

Impacts of Climate Change and Financial Support on Household Livelihoods: Evidence from the Northwest Sub-Region of Vietnam*

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Abstract

The study's goal is to determine the amount of climate change's impact on ethnic minority (EM) households' livelihoods, as well as their adaptability to climate change and long-term viability. The research was conducted in Vietnam's Northwestern Sub-region, where ethnic minorities account for more than half of the overall population. The study uses a combination of qualitative and quantitative methods based on a survey of 480 households in 04 provinces severely affected by climate change in the Northwest sub-region of Vietnam. The results show that: climate change (extreme weather events) occurs with increasing frequency, mainly affecting the life expectancy, health, and capital of households; Vulnerable groups (women, ethnic minorities) have a poor adaptive capacity and mainly suffer the consequences of shocks, are afraid to change their livelihoods; Microfinance plays an important role in enhancing the sustainability of livelihoods through increasing capital and financial assets and reducing the vulnerability of ethnic minority households. Finally, research has some solutions for microfinance - special credit specifically for ethnic minority households in the Northwest Sub-region: support for microfinance advice, home credit with transition orientations to adapt to climate change response and relieves its impact on the social lives.

Keywords: Vulnerability, Climate Change, Ethnic Minority, Vietnam

JEL Classification Code: G10, G14, G15

1. Introduction

“Climate change” is a global problem (Adger et al., 2003), especially in developing countries, which depend on agricultural production most affected by climate change, poor adaptability, low tolerance limit, difficulties in livelihood transformation, and sustainable livelihood options (IPCC, 2001, 2007). Those most affected are vulnerable groups

(Smith et al., 1996, 2001a, 200b; Smith & Lenhart, 1996; Smith & Pilifosova, 2003; Duc et al., 2012). Vulnerable people are not only ethnic minorities but also children, the elderly, women, and the poor tend to be the most vulnerable. “Vulnerability” to climate change is the sensitivity to climate change as measured by resilience and adaptability to change, poverty, food insecurity, and loss of autonomy (Sen, 1981; Hewitt, 1983; Ribot et al., 1996).

Vietnam has greatly developed nowadays with a rapid economic growth rate (Nguyen & Nguyen, 2020; Nguyen et al., 2021). However, fragile ecosystems, unstable geology, and complex topography, such as the Northwest Mountains of Vietnam, are sensitive to small changes in natural climate to disaster (Lee & Dan, 2005; Lee et al., 1997). The Northwest mountainous region of Vietnam is home to nearly 13 million people of 39 ethnic groups, of which nearly 70% are ethnic minorities. However, there is little information on the vulnerability of ethnic minority households to climate change as suggested in ADP, DFID, EC, GDC, WB (2008).

Therefore, this study aims to firstly assess the level of impacts of climate change on the livelihoods of ethnic minority households in the Northwest Sub-region of Vietnam, and secondly, to understand the households that are affected

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by climate change. How will ethnic minorities (vulnerable objects) respond to climate change; the third is to assess the role of financial and credit resources on the sustainability of household livelihoods, i.e., to discover the link between finance-credit and vulnerability, do financial-credit solutions have any impact on reducing vulnerability?

The study contributes theoretically by testing the research model: financial support - credit increases the sustainability of livelihoods and reduces vulnerability to climate change of ethnic minority households.

2. Research Overview

2.1. Vulnerability

According to DFID (1997), DFID (1999) “vulnerability” means the characteristics of a person or a group in terms of their capacity to predict, cope with, resist and recover from the impact of a disaster. It is a combination of factors that determine the extent to which the lives and livelihoods of others are placed at risk by a discrete and identifiable event in nature or society. Three generalized perspectives on vulnerability can be drawn: physiological (Turner et al., 2003; Eakin & Luers, 2006), social, and integrative (O’Brien & Leichenko, 2000). In a nutshell, vulnerability is a term used to describe the characteristics of a person or group of people and their living circumstances that affect their ability to respond to, withstand, and recover from the impact of a hazard.

2.2. Microfinance and Vulnerability Reduction

There are two different views on the relationship between assets (microfinance assistance) and vulnerability: The first supports the role of microfinance in vulnerability reduction. First, microfinance helps to provide immediate formal loans and savings to households to cope with shocks and secure staple food, even when formal credit markets and insurance are not available. Second, they can use savings to prevent and reduce the risk of occurrence. Includes direct income impact and indirect income impact through non-financial benefits such as training and education, enhanced social network, and better self-esteem (De Aghion & Morduch, 2006). Microfinance can help reduce members’ vulnerability, empower women’s membership, and enhance the role and status of women in society (Bali Swain & Wallentin, 2007; Mayoux, 2001, 2002; Rankin, 2000).

In contrast, there is also a view that research denies that microfinance helps reduce vulnerability only by reducing poverty (Glewwe & Hall, 1998; Calvo & Dercon, 2005; Carter & Ikegami, 2007). Carter (1996) and Carter and La Rovere (2001) showed that households tend to accept low income, do not use microfinance to achieve low risk, and

limit high-income relative to a high level of risk. In other words, there is a tendency towards risk aversion, which means that risk-averse households will cause severe damage to their livelihood assets.

2.3. Adaptive Capacity

Adaptation capacity to climate change shocks: Refers to all responses to climate change that can be used to reduce vulnerability (Burton et al., 2002); the process by which humans reduce adverse climate impacts and take advantage of the opportunities that the climate environment provides (Burton, 1997, 2004); is the ability to modify individual, collective and institutional behavior to reduce the damage of vulnerable groups affected by climate (Pielke, 1998). Asset- and financial-based frameworks help identify ways of short-term or future adaptation (e.g., financial capital to purchase crop insurance). As a result, complementary adaptive livelihood strategy packages based on available assets provide livelihood options that can be developed using a combination or alternative of assets or financial resources.

2.4. Sustainability of Household Livelihood

An integral part of the research is the application of the concept and approach of sustainable livelihoods in livelihood improvement and poverty reduction. The issue of “Livelihood” is simply understood as a means of ensuring people’s lives (DFID, 1997), which is composed of five main resources. The UK Department for International Development (DFID) and CARE International have developed a theoretical framework for sustainable livelihoods, the core of which is a pro-poor policy-making strategy. A generally accepted sustainable livelihood includes The ability, and assets (including social and natural resources) to earn a living both now and in the future while not undermining the financial base. natural resources (DFID, 1999a).

Compounding into sustainable livelihoods DFID (1999), Chambers and Conway (1991, 1992, 1995), and Scoones (1998) include (1) Humanly identifiable priorities; (2) The strategies they choose to pursue those priorities; (3) Institutions, policies, and organizations that determine their access to assets or opportunities and the outcomes they obtain; (4) Their approaches to the five types of capital they have; (5) People’s living context, including economic trends, technology, population, shocks and seasons.

3. Theoretical Framework

We present a theoretical framework in this section explaining the factors constituting household livelihoods; on that basis, the study assesses the level of impacts of climate change on livelihood components, facing the risk of loss of

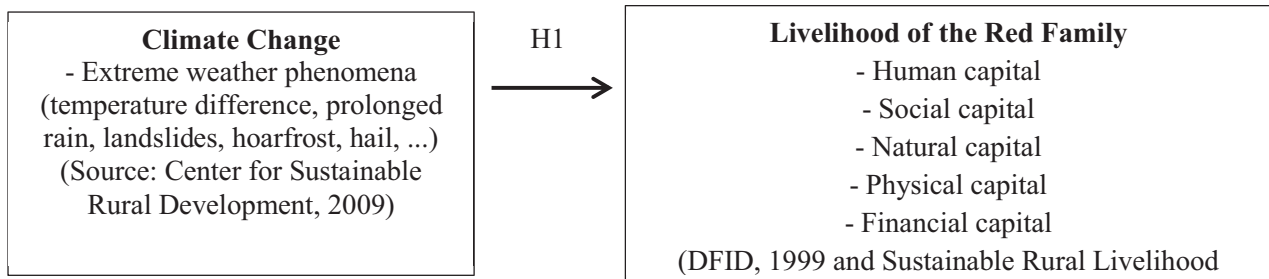
livelihood assets, households (especially vulnerable groups) will have to decide to choose a long-term livelihood strategy. Based on analyzing the characteristics of livelihoods and comparing them with the criteria of sustainable livelihoods to select the factors that strongly affect the sustainability of household livelihoods.

Model 1: Research on the impact of climate change (extreme weather events) on the livelihoods of ethnic minority households in the Northwest sub-region of Vietnam.

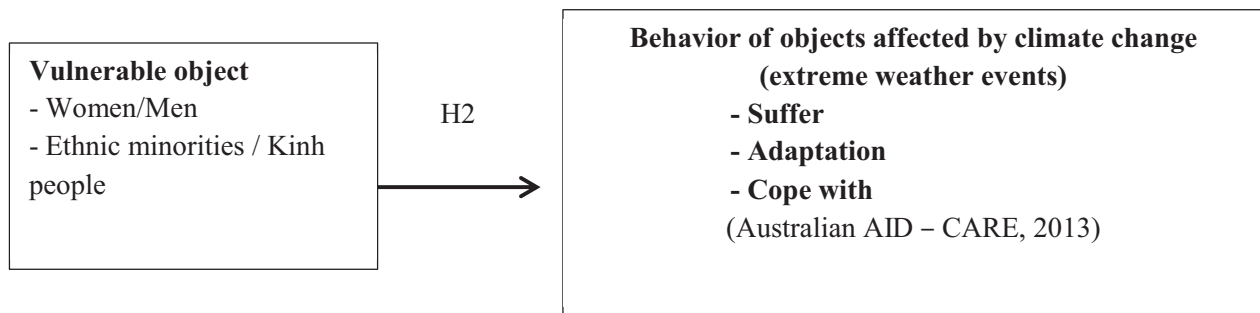
4. Research Methods

4.1. Research Location

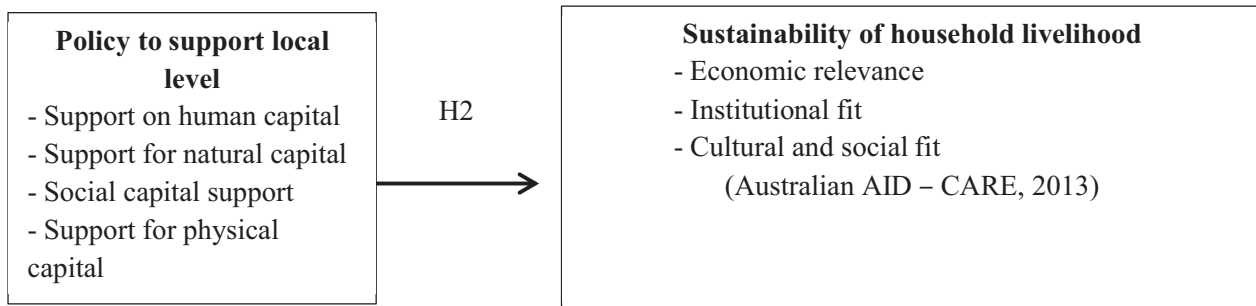
The study was carried out in the Northwestern Sub-region of Vietnam, where ethnic minorities account for more than 50% of the total population of the region as discussing on Open Development Vietnam (2022) in which 90% of households depend mainly on agricultural production.



Model 2: Studying the behavior of vulnerable populations in the context of climate change shocks (extreme weather events).



Model 3: Studying the impact of local support policies on the sustainability of ethnic minority households' livelihoods in the Northwest Sub-region of Vietnam.



Climate change is causing many negative impacts on this region, such as drought, landslides, erosion, storms, floods, etc. These negative effects affect every aspect of the social life of the people. Local people, in which households and ethnic minorities live mainly on agriculture, are the most vulnerable.

4.2. Data Collection Process

The study uses a survey design that allows primary data to be collected once at a specific time. Research subjects are households in 04 provinces of the Northwest Sub-region of Vietnam that are affected by climate change. Samples were taken from 480 households using the convenience non-probability sampling method. Regarding the sample size, according to the model recommended by Hair et al. (2010), each indicator has at least 5 observations, so over 300 observations ensure reliability. To increase reliability and reduce the risk of error votes, the study of collecting 500 votes is guaranteed to be scientific.

After developing the questionnaire (structured questionnaire), a preliminary survey with 50 households was conducted in June 2021 in Son La province, after adjusting the official survey questionnaire. November 2021 within 04 provinces in locations with production activities affected by climate change. The results of the survey show that: there are 11 error votes because the respondents do not know Vietnamese, 5 people are afraid to answer, 4 votes are incomplete, and the remaining 480 votes are screened and entered with full data. Enough information and perform the next steps of data analysis.

4.3. Scale of Research Variables

The study applied a scale based on the inheritance of studies in the review (DFID, 1999, Australian AID – CARE, 2013). However, the research on terms and expressions was adjusted and made clearer to ensure the research context (households are mainly ethnic minorities and do not understand Vietnamese well, so the questionnaire limited the use of terms and conditions), difficult to understand language; each question will be explained more clearly so that people understand the nature of the problem). All scales

are applied Likert scale with level 1- not serious/low effect/ low response to highest 5-very serious/high effect/high response.

In the research model of vulnerability and decision-making behavior to shocks, the sustainability of household livelihoods aftershocks is applied according to Australian AID - CARE (2013) on 3 behaviors: endure, adapt, and cope.

5. Results and Discussion

5.1. Descriptive Statistics

Table 1 (Appendix): 41.9% of the surveyed subjects are women, quite balanced in terms of gender in the survey sample; The surveyed age group is from 20–30 years old, accounting for 58.1%. The education level of the surveyed subjects mainly stopped at level 1 and level 2, accounting for 60.6%. There are 233 ethnic minority households, accounting for 48.5% of the total sample, of which nearly 91% are indigenous people living in the area for more than 1 year, accounting for 65%. Table 2 (Appendix): 62.7% of households have unemployed members. The livelihood assets of households are mainly agricultural land: 75% have 2–3ha/household, and only a few households have more than 5ha, accounting for 1%. More than 64% of households have been granted poor household certificates and enjoy incentives and subsidies for poor households. The average annual income of surveyed households: mainly under 10 million VND/household, accounting for 81.5%, and very few households with income over 10 million VND/year, accounting for 18.5% of the sample.

5.2. Experimental Research Results

Survey on assessing the severity of climate change (extreme weather events) in 12 communes in the Northwest sub-region of Vietnam 100% assessment: extreme weather events occur with frequency more and more, in a broader range, and the development is more difficult to predict (Table 3 - Appendix).

With extreme weather events occurring with more frequency and severity, affecting the livelihoods of surveyed households (Table 4 and Table 5 - Appendix): the

Assess the extent of local extreme weather events?	Level (1- not serious, 5 - very serious)
To what extent has climate change impacted life resources?	Level (1- not serious, 5 - very serious)
Assess the effectiveness of local support policies?	Level (1- Less effective, 5 - High efficiency)
To what extent does the transition to a new form of production meet the following criteria?	Level (1- Response Low, 5 - Response High)

greatest impact on health and life expectancy of the people (households said that the elderly and young children have almost no resistance to such extreme weather, easy to die), the second is households with low income (mainly under 10 million VND/household/year) 100% depends on agricultural production (2–3ha/household). Third, climate change has a major impact on financial and financial resources.

Faced with unexpected events of natural disasters (Table 6 and Table 7 - Appendix): Women are more likely to suffer 87.6% (Doing nothing about current and future climate impacts). Men are physically stronger and more resilient, but they do not suffer but have more flexible adaptations (having impactful behaviors and proactively changing livelihoods).

Regarding the type of ethnic group, there is a difference in behavior (Table 6 and Table 7 - Appendix): 64% of EM households choose to endure (quite indifferent to weather changes), and 36% of households have behavior to adjust their livelihoods to adapt, 0% of households there is warning and provision for natural disasters.

Regarding the educational level, there is a difference in the selection behavior (Table 6 and Table 7 - Appendix): for households without school training, at the primary and secondary level, there are mainly tolerance behaviors (53% sample); subjects with higher education (level 3) have adaptive behavior, and a few can cope with extreme weather events (less than 12%).

In the livelihood support policies of the local government for households (Table 8 - Appendix): 89% of households rate high efficiency when receiving timely financial and material support to help them stabilize their livelihoods and stabilize their livelihoods. Better recover from disaster consequences, 44% rate disaster warning tools, flexible livelihood transformation models, and disaster risk reduction training courses as more effective and lasting, and 37% of households rated land support and social access as less effective.

The survey on livelihoods before and after climate change shows that: nearly 90% of households are affected by climate change, 59.2% of households receive local support, there are gradually shifting the livelihood of the population: reducing 6% of households growing rice and maize; reduce 1% of households growing crops; raising livestock by 3.5% (increasing buffalo and cow raising, reducing poultry production); an increase of 7.2% of households completely abandoning production to work as hired labor or other self-employed occupations.

An assessment of the impact of financial support and livelihood sustainability is as follows: 100% of households who do not receive support for livelihood assessment before and after the transition has low sustainability and are afraid of changing to a new livelihood model (not wanting to change their residence and production methods) export); 87% of households receiving support appreciate the sustainability of their livelihoods before and after the transition.

Table 1 indicates that Chi-Square test results again show that there is a strong relationship between support (financial and material) and the sustainability of household livelihoods. Figure 1 shows the relative distribution of the normal distribution, so the data used for this study is reliable and appropriate.

5.3. Discussion

The results of the survey on the behavior of 480 households in the Northwest Sub-region show that: climate change has a serious impact on household livelihoods, negatively affecting livelihood resources. The Chi-Square Testing study showed that the behaviors (tolerance, adaptation, and response to climate change) of 480 subjects were closely related to gender and ethnicity. (Women and ethnic minorities have a higher tendency to choose to tolerate rather than respond). The research results are similar to the study of Pitt and Khander (1998); age and education have an independent relationship with behavior (sig coefficient > 5%) in contrast to Pitt and Khander (1998). The explanation for the study results: observations of climate anomalies are inferred by

Table 1: Chi-Square Test on the Link Between Financial and Material Support and the Sustainability of Household Livelihoods

Pearson Chi-Square Tests		
		BenVung
HoTro	Chi-square	351.172
	DF	first
	Sig.	0.000*

Results are based on nonempty rows and columns in each innermost subtable. *The Chi-square statistic is significant at the 0.05 level.

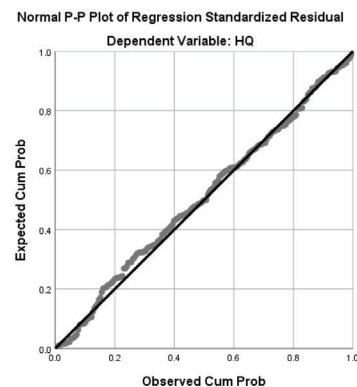


Figure 1: Q-Q Plots

older family members based on accumulated experience over the years, not based on expertise and education alone, can be concluded. In the villages/villages, there will be old people/village chiefs (or magicians) who have a lot of experience in monitoring the weather and agricultural production cycles to have accurate judgments.

Among the livelihood support policies, it shows the most important role of microfinance support, which has an immediate and highly effective impact in mitigating and responding to the negative impacts of climate change. Research results are consistent with the point of view in the study of Pitt and Khandar (1998), Pitt and Shahidur (1996). The majority of households receiving local support will continue to maintain the traditional livelihood model (increasing the sustainability of their livelihood), and a few households tend to reduce their dependence and agricultural production, shifting to raising cattle with good resilience, and high economic value (switching livelihood towards sustainability).

Research results support the role of microfinance in reducing vulnerability and increasing livelihood sustainability (Adger et al., 2003). Asset- and financial-based frameworks help identify ways of short-term or future adaptation (e.g., financial capital to purchase crop insurance). Measuring the sustainability of livelihoods is the economic, institutional, and socio-cultural suitability, in which the economic relevance factor in this study is prioritized by households in the decision to maintain traditional livelihoods and new livelihood transitions. The second most important factor assessed by households is supporting institutions and policies: namely, financial policies are supported effectively, and promptly. The final factor affecting the sustainability of household livelihoods is the socio-cultural suitability factor: cultural identities and customs are preserved as safe and suitable living places, suitable for women, children, and ethnic minority groups.

6. Conclusion and Policy Implications

The findings of the study show that: These negative effects of climate change (extreme weather events) affect all aspects of the social life of local people, which, households Families and ethnic minorities who live mainly on agriculture are the most vulnerable. Increasing negative levels of climate change will threaten household livelihoods in this region.

Indigenous knowledge is considered the basic foundation for self-sufficiency. It helps households be less dependent on external factors, reducing the community's vulnerability to the negative impacts of climate change. However, the reality of these activities is still limited due to a lack of supporting force, low capacity in the management system, scattered resources, etc. This leads to the situation of farmers and ethnic minorities. However, there are still many difficulties and

challenges, especially related to livelihood transformation, water scarcity, drought, land shortage, lack of production capital, and many ethnic minority households that do not have access to finance. micro, low-interest credit, etc.

Research and propose solutions for microfinance - special credit specifically for ethnic minority households in the Northwest Sub-region: support for microfinance advice, home credit with transition orientations. Change production, transform livelihoods for each loan source, diversify loan products of many sizes, pay capital weekly, and support disaster prevention insurance services and climate change risk insurance. This is a very important practical solution in supporting livelihood transformation, increasing the sustainability of livelihoods, sustainable poverty alleviation, supporting ethnic minority communities, and sustainable economic development in the Northwest region to adapt to climate change.

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Appendix

Table 1: General Characteristics of Surveyed Subjects

Targets	Sex	Value	Year Old	Value	Education	Value	Nation	Value	Home Town	Value	Life Time	Value
Content	Female	201	Under 20	66	No training	117	DTTS	233	Native	435	Less than 1 year	168
	male	279	From 20-30	279	Level 1	176	Terrible	247	Out of province	45	From over 1 to 5 years	140
			From 30-40	115	Level 2	147					From over 5 to 10 years	103
			Over 40	20	Level 3	26					Over 10 years	69
total		480		480	Intermediate	14						480

Table 2: Vulnerability Characteristics of Surveyed Subjects

Targets	Unemployed Member	Value	Size of Land Owned	Value	Poor Households	Value	Average Income/Year	Value
Content	0	179	first	92	No	172	Under 5 million VND	235
	first	155	2	39	Have	308	From over 5 to 10 million VND	156
	2	146	3	321			From over 10 to 20 million VND	81
			4	23			Over 20 million VND	8
total		480		480		480		480

Table 3: Assessment of Climate Change by Households in Recent Years

STT	Extreme Weather Phenomena	The Average Value	Std. Deviation
Reality1	Weather: a tendency to change from 04 seasons to 02 seasons	3.62	1.098
Reality2	The time for each rain is shorter	3.57	1.037
Reality3	Rain intensity is higher	3.48	1.048
Reality4	The long rainy season (February to October)	3.44	1.042
Reality5	Water source, quantity, and quality of water decrease	3.49	1.106
Reality6	Many rivers and streams dry up in the dry season	3.45	1.103
Reality7	The water level is higher in the rainy season	3.56	0.991
Reality8	The temperature difference is more between day and night	3.49	0.999
Reality9	Summer is hotter	3.51	1.007
Reality10	Occurrence of severe cold spells, frost, and frost	3.60	0.957
Reality11	Higher strength limit	3.52	0.969
Reality12	Droughts appear more frequently	3.49	1.003
Reality13	Higher intensity soil erosion	3.83	0.915
Reality14	Soil erosion occurs more frequently	3.59	0.898
Reality15	More intense tornado/thunder/hail	3.77	0.890
Reality16	Thunder/Thunder/Hail appear more often	3.54	0.917
Reality17	More intense landslides	3.75	0.913
Reality18	Landslides occur more frequently	3.55	0.950
Reality		3.569329	0.56223

Table 4: Assessment of Impacts of Climate Change on Household Livelihoods

Impact1	Human capital Education	3.66	0.926
Impact2	Age	3.76	0.931
Impact3	Household size	3.54	0.951
Impact4	Dependency rate	3.53	0.982
Impact5	Social capital Team member	3.62	0.983
Impact6	Natural capital Area of agricultural land	3.60	0.979
Impact7	Landscape	3.54	1.047
Impact8	Location of housing	3.62	1.015
Impact9	Physical capital Household productive assets	3.59	0.643
Impact10	Financial capital Official source of credit	3.59	0.665
Impact11	Unofficial sources of credit	3.60	0.625
Effect		3.6053	0.53384

Table 5: Level of Damage From Climate Change in the Northwest Sub-Region

Human Damage	Damage to the House	Property Damage	Damage to Agricultural Products and Crops	Damage to Livestock, Livestock, Poultry	Total Estimated Damage
17	~ 2 billion	~ 3 billion	500 million won	~ 1.5 billion won	~ 5 billion
DEADMAN	Copper	Copper	Copper	Copper	Copper
159					
Injured person					

Table 6: Relationship Between Vulnerability Characteristics and Behavior Before Impacts of Climate Change

	HanhVi						
	Suffer		Adaptation		Cope With		
	Count	Row N %	Count	Row N %	Count	Row N %	
Sex	Female	176	87.6%	25	12.4%	0	0.0%
	Male	55	19.7%	154	55.2%	70	25.1%
Nation	Ethnic Minority	149	63.9%	84	36.1%	0	0.0%
	Terrible	82	33.2%	95	38.5%	70	28.3%
age	Under 20	29	43.9%	23	34.8%	14	21.2%
	From 20-30	136	48.7%	104	37.3%	39	14.0%
	From 30-40	55	47.8%	45	39.1%	15	13.0%
	Over 40	11	55.0%	7	35.0%	2	10.0%
Education	No training	62	53.0%	36	30.8%	19	16.2%
	Level 1	69	39.2%	76	43.2%	thirty first	17.6%
	Level 2	82	55.8%	49	33.3%	16	10.9%
	Level 3	ten	38.5%	13	50.0%	3	11.5%
	Intermediate	8	57.1%	5	35.7%	first	7.1%
	Colleges	0	0.0%	0	0.0%	0	0.0%

Table 7: Testing the Relationship Between Vulnerability Characteristics and Behavior Before the Impacts of Climate Change

Pearson Chi-Square Tests		
		HanhVi
Sex	Chi-square	219,468
	DF	2
	Sig.	0.000*
Nation	Chi-square	89,777 yen
	DF	2
	Sig.	0.000*
Age	Chi-square	3.233
	DF	6
	Sig.	0.779
Education	Chi-square	14.147
	DF	8
	Sig.	0.078 ^b

Results are based on nonempty rows and columns in each innermost subtable.

*The Chi-square statistic is significant at the 0.05 level.

^bMore than 20% of cells in this subtable have expected cell counts of less than 5. Chi-square results may be invalid.

Table 8: Relationship Between Supportive Policies of Local Government and Sustainability of Surveyed Household Livelihoods

	Support				
	No		Have		
	Count	Row N %	Count	Row N %	
Sustainability	No	196	100.0%	0	0.0%
	Yes	37	13.0%	247	87.0%