacts of Climate Change to Women Exacerbated by Gender Inequality: A Case Study of Lao Cai

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Abstract

This paper is based on the results of a study conducted in Lao Cai to explore how climate change affects to women's agricultural activities as well as how gender inequality strengthens the impacts. The method of this study is qualitative with data collected in three communes of Ban Qua, Quang Kim and Muong Vi in Bat Xat district with qualitative tools namely expert interviews, semi-structured interviews and focus group discussion and quantitative tool namely survey. The finding of the research is that firstly, climate change can lead to vulnerable livelihoods. Moreover, the consequences of climate change are by no means gender-neutral. This is related to the second finding that traditional system of Vietnam is patriarchy and Confucianism in which women have to devote their time to family, have lower social status, have limited access to natural, financial and educational resources. The conclusion of the research is that women can be an effective agent of changes in climate change adaptation if they have more capitals such as finance, network and capabilities such as technical knowledge and sciences in agriculture.

Keywords: gender inequality, women empowerment, climate change adaptation.

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1. Introduction

Rural women play an important role in agricultural and non-agricultural food production, yet they face more challenges in livelihoods due to gender-based stereotypes and discrimination such as loss of equal opportunities, access to resources, assets and services. In Vietnam, women mainly work in the agricultural sector such as unpaid workers (Doss et al., 2011). They are not paid to do farm work at home, or are paid very poorly compared to men for hired labor jobs at farms or agricultural enterprises. Similar to the recognition of women's contribution to agriculture worldwide, women's role in Vietnam agriculture tends to be underappreciated, owing to the commonly held view that women are not involved in agricultural production as high valued producers (Doss et al., 2011).

Vietnam is one of the most vulnerable countries in the world with major natural disasters occurring in Vietnam include storms, floods, droughts, landslides and forest fires impacted negatively the most on the poorest people in society (World Bank, 2012) women, and children and explores the constraints and opportunities they face today in rising out of poverty. It builds on a rich body of poverty analysis and an excellent base of knowledge from previous reports and aims to do three things. First, it proposes revisions to Vietnam's poverty monitoring system - via better data, updated welfare aggregates, and new poverty lines - to bring these more in line with economic and social conditions in present-day Vietnam. Second, it revisits the stylized facts about deprivation and poverty in Vietnam, and develops an updated profile of poverty using data from the 2010 Vietnam Household Living Standards Survey (VHLSS). In addition, climate change models predicted that Vietnam will be one of the most severely affected countries in the world (World Bank, 2012) women, and children and explores the constraints and

opportunities they face today in rising out of poverty. It builds on a rich body of poverty analysis and an excellent base of knowledge from previous reports and aims to do three things. First, it proposes revisions to Vietnam's poverty monitoring system - via better data, updated welfare aggregates, and new poverty lines - to bring these more in line with economic and social conditions in present-day Vietnam. Second, it revisits the stylized facts about deprivation and poverty in Vietnam, and develops an updated profile of poverty using data from the 2010 Vietnam Household Living Standards Survey (VHLSS). The impact of climate change has been recognized as having a negative impact on poverty and agriculture in Viet Nam (World Bank, 2012) women, and children and explores the constraints and opportunities they face today in rising out of poverty. It builds on a rich body of poverty analysis and an excellent base of knowledge from previous reports and aims to do three things. First, it proposes revisions to Vietnam's poverty monitoring system - via better data, updated welfare aggregates, and new poverty lines - to bring these more in line with economic and social conditions in present-day Vietnam. Second, it revisits the stylized facts about deprivation and poverty in Vietnam, and develops an updated profile of poverty using data from the 2010 Vietnam Household Living Standards Survey (VHLSS). Climate change has had a significant impact on both men's and women's agricultural activities and their livelihoods; however, its impacts are not gender neutral. Gender-differentiated aspects on climate impacts are reflected in some aspects as follows: it has particularly increased the general workloads of women as compared to men (World Bank, 2011). Particularly, in agriculture, women also have more burdens in labour works in agriculture than men in climate change context (United Nations & Oxfam, 2009) and to recommend policy actions that address climate change challenges and gender equality. The paper addresses gender dimensions and of climate change impacts as well as of

greenhouse gas (GHG). Women's work in agriculture, however, is often worst hit and women are least able to recover as a result of disasters (World Bank, 2011). Women also have higher risk of losing income and productive sources than men in agriculture in climate change context due to a high dependency on land and natural resources (World Bank, 2011). As a consequence, women are considered victims rather than actors involved in climate change adaptation measures (Carr & Thompson, 2014).

The factors that make climate change impacts worse for women it is gender inequality namely socially constructed gender division of labors, gender hierarchy, limited access to education, agricultural services, access to land ownership. In general, women have more caring responsibilities than men in the family and the society (World Bank, 2011). Women carry a wide range of caring responsibilities in the household, for children, spouses and other relatives, but also for neighbors, elderly and sick people in their communities and they often face more difficulties in feeding and caring for others when resources are scarce (World Bank, 2011). As a result, women's and girls' tasks and responsibilities often reduce their opportunities to enroll in (formal and informal) education/trainings to engage in income generating activities, updated knowledge, information, techniques, outer networking, leading to lack of capacities, decision making at the community level including climate change adaptation strategies. Women also have less access to land and services. Women only hold 20% of land tenure certificates while this number for men and joint holders of men and women are 62% and 18% respectively (Ray-Ross, 2012). Having less land rights is an important factor that limits women's access to credit for diversifying income sources, markets, and services for recovery from loss and coping strategies in climate change adaptation (World Bank, 2011).

Because having less opportunities and accesses to resources, women have different coping strategies in climate change adaptation comparing to men. Because of their different socially-defined roles in households, communities and the market, different strategies are adopted by women and men in response to climate change. Women seek for adaptation strategies by making use of income diversification and community support, while men directly target to financial support (Pham, Doane, & Doneys, 2016). Women may have decision-making in the household but it is when men are going far away from home (Pham et al., 2016). If men are at home, attending village, ward or commune meetings is commonly supposed a man's task. Women are likely attending public meetings only when men are busy or absent (Pham et al., 2016). Women's participation in local People's Committee Councils is significant but still limited: 23.8 percent at provincial, 23.2 percent at district and 20 percent at commune level as is limited by child-care and food distribution (World Bank, 2011). As a consequence, women's involvement in local Committees for climate change adaptation and general local decision-making are less. The needs and views of women need to be integrated much more into climate change adaptation plans, notably, women of ethnic minority groups.

The concept "gender" refers to the socially constructed roles, behaviors, aptitudes, and relative power associated with being female or male in a given society at a particular point in time (Esplen, 2009, p. 2). In analysis of climate change, the gender approach is necessary to understand not only how the identities of women and men determine different vulnerabilities and capacities to cope with climate change impacts, but also how to tackle both the causes and consequences of climate change. It is recognized that people who are already the most vulnerable and marginalized, experience the greatest impacts and at the same time, they

have the least capacity or opportunity to prepare for those impacts (Esplen, 2008). As women constitute the largest percentage of the world's poorest people, they are the ones who would experience the greatest impact of these changes but they are least responsible for. There is little existing research that explores the linkages between climate change and gender. This study aims at the integration of the gender-sensitive perspective in climate change particularly in Lao Cai, Vietnam.

According to Denton Climate change is a global phenomenon, but its consequences will impact differently on women and men. Linking gender and climate change should go beyond demonstrating the vulnerability of women and their need for focused and tailor made capacity development. A lot of changes would need an allocation of resources and strong political will among decision makers to appreciate gender inequities in sufficient detail to begin to incorporate such considerations in designing policy interventions (Masika., 2002, pp. 10–17).

Adaptation is defined by The Intergovernmental Panel on Climate Change (IPCC) as *“initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. Various types of adaptation exist, e. g. anticipatory and reactive, private and public, and autonomous and planned”* (Rodenberg, 2009, p. 8). Adaptive capacity is defined as *“the whole of capabilities, resources and instruments of a country or region to implement effective adaptation measures”* (Rodenberg, 2009, p. 8). Adaptation can take place at different levels of society and be influenced by various groups of vulnerable actors including women and that climate change adaptation cannot be without gender equality and this approach is the approach of this article.

Women in Northwest of Vietnam, including Lao Cai play an important role in agricultural production, marketing, and natural resource management (Staal et al., 2014). However, in the context of climate change and gender inequality, women face more challenges to adapt to because of gender stereotypes which increase the burdens (unpaid manual works in agriculture) on them. Moreover, ability of women to engage in income generating activities in agriculture has been limited when their ownership over physical and human capital are considered only secondary to their male counterparts. In the meantime, women in poor households, who are at greater risk of climate change, are more likely to be involved in the agricultural sector. Many studies also show that because of prevailing gender inequalities women in Vietnam are likely to be more affected by climate change than men due to their lower positions in the families and communities (United Nations Vietnam & Oxfam, 2009). Those studies argue that due to unpaid works women is one of the most vulnerable groups to climate change impacts. However, those studies tend to end up focusing on women and men alone or as individuals rather than challenging gender hierarchies. They also tend to see women as victims due to unequal processes of decision-making rather than agents of change in climate change. While women do not have strong financial capital, they still can adapt to the climate change by their own social capital in the villages and their local knowledge. Gender vulnerability in climate change also should be measured by other factors such as dynamic variables such as age, ethnicity, class etc. Similarly, climate change impacts also should not be seen in isolation to other important changes taking place such as social, economic conditions, gender roles, gender relations and hierarchies (World Bank, 2011).

This article will be formed into 3 parts. Part one will look at the impact of climate change on women, especially livelihoods of women while they play the role in agriculture as manual workers. Part two will look at gender hierarchy as an exacerbated factor to climate change impacts. This part will explore the hidden causes that increase women's works namely time for taking care of family, less access to resources, unequal power relation to their men counterparts. Part three of the paper is about climate change adaptation initiatives to tackle the problem.

2. Methodology and Data Collection

2.1 Research site

The field works were conducted twice in Bat Xat-a rural district of Lao Cai Province in the Northeast region of Vietnam in June 2017 and in May 2018. In the scope of the research, we examine 3 communes namely Quang Kim (located in low land area) has a total of 1513 households of which the total population is 5949 and the number of females is 2952, Ban Qua (located in middle land area) has a total household of 1,449 with a total population of 5957 and a female population of 2732, and Muong Vi (located in high land area) in Bat Xat has a total of 513 households, with a total population of 2332 of which 1129 are female.

2.2 Research methodology

Qualitative tools were used primarily in this study with expert interviewing (n=5), unstructured interviews with women (n=50), focus group discussion with groups of mix women and men (n=3).

The expert interviews were used for interviews with the village head, leaders at the Bat Xat district, officials in Agriculture and Rural Development Department and officials of the Women's Union of the three communes.

Unstructured interviews were conducted for women (50 cases) to explore the constraints, impacts of climate change, and gender roles on agriculture. Group discussions were conducted with stakeholders including women's unions, extension societies.

2.3 Criteria of selecting sampling

Women participants were aged 18+, permanent residents of Lao Cai who were born and living here, and selected using a **purposive sampling method** (does not aim to provide the final and conclusive answers to the research questions, but merely explores the research topic with varying levels of depth). This method is a non-probability sample that is selected based on characteristics of a population and the objective of the study. This type of sampling was used because the researchers need to reach a targeted sample quickly, and sampling for proportionality is not the main concern. There are seven types of purposive samples. We specifically apply typical case sampling in this method in order to study a phenomenon as it relates to members of the effected population, here are women. The participants of semi-unstructured interviews are women (n=50) because the questions are directly relevant to their livelihoods and their role in climate change adaptation's decision making.

Majority of participants (women) in the research are from the age of 30 to 60 which accounts for about 78% of total respondents so that they were old enough to have experienced changes over the last few decades. Majority of participants (women who were interviewed) in the research are low skilled labor in agriculture which accounts for 98 % of total respondents. It means that they consider themselves as traditional farmers rather than trained people who work for agriculture sector. In terms of means of livelihood, the highest number of women is growing rice which occupies 37%, the smallest number of participants are local officials which occupies only 2%.

Majority of participants in the research have more than 4 family members which accounts for about 78% of total respondents. For families who have from 2 to 4 members, they are young couples and only have one child in the family. Majority of participants (chosen randomly) in the research areas are not poor household families which accounts for about 96% of total respondents. Majority of household heads are male which accounts for 86.3% while this rate for the female counterparts is only 7.8%, and the remainder are joint male-female headed households. The household head and the family members' names are written in household registration book (so ho khau).

Focus groups and interviews were conducted by two female researchers to moderate cross-gender and cross-cultural sensitivities. An interview and focus group guide identifying key themes such as gender inequality, and climate change impacts and adaptation was used to allow for flexibility in questioning while maintaining some structure. Focus groups were conducted to expand on data collected during interviews and to validate preliminary findings, with participants selected from interviewees. This method is used to explore local knowledge and knowledge of women on agriculture and adaptation to climate change. Specifically, these discussions are used to understand the role and responsibilities of how are men and women different. Participatory observation is applied throughout the field to record informal information and record specific information in the field.

An environmental scan and participant observation techniques were used to collect contextual information on the impacts of climate change, and involved taking part in everyday activities in the community during the time in the fieldwork.

The study followed ethical norms for working with Lao Cai communities including obtaining Institute ethics approval, and eliciting informed consent from all study participants. Confidentiality was preserved when demanded by the participant.

2.4 Methods used to analyze data

Demographic information was analyzed in SPSS (quantitative analysis program) while content analysis was performed via qualitative data analysis to identify key themes and meanings concerning gender roles, climate change adaptation. Concept mapping was then used to illustrate determinants identified from the content analysis and describe the relationships between various drivers operating at multiple spatial temporal scales.

3. Research findings and discussion

The impact of climate change in agriculture productions and its impact to women

Data collected on the impact of climate change on agricultural production in the field firstly is hotter weather, prolonged drought or severe cold. Secondly, long lasting heavy rain leads to flash floods, landslides, inhibition of flowering and fertilization of rice. Because rice is grown in highland areas with sloping slopes, rice is vulnerable. Thirdly, there are more diseases and pests abnormally. Both of those impacts lead to decrease in quality and quantity of food and increase the labour forces and investment in agriculture. *“Due to the heavy rain in 2016, 144.67 hectares of rice crop were flooded and buried so farmers had to plant other crops such as maize and some vegetables, so the average productivity of the district was low, reaching only 46.83 quintals per hectare... Due to the effect of cold*

weather in January to February 2016, the yield was affected much, some vegetable crops were not harvested such as cucumber and soybean” (People’s Committee of Bat Xat district, agricultural and rural development in 2016 (No. 209a / BC-NN).

Field research shows that people are aware of significant climate change, and adverse weather effects on rice cultivation and other agricultural activities. For example, a woman interviewed said *“In the past five years, the weather was hotter, more sunny, more rain and more unusual, so it is difficult to predict the weather, and if we transplant plants in bad weather, we lose the season.”* (women, age 35, Ban Qua commune, Dao ethnic group).

Older locals argue that the seasons are not as clear as before and that they often fluctuate over the course of the year, with the rains and storms coming sooner or later than expected. *“Before people could forecast the weather but now it has been changed all of sudden so farmers are unable to predict the best time of seeding, transplanting or harvesting”* (woman, age 52, Dao ethnic).

Climate change has impacted on pests and pesticide use in agriculture (Hesham, 2014). Climate change leads to the abuse of pesticides and chemicals for plants and animals to increase the productivity and to ensure that they have enough food to eat and to sell. This not only directly affects to food safety, but also directly affects to the health of women working directly in the field. *“The weather has been changing a lot, as in March this was hot and sudden cold chicken farming was much epidemic... The type of rain currently also makes the rice field more diseases; I have to go spraying (pesticides). Weather changes, pigs are dead, chickens are also sick. Last few years my farm has some died. The weather changes, I have to buy epidemic drugs for them to drink... As these days, there was few sunny days*

and then rain consistently, there are many pests. I have to spray 2-3 times a week to control” (women, age 41, Gay ethnic)

Rural women are more unlikely to have access to affordable rural services. Women are often the handlers of live animal products, with poor hygiene, lack of knowledge of disease, and women are exposed to higher risks for foodborne illness and diseases from animals according to Ministry of Agriculture and Rural Development in 2012. Of the 100,000 people, 1,710 were poisoned by direct contact with pesticides.

3.1 Gender division of labor strengthens climate changes impacts to women

The division of labor in the family also leads to clearly distinguishable livelihood tasks as well as a few common tasks shared such as cropping and harvesting. Women are generally responsible for all household chores, including food preparation and cooking, child care, family health care, cleaning, feeding and firewood. Home-based jobs are often supported by children, and they maintain a daily supply of food through gardens around the house. Some ethnic minority women also act as healers with knowledge of medicinal plants and they also grow them in the family’s gardens.

Women also devote considerable time to doing daily plantings of crops and agriculture. The role of men in agriculture is plowing, building, repairing houses, hunting, buying cattle. Men are primarily engaged in activities that require higher physical activity but are shorter while women’s responsibilities are more time consuming and have to be sustained. Women are both a direct and frequent source of labor in agriculture to create a direct source of food for the family and work to generate additional income for the family. At the same time, women are also responsible for all household chores.

The magnitude of the impact of climate change on men and women varies, although climate change has led to increased employment in agriculture for both men and women. Both are different. These factors make the relationship between men and women tense, leading to negative effects on their mental and physical health. In particular, women are strongly influenced both physically and psychologically, because they are often forced to become single caregivers for family members while men are working far from home. Moreover, poor households and women household heads (due to husbands died or worked far away) are often the ones who have the least investment in the protection of agricultural products. As a result they need more time and effort to recover losses from disasters than other households.

Due to working as manual labor, doing all the farm work directly in the field, women are likely to be exposed to the impacts of climate change. The roles of men and women are clearly defined. In agriculture, men point to fields for seasonal pest control, weather forecasts while women do all day care tasks such as weeding, fertilizing and tree care. The daily habits of a woman and their time are also more attached to agriculture than men. They do everything from growing vegetables, raising pigs and other household chores at the same time to help men focus on other activities or off-farm jobs. Women play an important role in most household activities, while husbands and children only help when women are not at home.

In many households, while men focus more on external work, the main role of women is to look after family members, their involvement in social activities, politics is often not encouraged by the parents and most women do not have much time to participate. The distribution of workload between men and women often limits the access of women to formal education and career development.

In terms of means of livelihood, the highest number of participants are growing rice, raising livestock and growing vegetables which occupies 37%, 25% and 22% respectively and the smallest number of participants are collecting forest herbal medicine, doing small business and local officials which occupies only 8%, 6% and 2% respectively. The income of households interviewed comes not only from rice production but also from other sources such as working as hired labour outside the household (both men and women), vegetable planting and poultry raising (by women).

All the women interviewed were growing vegetables or raising poultry in their home gardens. Women say that these activities are the source of and supply of food for their families and that they can also sell these products to local markets to increase their income. Some other women try to find jobs in the neighborhood such as hired labor, but men appear to be more mobile than women in finding work. Respondents said that women of all households in all three communes tried to find and combine different livelihood activities to meet the changing needs of their families.

In regard of non-income activities of households, most of women spend time at home to do the housework the most which accounts for 37%. The other activities of women such as attending social unions, doing child care and taking care of senior members at home which account for 29%, 22% and 12% respectively.

According to the leaders of the Women's Unions in all three studied communes, women tend to drop out of school earlier than men, reducing the opportunity to participate in income generating activities and decision-making processes at the grassroots level and community. Their participation in social activities, however, is still limited and is usually more logistical than management or leadership. The participation of women

in local levels of government in adaptation to climate change in agriculture is limited because of the care of children and the distribution of food; Women tend not to participate in decision-making because patriarchy system tends to prioritize men in management and decision making positions than women. Therefore, in case of climate change adaptation, women are likely to be heavily impacted and their voices are less to be heard.

Climate change has had a significant impact on both men's and women's livelihood activities, but it has particularly increased the workload of women as compared to men. *"Due to the decline in productivity, people cannot live on their own food but have to buy food mainly from the outside. While the basic source of income is unstable, the price of food in the market is rising, the cost of living in the home is also increasing, which puts pressure on the female in the family, who is responsible for managing household expenses"* (man, 45, local official, Bat Xat district).

When asked how life in the past 10 years has changed, women responded *"In the recent 10 years, life has been more difficult because of rising food prices, and agriculture has become more difficult due to unfavorable weather and land degradation. In the past, we could find food from our own garden. Now we need the money to live, no money, life is very hard"* (women, 48, Red Dao ethnic, Muong Vi commune).

This answer, however, to a younger woman, have higher income, better education and have right to access to land is that *"My life in the recent 10 years is generally better than before because I am a local official, having stable salary. I also participate actively in social issues... About the land ownership, only my name is written in red (land ownership certificate) because my parents give for me, my husband is Kinh and does not have land here"* (women, age 35, Ban Qua commune, Dao ethnic group).

For men, life in recent 10 years also is better because they can access to, have the right to use and make use of modern machines, technology for social life and for agriculture production *“Life is better because it now has more advanced technology such as tractors, plumper, to apply in agriculture so doing agriculture is less hard. There are also more gadgets such as motorbike, mobile phone so it is easier to transport and contact with people; television and telephones make life easier, more accessible media, information and help improve the spiritual life of the people”* (man, 28, Red Yao, Ban Qua commune). This difference reflects the fact that active access to modern facilities and high mobility can make a difference between men and women. Interview data show differences in age-based and gender-based ideas. There are also women who use machines such as driving tractor but it is less popular and in case men are absent.

However, women are more exposed to climate change because they have not only needed to earn more money to feed their families, while facing a decline in agricultural productivity-a source of food for the family. They also need more information related to agriculture, but not many women actually use technology such as weather forecasts or agricultural techniques. *“I do not know much about agricultural market information, or weather forecasts, I only work in the house. If the weather changed, my husband often told me to prepare to harvest. I just fertilize for the trees and plants at home while my husband buys agricultural products of the other households and then sells them in the market. He use his motorbike to transport”* (woman, 25, Red Yao, Ban Qua commune).

Women are also under more pressure, for example, they have to provide food for the whole family while finding new sources of income such as hired labor (as builders in the vicinity) or open small business at home. In general, women's livelihoods have changed, but they are not looking for

jobs in places as far away as men do, but look for new livelihoods in neighboring villages. *"Families have women in labour age also are travelling to the other villages as hired labour to accumulate money for children's education"* (women, 32, local official, Quang Kim commune). This shows that the impact of climate change as well as other socio-economic factors (the need to increase income of family), women is now not only doing unnamed and unpaid works but now they are one of the main forces to generate direct income for the family.

There are a few cases where the women who work in commune have stable income and social status, which also partly improves their status in the family. *"In the family, I have more stable income than my husband. My husband is a carpenter; sometimes he has money, sometimes not, so I am the main income earner in my family. He is very supportive in housework, when I cannot come back home at lunch time, he cooks for the children and takes them to school"* (women, age 35, local official, Ban Qua commune, Dao ethnic group).

In general, however, men are more likely to go out to work than women. In addition, families also offer more (regular or training) opportunities for men. *"In my family, my husband has higher education, agricultural training, or veteran association, farmer's union, he often goes. There are some women involved, but there are some women in the Executive Board only"* (women, age 36, Giay ethnic, Muong Vi commune).

It can be seen that climate change raises the pressure on both sexes but directly affects women more. When men go to school or work away from home, livelihoods and care of family as well as agricultural labor put on the women's shoulder. Although men working far away send remittance to contribute to the family economy, that income does not increase while the cost of many consumer goods and food in the market has also risen,

often higher than their increased earnings, many have continued to face hardship and stress in trying to meet their needs. Women have to shoulder the burden of caring for their families and farming, while looking for additional jobs to generate income. Thus, when a man is away from home, women become caretakers and decision makers at the same time for themselves and for their family. *“Farming in the family was decided by me. Doing housework, taking care of children is all I do. My husband does not work because he has to work far away”* (woman, age 52, Dao ethnic, Ban Qua commune).

In fact, it can be seen that the lack of men in the family (in case they travel far away to work and there are only women and old people stay at home) creates more burdens for women, especially in time of extreme weather. Women and girls here have to do as much work as men did before. Although the division of labor has changed, however, men remain the key decision makers in the family because they are still the household heads. One of the reasons for this is that women in the family who have a brother after marriage do not have the right to inherit property (garden, land) because after marriage women come to live in the husband's family and they have no rights to the property of the husband. Thus the voice as well as their status in the family of the husband was reduced due to the imbalance of power over property, land in the family.

The gender gap is significant in accessing to land use rights certificates (LURCs). Evidence from the PAPI surveys of citizens in 2016-The Viet Nam Provincial Governance and Public Administration Performance Index shows that among those with LURCs, there were more 13% of men listed on LURCs than women. In addition, this gap tends to be higher in rural areas where the proportion in rural areas is 19% and urban areas are 5.8%. The government has also made efforts to address this gender gap.

Accordingly, Article 48 of the 2003 Land Law requires that both names of spouses should be included in the LURC when the land use right is the common property of both. This is regulated in Article 98 of Land Law 2013. The purpose of this Article is to protect the rights of women and to secure ownership in the event of death, divorce, inheritance. It allows women to be more actively involved in household and productive economic decisions. However, ethnic minority women are particularly vulnerable to unstable situations and access to land.

Regarding agricultural land use right in the family, in this study, the majority of husbands hold 62%, followed by the husband and wife accounted for 30% and only a few women own land occupied 8%, which lower than the national average as of 2016 as Lao Cai is a mountainous area with different ethnic minorities, women particularly from ethnic groups are more difficult to access to land rights. All households in the study area have land for cultivation and livestock, and land owners are generally male except for two cases where women inherited land property from their parents after they passed away. Not all families have both husband and wife names on the red book (land certificates). *“The red book at home does not have my name. I did not hear anyone say I have to put my name in”* (women, 48, Red Dao ethnic, Muong Vi commune). Thus, in those families, women are less empowered. In many cases, even when women were the main income generators, they were disregarded as property owners as normally men put their name in “Certificates of Land Use Right” (or “*sổ đỏ*” was called by Vietnamese common language) and they are always the ones who make the important decisions or big spending in the family.

Participation in village or commune meetings is often considered to be the task of male-headed households. As a result, women tend to go to meetings or training workshops on agriculture, adaptation to climate change

only when men are busy or absent. *“In a fish farm training classm there are 25 farmers, only 5 participants are female”* (man, 45, local official, Bat Xat district). Women should, therefore, be given more opportunities to participate in technical courses, skills training or local meetings to share experiences and techniques for agricultural activities. Similarly Although women are directly engaged in producing food for the family and society, in the typical farmer’s awards, only men participate and are rewarded for being household head. *“While agricultural work is primarily a work of women, women spend more time and play an important role in everyday caring for crops and livestock - a determinant of successful agriculture, only men received the awards”* (man, 45, local official, Bat Xat district).

Despite knowing that there is inequality between men and women, however, women find it difficult to change their husbands as well as the gender roles that society has set. *“I want him to change, but it’s hard. I want him to take care of me a little at times when I am sick, I also ask him to do housework but he does not. I also said a lot but he never changed”* (women, 48, Red Dao ethnic, Muong Vi commune). With this in mind, how Lao Cai women and men have responded to climate change will be the subject of the discussion below.

4. Climate change adaptation initiatives

It can be said that seasonal fluctuations in price, natural shocks (exposure to climate stresses and hazards), reduced quantity and quality of production are vulnerability factors that men and women in the study area clearly could not control directly. These factors have a direct impact on men and women’s assets and the options available to them in pursuing optimal adaptation strategies.

Lao Cai is located in the remote area of the northern mountainous region with limited access to resources and information. Especially for ethnic minority women, they have limited access to information and resources to adapt to climate change and to find new varied livelihoods. In general, men are more likely to have access to information about new economic opportunities than women because they are more likely to be in contact with and interact to people from the outside communities. They also have more rights to use more modern vehicles in the home such as motorcycles, plows, telephones, radio communications. In addition, men are encouraged to participate in village meetings, public events and women attend only when the husband is busy or absent. *“Men’s strengths are more experienced in forecasting, analyzing, listening to weather forecasts, being alert to cold weather and actively seeking out information. Women often do more direct work and if there are more pests, they have to go spraying pesticides. If it is sunny, they have to take care of the roots and spend more time in labor”* (man, 45, local official, Bat Xat district).

However, women still hope to have more opportunities to earn more in the future despite the fact they are still very busy with everyday tasks. *“Now I do not expect too much, only want to have good health to work, to produce more”* (women, 48, Red Dao ethnic, Muong Vi commune).

Beside the reason that the men were absent so that the women could take more control over decision-making in climate change adaptation initiatives at home. They also gradually control decisions about livelihood issues. Although these responsibilities place a heavy burden on the women, they gradually gain more freedom in making personal decisions and participate in more public activities, activities of community and technical trainings. These also contribute to improved capacity and access to information to help women become more confident in making decisions in

agriculture, livelihoods and climate change adaptation. *“Things related to the family’s livelihood and expenditure, I decided all”* (woman, age 52, Dao ethnic, Ban Qua commune).

The ways women used to adapt to climate change mostly is to make use of community supports accounted for 38%, using their own initiative and local knowledge accounted for 28% and 22% respectively while applying new technologies only accounted for 12%.

For women in the ethnic group, they prefer to apply local knowledge to treat animals’ diseases. *“I used local herbal, Chinese herbal, picking up the tree leaves for pig to eat. I boiled the leaves and cooked it with bran for pig to eat. Sometimes, after eating that medicine only one time the pigs recovered, sometimes taking 2, 3 times also was not effective”* (women, 48, Red Dao ethnic, Muong Vi commune).

Another way to prevent livestock from the diseases is to make use of personal experience and initiative. It can be argued that these women are also skilled to the point of knowing how to adapt to climate change as well *“Now we cannot farm in low land, we farm in upper hil. We have a farm there, now only we raise chickens there, before having goats and pigs. There are less people there so it is less disease... That is a source of food for my family, we also will sell them if we need money”* (women, 48, Red Dao ethnic, Muong Vi commune).

Another personal initiative to prevent cows to die in the extreme coldness is to prepare food and warm place for the animals to live inside and those tasks are only made by women. *“In the past, I used only dry leaves and grass cages to cover the buffalos in winter but now the weather is changing, so I try to buy bricks, buy cement to build buffalo cage to keep them warm from cold. Since then there have not been dead any yet. This cage is made by ourselves (husband and wife).... Now buffalos do not*

expose to the rain, sun, not dead because of the canvas cover... My husband monitor the field, cut grass, I go to transplant only. I sweep, clean, cover the rain for the buffalos.... The buffalos were bought by my husband ... When the weather is cold, then I cover straw in the cage, making clean grass for the buffaloes eat in the winter, cooking rice and water for them in December and January” (women, 40, Giay ethnic, Muong vi commune).

On applying local knowledge on rice planting, an older woman think that the local practice of her generation on rice production is more sustainable and more environmentally friendly than the modern one. Therefore, if apply it again, it wil be a possible way to adapt to climate change. *“In the past, people in this area used leaves to compost to make a good rice paddy. That practice made good soil, good rice, but still high productivity but more labour work also. However, nowadays, people use more chemical fertilisers, the soil becomes stiff, rough and lumpy but it takes less effort to fertilise” (woman, age 52, Dao ethnic, Ban Qua commune).*

In the context of the mountainous north of Viet Nam, the patriarchy system and culture in society allows men to have more social status and power than women. This affects family decision-making as well as access to family and social resources. For men who do not go to work far away but live in the local area or men from other localities move in, they are more visible in the public sector as in political and social organizations, while women are closely associated with reproductive and family responsibilities. This also makes a difference between men and women in climate change adaptation.

Generally, both men and women suffered from the increased workloads before, during and after any disaster events as a consequence of climate change. However, there was gender role differentiation during the different phases of the disasters (the consequence of climate change).

Before any disasters, women were responsible for food preparations, water storage, packing belongings, while men took care of the home maintenance and production activities. The men also cut down some overgrown tree branches and participated in the resident's disaster reduction groups.

During the disasters, men had a tendency to take care of the public works while women cared for the domestic arena, including care of the children and elderly. After the disasters, both men and women were involved in preparing or rebuilding the houses and recovering from the damages, though men tended to perform the tasks that required most physical strength. However, if men were absent from home, women were responsible for almost everything thus their workloads increased significantly, the only thing their husbands can do is to send money for wives to recover from the disasters.

The local economy appeared to be diversified recently, with local people's incomes now are coming from different sources rather than just from agriculture production as in the past. Thus, diversification of income sources was a local common strategy to avoid risk, and as a consequent, additional ways of generating income were needed such as migration to the cities to engage in manual labor jobs.

Diversification of income was a practical strategy in order to reduce risk of external shocks since different sources of income were likely to be affected differently by external shocks. Income diversification appeared to be key for disaster risks management (by climate change impacts) and would help vulnerable households to meet and smooth their family's consumption, social and labor needs, and develop incomes. Income diversification opportunities were both within and outside agriculture production and include both on- and off-farm strategies. However, women have more difficulty than men to find jobs as off-farm strategies for climate change adaptation because of their tasks at home. *"Their main barrier is that the heavy workload of*

the household has consumed most of their time. Men also use the time to care for children and production activities, but most of them tend to work outside more than most years, so men cannot help much. Women must care for all family members and at the same time, do most of the household chores such as cooking, washing and collecting water and cope with climate change impacts” (women, 32, local official, Quang Kim commune).

There are some policies to diversify the household income in Bat Xat, Lao Cai such as Poverty Alleviation Program 135 which aims at Supports the communes with special difficulties in crossbred and high quality rice varieties such as Seng Cu, Bac Thom. This program also supports for economic development models such as breeding cows, develop plans, support production lines (market chain), production tools such as plows, plucking machines, milling machines, seedlings machine. This also provides seeds of cauliflower, cabbage for self-sufficiency in the family. Currently, the model of planting dragon fruit in the land of intermixed rock with direct technical consultancy, training and supplying fertilizer varieties is implementing in MuongVi Commune. This program is the government support for difficult households, ethnic minorities, people with disabilities to reduce poverty, increase livelihoods diversity and to cope with climate change impacts.

However some family members in Bat Xat said that the supports from program was not really effective *“There was a time state support for chickens from the lowland area. Right after receiving, those chickens were sick, the family had to spend money to buy medicines for the chicken but they still died. We lost money, lost care and labour work”* (man, 28, Red Yao, Ban Qua commune).

An ethnic woman also said *“The capital support programs for production are not received by everyone, only the most productive households received, I do not”* (women, 48, Red Dao ethnic, Muong Vi commune).

The seasonal fluctuations in price and production of agriculture products are other critical trends over which people in the communes have limited or no control. If they could not handle the volatility and switch out of production after the market crashed, then waiting until it was up again before switching back in, then they would lose money and potential income. Therefore, local authorities are also looking for sustainable investors to invest in agricultural sector for promoting and sustaining agricultural production and distribution. However, the upper land is divided unevenly, some households have more land than other households (because land on the hill is reclaimed land, whoever comes first and foremost in the past would have more land). If the enterprise wants to invest, it has to lease the land under the replication model with support of local authority. Besides, they are focusing on teaching and guiding on the techniques of cultivation, plantation to farmers (both men and women). *“However, the quality of the work of the extension staff has not met the actual requirements while the time of technical guidelines at the community level are few and limited”* (man, 45, local official, Bat Xat district).

In the Bat Xat area, there are Mong, Giao, Day, Ha Nhi ethnic groups are supported seed, tools and plows. Crop restructuring has been taking place since 1998 to change local varieties and farming practices. However, according to an ethnic women *“I am not very happy with apply new seeds because I was used to grow our local seed in the past with different practice of farming”* (An ethnic, 45 years old). Normally, the specialized agency is the place to decide what to plant from the trial.

Some local products are friendly sustainable in the extreme weather such as cassava which makes fertile soil; local maize and rice have large market and stable prices. Growing medicinal plants such as garlic, cassia is also encouraged because the local authority can form the area of production to distribution easily. In communes such as Y Ti, Coc San, Quang Kim and Ban Qua, vegetable production is higher than that of rice. In these communes, they are also applying greenhouse vegetable cultivation technology (hi-technology model). However, output for the product is still very precarious.

5. Conclusions

The finding of the research suggests that firstly climate change can lead to vulnerable livelihoods to both men and women. Climate phenomena in this area include prolonged hot weather, heavy rain, landslides, and lack of fresh water, which affects the farming practices, productivity as well as the quality of agricultural products. This has a detrimental effect on food sources and their families.

Secondly, the research result suggests that due to the gender roles, the consequences of climate change are by no mean gender neutral. (1) Women and men also have different roles in climate change adaptation in agriculture. While men focus more on science and technologies in agriculture and only go the field if needed, women are likely to taking care everything in detail in a daily routine. (2) Because of the gender roles, climate change impacts to men and women differently. In agricultural production, women are likely to work prolonged time as labor in the field and it burdens more on women in the extreme situations of climate change. Despite this fact, the Vietnamese government policy in climate change adaptation is still lacking of gender sensitivity in including the gender differences to tackle the problem.

However, women also can be an effective agent of change in climate change adaptation if they have more capitals such as finance, network and capabilities such as technical knowledge and sciences in agriculture. Increasing access to resources for women is, therefore, an important factor in enhancing the role and involvement of women in decision-making on strategies and initiatives for climate change adaptation in the local agriculture. At this level, the policy needs to focus more on the commitments to address the gender dimensions in climate change by providing step by step guidance of how to do it.

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7. References

- Carr, E. R., & Thompson, M. C. (2014). Gender and Climate Change Adaptation in Agrarian Settings : Current Thinking, New Directions, and Research Frontiers, 3, 182–197.
- Doss, C., Raney, T., Anriquez, G., Croppenstedt, A., Gerosa, S., Lowde, S., ... Matuscke, I. (2011). *The role of women in agriculture*. Food and Agriculture Organization of the United Nations. Retrieved from <http://www.fao.org/docrep/013/am307e/am307e00.pdf>
- Esplen, E. (2008). *Gender and climate change : mapping the linkages A scoping study on knowledge and gaps June 2008* (Vol. 44).
- Esplen, E. (2009). *Gender and Care Supporting Resources Collection*.
- Hesham, I. (2014). *Climate change impacts on pests and pesticide use Climate change impacts on pests and pesticide use*.

- Masika., E. by R. (2002). *Gender, Development and Climate Change*. Oxfam Focus Gender. Oxfam GB. [http://doi.org/10.1890/1051-0761\(1997\)007\[0470:ASSORO\]2.0.CO;2](http://doi.org/10.1890/1051-0761(1997)007[0470:ASSORO]2.0.CO;2)
- Pham, P., Doane, D. L., & Doneys, P. (2016). Changing livelihoods, gender roles and gender hierarchies: The impact of climate, regulatory and socio-economic changes on women and men in a Co Tu community in Vietnam. *Women's Studies International Forum*, 54, 48–56. <http://doi.org/10.1016/j.wsif.2015.10.001>
- Ray-Ross, S. (2012). *USAID/Vietnam Gender Analysis*.
- Rodenberg, B. (2009). *Climate Change Adaptation from a Gender Perspective: A cross-cutting analysis of development-policy instruments*. Bonn.
- Staal, S. J., Phuong, N. D., Karimov, A., Maize, I., Raneri, J., & International, B. (2014). *A situational analysis of agricultural production and marketing, and natural resources management systems in northwest Vietnam*.
- United Nations, & Oxfam. (2009). *Responding To Climate Change in Viet Nam : Opportunities for improving gender equality A policy discussion paper*. Retrieved from http://www.un.org.vn/en/publications/un-wide-publications/doc_details/108-viet-nam-and-climate-change-a-discussion-paper-on-policies-for-sustainable-human-development.html
- United Nations Vietnam, & Oxfam. (2009). *Responding to Climate Change in Vietnam: Opportunities for improving gender equality A policy discussion paper*. Hanoi.
- World Bank. (2011). *Vietnam Country Gender Assessment*. Hanoi.
- World Bank. (2012). *Well Begun, Not Yet Done: Vietnam's Remarkable Progress on Poverty Reduction and the Emerging Challenges*. 2012 Vietnam Poverty Assessment. Hanoi.