Poverty Assessment of Ethnic Minorities in Vietnam

Le, Chau and Nguyen, Cuong and Phung, Thu and Phung, Tung

20 May 2014

Poverty Assessment of Ethnic Minorities in Vietnam

Chau Le

Cuong Nguyen

Thu Phung

Tung Phung*

Abstrat

Ethnic minorities in Vietnam have experienced high income fluctuation over time. This study aims to examine why a number of households experienced an income increase while others experienced an income decrease in poor areas with high density of ethnic minorities in Vietnam. It shows that the increase in household income results from an increase in average income per working hour. That is, the number of working hours did not change significantly but the increase in productivity per working hour helps households to increase their household income. In addition, the increase in number of working hour and increase in income transfers also contribute to the income increase. Our study also indicates that the increase in labor productivity mostly comes from agricultural sector but not from non-agricultural sector. For households with falling income, the major reasons for the income decrease are decreasing labor productivity, especially in agricultural sector.

1. Introduction

Vietnam has achieved remarkable results in poverty reduction during the past year. However, the progress of poverty reduction varies greatly among different ethnic groups. In Vietnam, there are 54 ethnic groups, and Kinh is the major group which account for around 85 percent of the population. Compared with other ethnic minorities, Kinh people are concentrated in delta and high population density areas. Ethnic minorities tend to live in mountains and highlands. Ethnic minority households face huge obstacle in access to important resources such as education, capital, market and agricultural land (The World Bank, 2009 and 2012). Although, ethnic minorities account for around 14 percent of the Vietnam's population, they account for 50 percent of the poor population (according to the 2010 Vietnam Household Living Standard Survey). It can be said that chronic poverty is now a phenomenon of ethnic minorities (Pham et al., 2012; World Bank, 2012).

The government has launched a large number of poverty reduction programs. A large amount of funds have been spent on assistance programs targeted at the poor and ethnic minorities. To reduce poverty in difficulty areas, the Government has implemented the Program 135 which was targeted at the poor and ethnic minorities in the most difficult and poorest communes of Vietnam since 2000. Yet, several research studies have shown that economic growth and poverty reduction is not achieved by a number of ethnic minority groups. Even within a commune, there is a large gap in mean income as well as the poverty rate between Kinh and ethnic minorities (Lanjouw et al., 2013). There is a substantial variation in poverty rate among different ethnic minority groups. IRC report (2012) indicates that certain ethnic minority groups in the Program-135 areas such as H'Mong and Nung had shown huge progress in poverty reduction effort during the period 2007-2012. Whereas, other groups such as Thai and Muong seemed to lag behind in the poverty reduction progress.

This study aims to answer the following questions: how have the standards of living of the ethnic minorities changed during the period 2007-2012? Which group is the most successful in poverty reduction and which is the least successful group during the same period? What are the reasons for the success and failure of the two ethnic minority groups? The research findings are expected to serve as inputs for policy dialogues and recommendations for designing upcoming poverty reduction programs and policies for the ethnic minorities.

There are numerous studies on household poverty in Vietnam, and several studies focus on ethnic minorities, e.g., Van de Walle and Gunewardena (2001), Baulch et al. (2004), Baulch et al. (2012), Pham and Reilly (2009), Pham et al. (2009), Imai et al.

(2011), Pham et al. (2012), IRC (2012), Nguyen et al. (2013). Compared with the previous studies, this study has two different features. Firstly, it relies on panel data from the Baseline Survey of the Program 135-II conducted in 2007 and the Endline Survey of the Program 135-II conducted in 2012 to examine the welfare changes of the ethnic minorities in the Program 135 communes – the areas with special difficulties and high ethnic minority population. Secondly, it identifies the most and least successful ethnic minority groups in poverty reduction and income growth during the recent period 2007-2012. Thirdly, the study use different decomposition and regressions methods to examine the reasons for the success and failure of the ethnic minority groups.

The study is structured into eight sections as follows. The second section overview the recent studies on ethnic minorities in Vietnam. The third section describes data sets used in this study. The fourth section presents the changes in living standards including income, livelihood, health, education and housing conditions of ethnic minorities during the period 2007-2012. The fifth section presents the pattern of poverty and income inequality of ethnic minorities. The sixth sections identifies the most and least successful ethnic minority groups in poverty reduction and income growth, and it uses different decomposition techniques to examine the reasons for the success and failure of these ethnic minority groups. The seventh sections use regression methods to examine how household factors and commune projects can explain the success and failure in income growth of the ethnic minority groups. Finally, conclusions and policy implications are presented in the eighth section.

2. Literature Review

The socio-economic and demographic analysis of poverty situation among the ethnic minorities has been well documented for a number of decades. These academic studies are also complemented by a plethora of policy reviews that linked/evaluated the effectiveness in various poverty reduction policies to social and economic progress of ethnic minorities across the country. While most of existing researches have been consistent in their findings about consistently high poverty rate, low living standard, and limited access of the ethnic minorities to social infrastructure, only a few studies have decomposed ethnic minorities into separate groups by ethnicity for in-depth analysis. Furthermore, inequality in socio-economic development progress not only exists between the ethnic minorities and the ethnic majorities but also prevails among different ethnic minority groups. It is therefore important to gain further insight into unique characteristics of different ethnic

minority groups in order to answer the following important questions: why some of the ethnic minority groups are successful in poverty reduction while the other groups are not despite their receiving huge support from the government and development partners?

Pham et al (2011) used baseline dataset of Program 135 Phase II (P135-II) to provide situational analysis of poverty and multiple socio-economic aspects of the ethnic minorities. P135-II provides the most comprehensive data set about demographic, socio-economic information of the ethnic minorities in Vietnam. The data set is representative of ethnic minorities in the country; therefore, the analysis using P135-II baseline data would provide a highly accurate and representative analysis and description for the ethnic minorities. The data set allows for decomposition into 14 ethnic groups comprising the Kinh, Tay, Thai, Muong, Nung, Dao, Mong, 'others in the Northern Uplands', Ba Na, H're, Co Tu, 'others in the Central Highlands', Khmer, and 'other ethnic groups'. The study identifies significant gaps between ethnic minority groups. Some ethnic minority groups with larger populations such as the Tay, Thai, Muong, Nung and Khmer have poverty rates lower than the average for ethnic minorities as a whole. In contrast, some smaller groups such as the H're and Ba Na, groups in the Central Highlands and the Northern Uplands, and the Hmong have much higher poverty rates. The study also analyzes multiple reasons undermining the socio-economic progress of the ethnic minorities: inability to speak Vietnamese, cultural practices such as community leveling mechanism, low quality of assets and services.

Impact evaluation for P135-II in IRC (2012) indicates that level of improvement in living standards of each ethnic minority group varies. The study decomposes ethnic minority groups into 7 groups: Tay, Thai, Muong, Nung, H'Mong, Dao, and 'other'. Sustained improvements in income and poverty were found among Tay, Nung, Dao and H'mong groups, and less improvement was seen among other ethnic groups such as Thai and Muong groups. Program benefits were not equally distributed among different ethnic groups. The study indicates that majority of poverty reduction was achieved by income growth, but the rate of growth tended to decrease overtime.

Dang (2012) aimed to answer the question "How have ethnic minority families and communities achieved improved economic and social development outcomes?" The study applies qualitative approach through field research in Dak Lak, Tra Vinh and Lao Cai. The qualitative research offers a four-step Paths-to-successful-development model. Step one refers to the stage at which poor households begin cash crop production. Ethnic minority households with average land holdings and land quality shift part of their available land from semi-subsistence grain production to planting a cash crop. Step two is intensification

of agricultural production. Households in this stage concentrate their effort in a single product and gain credit access. Step three comprises diversification of agricultural and non-agricultural activities to reduce risk after achieving higher income from cash crop production. Step 4 involves education investment for children.

The Country Social Analysis (2009) has identified three trends that account for different economic outcomes between Kinh and ethnic minority communities: differences in assets, difference in capacity, and difference in voice. From these differences in outcomes, six pillar of disadvantage for the ethnic minorities were constructed: *(i)* lower levels of education, *(ii)* less mobility, *(iii)* less access to financial services, *(iv)* less productive, lower quality land, *(v)* limited market access, *(vi)* stereotype and other cultural barriers. These factors form a "vicious cycle".

A number of researches have tried to answer explain the "income gap" between the majority and the ethnic minorities. Pham et al (2011) found that about a third of the income difference between the majority and ethnic minorities can be attributed to the characteristics such as landholding, educational attainment, household demographic features, and access to infrastructure. The remaining two-third of the income difference results from the returns that each group gets from their characteristics, including their assets. The ethnic majorities make better use of their assets as compared to the ethnic minorities. In addition, factors such as inability to speak Vietnamese and cultural practices may contribute to the "differences in returns to characteristics".

3. Data set

The main data source that is used in this study is from the Baseline Survey and Endline Survey of the Program 135-II in 2007 and 2012, respectively. The Baseline Survey (abbreviated as BLS 2007) of the Program 135-II was conducted by the General Statistical Office (GSO) in 2007. The Endline Survey (abbreviated as ELS 2007) of the Program 135-II was conducted by the Indochina Research & Consulting (IRC) in 2012. Both surveys were implemented with technical assistance from UNDP.

For comparison, both the survey used the same questionnaire and covered the same sample of households. Data were collected using household and commune questionnaires. The household and commune questionnaires are similar to questionnaires of the Vietnam Household Living Standard Surveys (VHLSS). Information on households includes basic demography, employment and labor force participation, education, health, income, housing, fixed assets and durable goods, and participation of households in poverty alleviation programs. However, unlike the VHLSSs, BLS 2007 and ELS 2012 did

not contain information on household expenditure. The commune questionnaires were used to collect basic information on communes' living standard including economic, social issues, infrastructure, etc.

The surveys covered 400 communes in the Program 135-II. In each commune, one village was randomly selected, and each selected village, 15 households were selected for interview. Thus the number of households covered in the 2007 BLS is 6,000. The 2012 ELS followed these households, and there are 5,668 households covered in the 2012 ELS. Other households were migrating and could not be tracked. In this study, we use the panel data of 5,668 households.

One important feature of this survey is that it is representative for the poor in the Program 135-II. There are a large proportion of ethnic minorities households surveyed. Thus BLS 2007 allows for analysis of small ethnic minorities, while VHLSSs do not. Table 3.1 presents the number of households in the panel data by ethnic minority groups.

Table 3.1. The number of households in the panel data by ethnic minority groups

Groups	Frequency	Percent	Cumulative
Kinh	1,158	20.44	20.44
Tay	739	13.04	33.48
Thai	545	9.62	43.1
Muong	485	8.56	51.66
Nung	283	4.99	56.65
H'mong	783	13.82	70.47
Dao	557	9.83	80.3
Khmer	114	2.01	82.32
Hre	120	2.12	84.43
Ba Na	88	1.55	85.99
Co Tu	90	1.59	87.58
Others	706	12.42	100
Total	5,668	100	

Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

4. Poverty and Income Inequality of Ethnic Minorities

4.1. Income poverty

In this study, poverty is defined based on per capita income and income poverty line. A household is defined as the poor if their per capita income is below the income poverty

line. The income poverty line is 2,400 thousand VND/person/year in the price of 2006. This is the national poverty line set up by the government for the period 2006-2010. We adjust this line to the price of January 2007 and 2012.

Figure 4.1 shows that the poverty rate decreased from 51 percent to 45 percent during the period 2007-2012. Poverty mainly decreased among all ethnic minority group except Thai. Ba Na and H'Mong are two groups experiencing the highest speed in poverty reduction (decrease by more than 20 percent). In 2012, ethnic groups with the highest poverty rates are H're (63 percent), Co Tu (62 percent), H'Mong (61 percent). Khmer and Kinh have the lowest poverty rate, 27 percent and 30 percent respectively.

Although Kinh has lower poverty incidence, their poverty reduction decreased from 34% to 30% during this period. This finding is different from the finding at the national level: Kinh household experienced a faster rate of poverty reduction during the last decade than ethnic minorities. One reason is that the households sampled in this study are from poor communes in the 135 program areas. The gap between Kinh and ethnic minorities in these areas is smaller than the gap between Kinh and ethnic minorities at the national level.

Figure 4.1. Poverty rate in 2007 and 2012
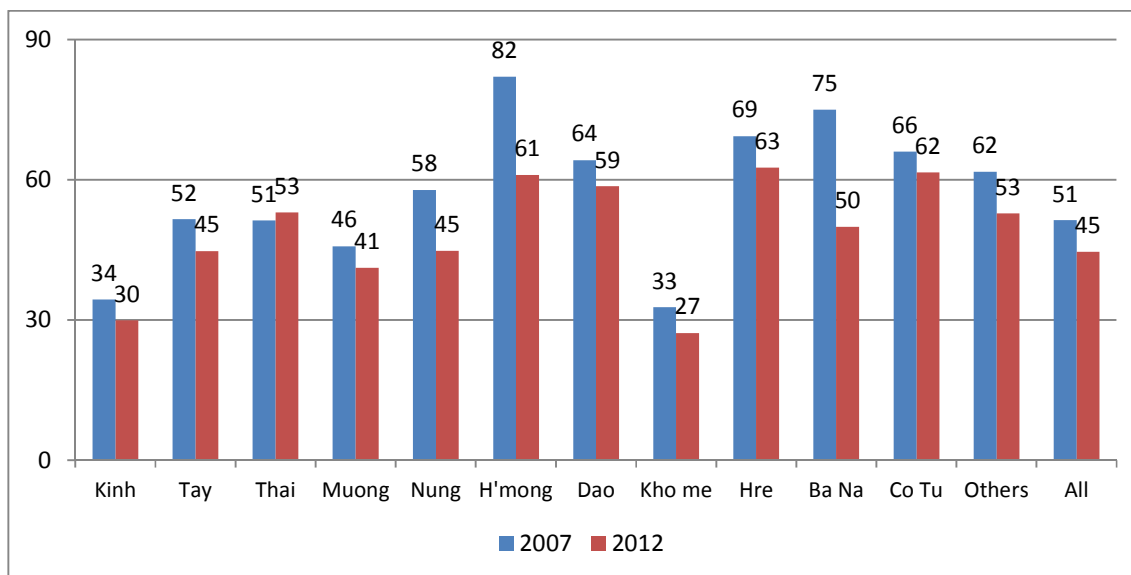
The poverty gap and severity indexes are presented in Table 4.1.[1] There is almost no success in reduction of the poverty depth and severity during the period 2007-2012.

---

[1] Detailed description of poverty measures is presented in Appendix.

The point estimate of the poverty gap index is even increased. There is a large variation in the poverty gap and severity among ethnic minorities. There is an increase in the poverty gap and severity among several ethnic minority groups such as Thai, Muong, Dao, Hre and Co Tu. Although Ba Na and H'Mong households were those who still had high poverty depth and severity in 2012, they were very successful in decreasing the poverty depth and severity during 2007-2012.

Table 4.1. Poverty gap and severity indexes

Ethnic groups	Poverty gap index (%)			Poverty severity index (%)		
	2007	2012	Change	2007	2012	Change
Kinh	12.0	12.8	0.8	6.6	8.2	1.6
Tay	17.5	17.4	-0.1	8.6	9.4	0.8
Thai	20.8	24.6	3.8	10.8	15.3	4.5
Muong	15.6	18.4	2.8	7.2	11.4	4.2
Nung	19.6	15.9	-3.7	9.3	8.4	-0.9
H'mong	33.0	24.8	-8.2	17.2	13.8	-3.4
Dao	23.3	26.4	3.1	11.9	15.7	3.8
Khmer	14.1	10.5	-3.6	8.2	6.3	-1.9
Hre	23.7	27.1	3.4	11.2	15.7	4.5
Ba Na	29.3	16.2	-13.1	16.6	8.5	-8.1
Co Tu	23.2	30.7	7.5	11.5	20.2	8.7
Others	26.2	21.3	-4.9	15.1	12.3	-2.8
Total	18.6	18.2	-0.4	9.8	10.8	1.0

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

4.2. Multidimensional Poverty

Besides the approach of assessing poverty based on income, this study also uses the methodology used by Alkire and Foster (2007, 2011) to measure multi-dimensional poverty. A household is defined as the poor if they lack several dimensions of welfare. Detailed description of the method is presented in Appendix. In this study, the multidimensional poverty index (MPI) is defined based on the six following dimensions: education, health, employment, housing condition, assets, and social inclusion. We select these dimensions based on the importance of the dimensions mentioned in Vietnam law and policies, and empirical studies on multidimensional poverty in other countries (e.g., Alkire and Foster, 2007, 2011), and also the availability of data.

Each dimension is measured by several indicators (denoted by I_k). The definition and mean of indicators are presented in Table 4.2. There are 17 indicators (K=17). All the

indicators are binary. An indicator of a household is equal to 1 if the household lacks that indicator. For example, if a household has a person aged above 9 with illiteracy, this indicator of the household is equal to 1.

Table 4.2. Poverty dimensions and indicators

Dimension	Sub-indicators (all dummy variables)	2007	2012	Change	Weight
	Households have a person aged above 9 with illiteracy	0.4571	0.4641	0.0070	1/18
Education	Households have a child 7-14 not attending school	0.1237	0.0671	-0.0566	1/18
	Households have a person aged above 14 without primary school	0.6578	0.6527	-0.0051	1/18
Health	Households have a person who were sick during the past 4 weeks	0.2661	0.2895	0.0234	1/12
	Households have a person without health insurance	0.5051	0.6191	0.1139	1/12
Employment	Households have a person with working hours per week less than 35	0.8418	0.7117	-0.1301	1/6
	Per capita areas less than 8 m2	0.2480	0.1443	-0.1037	1/30
Living condition	Households do not have toilet	0.3409	0.2756	-0.0652	1/30
	Households do not have clean water	0.3271	0.3296	0.0025	1/30
	Households live in a temporary house	0.3428	0.2145	-0.1283	1/30
	Households do not have electricity	0.2404	0.1252	-0.1152	1/30
	Households do not have a color television	0.4354	0.2307	-0.2047	1/18
Assets	Households do not have a motorbike	0.4886	0.2838	-0.2048	1/18
	Households do not have a electric fan	0.4548	0.4609	0.0061	1/18
	Households do not know the Program 135	0.5047	0.6255	0.1209	1/18
Social participation	Households live in village without village meetings	0.7031	0.5016	-0.2016	1/18
	Households do not attend village meetings	0.7366	0.5506	-0.1860	1/18

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

In Alkire and Foster (2007, 2011), the poverty cut-off L is set equal to 1/3. In this study, we also this cut-off level, and other two cut-off levels, 0.2 and 0.4, to examine whether the poverty ranks of ethnic minority groups are sensitive to the poverty cut-off levels.

Tables in Appendix present the estimates of the headcount ratio (H) and the intensity of poverty (A) of ethnic minority household during 2007-2012 using the three poverty cut-off levels, respectively. The MPI is presented in Table 4.3. It shows that multi-dimensional poverty of every ethnic group decreased during the period 2007-2012 regardless of the poverty cut-off levels used. For Thai group, poverty rate by income did not decrease but multi-dimensional poverty rate decreased substantially. Multi-dimensional poverty rate of Ba Na and Co Tu groups decreased to a large extent. For H'Mong, the rate of decrease in poverty rate by income is stronger than the rate of decrease in multi-dimensional poverty rate. Tay and Muong groups have low multi-dimensional poverty rates, both at 16 percent; this rate is even lower than their Kinh

counterpart in P135-II areas. Khmer group has low poverty rate by income (27 percent) but its multi-dimensional poverty rate is relatively high (43 percent) as compared to other ethnic groups.

Figure 4.2. Multidimensional poverty index
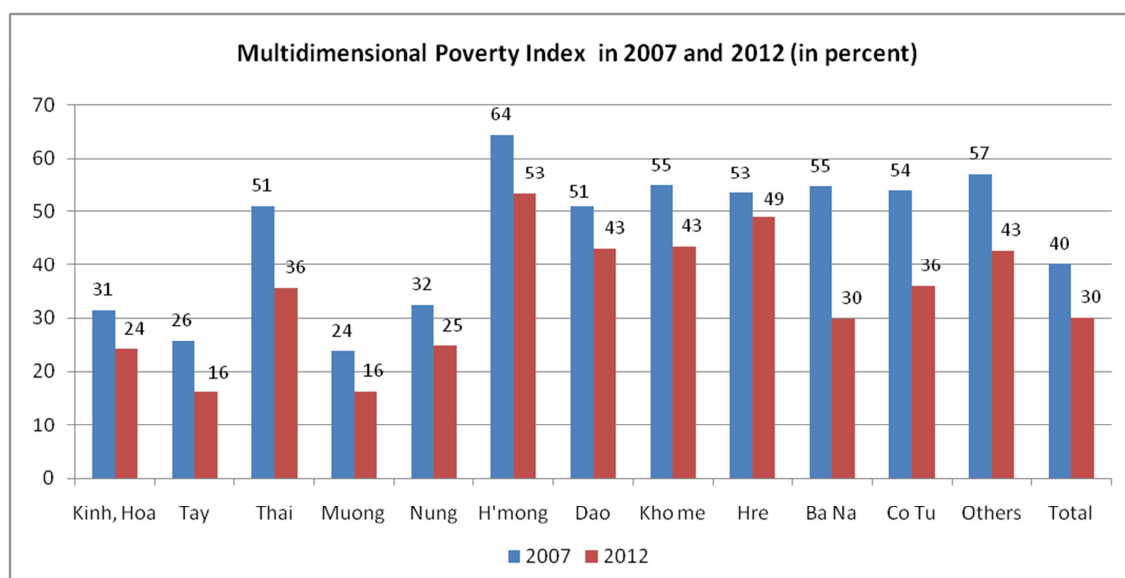
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Income and living standards have strong correlation. However, an increase in income does not necessarily mean an improvement in living standard. A household can be poor by income measurement but not multi-dimensionally poor and vice versa. Ba Na households are those who are the most successful in reducing both income poverty and multidimensional poverty. However, several households are very successful in income poverty reduction but less successful in multi-dimensional poverty reduction such as H'Mong households. Some households such as Thai are more successful in reducing multi-dimensional poverty than income poverty. Therefore, classification of poor households needs the combination of income and other factors that reflecting living standard.

Table 4.3. The multidimensional poverty index

Ethnic groups	Cut-off = 0.2			Cut-off = 1/3			Cut-off = 0.4		
	2007	2012	Change	2007	2012	Change	2007	2012	Change
Kinh	42.1	35.3	-6.8	31.3	24.0	-7.3	19.5	11.2	-8.3
Tay	39.9	30.6	-9.3	25.6	16.2	-9.4	15.3	7.4	-7.9
Thai	56.1	44.9	-11.2	50.8	35.5	-15.3	45.3	24.5	-20.8
Muong	35.4	29.8	-5.6	23.7	16.2	-7.6	14.6	8.1	-6.5
Nung	42.6	38.3	-4.3	32.4	24.6	-7.8	24.1	14.3	-9.8
H'mong	64.6	57.9	-6.7	64.3	53.3	-11.0	62.5	49.0	-13.6

Ethnic groups	Cut-off = 0.2			Cut-off = 1/3			Cut-off = 0.4		
	2007	2012	Change	2007	2012	Change	2007	2012	Change
Dao	55.8	48.8	-7.0	50.9	43.0	-7.9	44.6	32.6	-12.0
Khmer	58.8	48.6	-10.2	54.9	43.5	-11.4	51.9	32.9	-19.0
Hre	53.6	51.0	-2.6	53.3	48.8	-4.5	47.2	32.9	-14.3
Ba Na	56.7	42.4	-14.3	54.7	29.8	-24.8	49.9	23.0	-26.9
Co Tu	55.7	41.3	-14.4	53.8	36.0	-17.8	47.4	26.1	-21.4
Others	59.0	49.0	-10.0	56.9	42.6	-14.3	51.3	33.8	-17.5
Total	**48.6**	**40.5**	**-8.1**	**40.0**	**30.0**	**-10.0**	**31.0**	**19.0**	**-12.0**

Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

4.3. Income inequality

To measure inequality, we use three common measures of inequality: the Gini coefficient, Theil's L index of inequality, and Theil's T index of inequality. Higher values of inequality indexes means higher inequality in income distribution across households. Detailed presentation of inequality measures is put in Appendix. Figure 4.3 presents the Lorenz curve of income distribution in 2007 and 2012, and it shows the income inequality increased over this period.

Figure 4.3. Income Lorenz curve 2007-2012

All households	Ethnic minority households
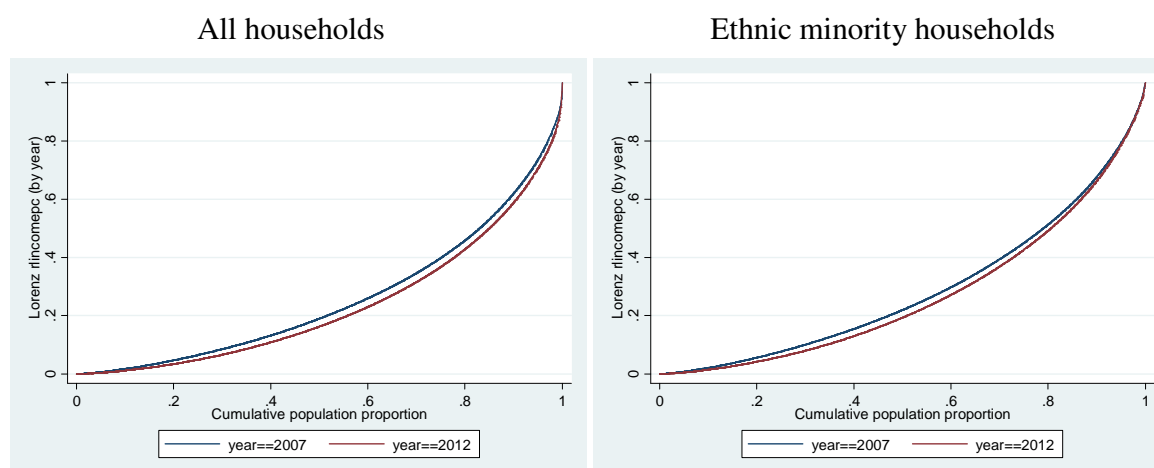
Inequality in income among ethnic groups tends to increase. In 2007, average income of the 10 percent richest households was 8 times higher than the 10 percent poorest households. In 2013, this figure reached 13 times. Gini – the index measuring the level of inequality in income increased from 0.48 to 0.53 during the same period. Gini index of every ethnic group increased (Figure 4.4). Other inequality measures also show

11

the increasing income inequality overtime time (Table 4.4). Inequality within ethnic groups is highest for Kinh households, followed by Tay and Muong. Ba Na and H'Mong have lowest income inequality.

Figure 4.4. Income Gini index
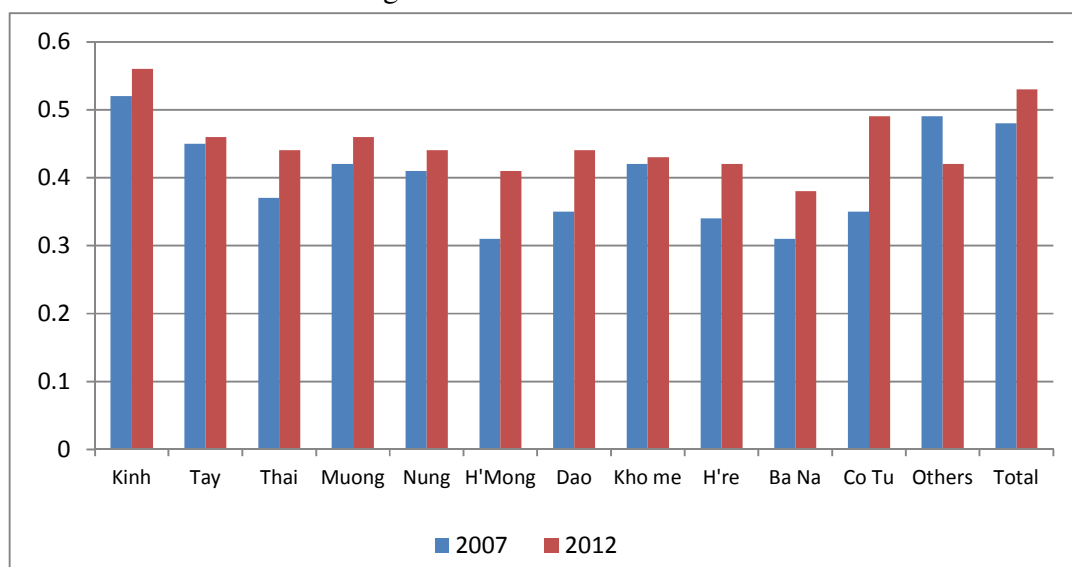
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012

Table 4.4. Income inequality in 2007-2012

Group	2007			2012		
	Theil's L	Theil's T	Gini	Theil's L	Theil's T	Gini
Kinh	0.490	0.678	0.518	0.598	0.766	0.565
Tay	0.344	0.369	0.447	0.384	0.402	0.464
Thai	0.239	0.232	0.375	0.363	0.323	0.437
Muong	0.293	0.319	0.418	0.405	0.359	0.457
Nung	0.279	0.296	0.409	0.338	0.326	0.440
H'mong	0.154	0.159	0.307	0.290	0.308	0.410
Dao	0.207	0.206	0.350	0.346	0.338	0.441
Khmer	0.334	0.288	0.417	0.332	0.315	0.425
Hre	0.187	0.214	0.337	0.319	0.315	0.423
Ba Na	0.171	0.150	0.308	0.261	0.230	0.378
Co Tu	0.206	0.213	0.353	0.444	0.429	0.487
Others	0.282	0.267	0.397	0.321	0.309	0.422
All	0.409	0.534	0.483	0.512	0.630	0.528

Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012

To understand the reason for the arising inequality, we decompose the inequality measured by Theil's L index by inequality between ethnic groups and inequality within ethnic groups.[2] Table 4.5 shows that the income inequality comes primarily from income

---

[2] The decomposition using Theil's T index gives similar results. Thus we do not present the Theil's T decomposition in this report.

inequality within ethnic minority groups. The within income inequality accounts for 81.4% and 82.8% of the total inequality in 2007 and 2012, respectively. The increase in inequality within ethnic groups is also the mean reason for the increase in total inequality during 2007-2012. The income inequality between ethnic groups only contributes less than 20% to the total inequality.

When Kinh households are excluded from the analysis, the result is also similar. Income inequality within ethnic minorities is the main source of the total income inequality of ethnic minorities. Income inequality between ethnic minorities accounts only around 7.5% of the total income inequality, and this component was decreased during 2007-2012.

Table 4.5. Income inequality decomposition by ethnic minority group (Theil's L)

	All households			Ethnic minority households		
	2007	2012	Absolute change	2007	2012	Absolute change
Total Inequality of households, of which	0.409 (100%)	0.512 (100%)	0.103 (100%)	0.292 (100%)	0.366 (100%)	0.074 (100%)
Inequality between ethnic groups	0.076 (18.7%)	0.088 (17.2%)	0.012 (11.6%)	0.036 (12.3%)	0.027 (7.5%)	-0.009 (-11.5%)
Inequality within ethnic group	0.333 (81.4%)	0.424 (82.8%)	0.091 (88.4%)	0.256 (87.7%)	0.339 (92.5%)	0.082 (111.5%)

Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012

In Table 4.6, we decompose the income inequality measured by the Gini index by income source. The decomposition results are quite similar for 2007 and 2012, and we use the 2012 result for interpretation. There is very high inequality in non-farm income and wage income than farm income. It means that nonfarm income and wage income accrue to few households. The farm income inequality is low since most households rely on farm income. However, since farm income account for the largest share of total income, the farm income inequality also account for the largest source of the total income inequality. Interestingly, increasing farm income for all households by one percent will lead to a 0.18 percent reduction in the total income inequality. On the contrary, increasing non-farm income and wage income by one percent can cause the total income inequality increased 0.08% and 0.04%, respectively.

Table 4.6. Gini decomposition by income sources: all households

Sources	Share of income in total income	The Gini of income source	Gini correlation of income source with total income	Contribute to total Gini	Elasticity of total Gini to change in income source
	Sk	Gk	Rk	Share	% Change
2007					
Wage income	0.2111	0.8264	0.7036	0.2874	0.0763
Non-farm income	0.0656	0.9517	0.7310	0.1068	0.0412
Farm income	0.5808	0.4274	0.6987	0.4061	-0.1746
Other income	0.1503	0.8356	0.6252	0.1839	0.0336
Total income	1	0.4271		1	
2012					
Wage income	0.2827	0.8012	0.7603	0.3590	0.0763
Non-farm income	0.0584	0.9712	0.7881	0.0932	0.0348
Farm income	0.5205	0.5186	0.7119	0.4005	-0.1199
Other income	0.1444	0.8044	0.5675	0.1374	-0.0070
Total income	1	0.4798		1	

Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012

Table 4.7 presents the decompostion of Gini index by income source for ethnic minorities (Kinh households are excluded). The results are very similar to those in Table 5.6. Non-farm income and wage income inequality is higher than farm income inequality, but farm income inequality contributes largely to the total income inequality.

Table 4.7. Gini decomposition by income sources: ethnic minority households

Sources	Share of income in total income	The Gini of income source	Gini correlation of income source with total income	Contribute to total Gini	Elasticity of total Gini to change in income source
	Sk	Gk	Rk	Share	% Change
2007					
Wage income	0.1870	0.8354	0.7085	0.2764	0.0894
Non-farm income	0.0463	0.9593	0.7265	0.0806	0.0343
Farm income	0.6414	0.3843	0.7534	0.4637	-0.1777
Other income	0.1277	0.8295	0.6589	0.1742	0.0466
Total income	1	0.4005		1	
2012					
Wage income	0.2561	0.8124	0.7572	0.3467	0.0906
Non-farm income	0.0319	0.9838	0.8019	0.0553	0.0235
Farm income	0.5812	0.4764	0.7520	0.4582	-0.1230

Sources	Share of income in total income	The Gini of income source	Gini correlation of income source with total income	Contribute to total Gini	Elasticity of total Gini to change in income source
	Sk	Gk	Rk	Share	% Change
Other income	0.1328	0.7903	0.5906	0.1364	0.0036
Total income	1	0.4544		1	

5. Income, livelihood and living conditions

5.1. Income and livelihood

Increase in income is one of the ultimate goals of poverty reduction programs. Income is an important indicator of living standard and well-being of households, especially for households in extremely difficult communes of Vietnam. This section looks into the change in income level and examines income-generating sources and economic activities for each ethnic group in extremely difficult communes of the country.

Table 5.1. Income per capita (thousand VND) and the number of income sources

Group	Per capita income (thousand VND)			The number of income sources		
	2007	2012	Change	2007	2012	Change
Kinh	10133.2	12402.3	2269.1	4.9	3.9	-1.0
Tay	7247.2	7979.1	731.9	6.4	5.3	-1.1
Thai	5847.5	6062.8	215.3	6.2	5.1	-1.1
Muong	7321.8	8440.4	1118.6	6.1	4.5	-1.6
Nung	6514.8	8464.2	1949.4	6.7	5.6	-1.1
H'mong	3735.8	5527.7	1791.9	6.6	5.3	-1.3
Dao	5061.1	5862.9	801.8	6.7	5.1	-1.6
Khmer	9433.9	11357.2	1923.3	3.1	2.7	-0.4
Hre	4719.6	5217.2	497.6	6.0	3.6	-2.4
Ba Na	4168.9	7451.7	3282.8	5.1	5.1	0.0
Co Tu	5001.4	5673.9	672.5	6.4	5.7	-0.7
Others	5295.6	6598.4	1302.8	5.5	5.0	-0.5
Poverty						
Poor	2932.8	5997.2	3064.4	5.7	4.7	-1.0
Non poor	11368.1	11408.9	40.8	5.5	4.4	-1.1
Region						
North	6662.4	8385.6	1723.2	6.3	5.2	-1.1
Central	6822.3	8249.6	1427.3	5.4	4.4	-1.0
South	10153.8	10903.7	749.9	3.6	2.8	-0.8

Group	Per capita income (thousand VND)			The number of income sources		
	2007	2012	Change	2007	2012	Change
Total	**7408.0**	**8868.3**	**1460.3**	**5.6**	**4.5**	**-1.1**

Note: The income is measured in the price in January 2012.
The income sources include incomes from rice, annual crops, perennial crops, fruit, livestock, agricultural service, forestry, wage, nonfarm, and other sources.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Every ethnic group experienced an increase in income level over the period 2007-2012. This increase indicates that the standard of living had improved for every ethnic group. Ba Na group demonstrated the highest level of income increase with a 78.7 percent increase in income from 2007, an equivalent of 3282.8 thousand VND increase. The second highest group is the Nung with 30 percent increase in income. Thai and H're are two groups with the lowest increase in income, with the percentage standing at 3.7 percent and 10.5 percent respectively.

In absolute terms, the majority group earned the highest at 12.4 million VND/per head/per year in 2012. The majority earned an income on average at least two times higher than the H'mong, the Co Tu, the Dao, the H're, the Thai. The Khmer ranked after the ethnic majority, followed by the Muong, and Nung. This suggests a strong correlation, though not a causal link, between assimilation to the Kinh majority and average income level. It is notable that the number of income sources had declined across all studied ethnic groups except the Ba Na. This reduction in number of income sources implies the tendency to focus on a smaller number of activities of households in economically disadvantaged regions instead of widely diversifying over a broad range of livelihood activities.

Table 5.2. Per capita income and income shares by income sources

Groups	2007		2012		Change	
	VND	%	VND	%	VND	%
Kinh						
Agricultural income	3850.0	38.0	4168.6	33.6	318.6	-4.4
Crop	2346.7	23.2	2969.0	23.9	622.3	0.8
Livestock	767.9	7.6	1038.5	8.4	270.6	0.8
Others	735.5	7.3	161.1	1.3	-574.4	-6.0
Wages	2745.3	27.1	4107.5	33.1	1362.2	6.0
Nonfarm income	1306.4	12.9	1908.4	15.4	602.0	2.5
Other income	2231.5	22.0	2217.8	17.9	-13.7	-4.1
Total	**10133.2**	**100.0**	**12402.3**	**100.0**	**2269.1**	**0.0**
Ethnic minorities						
Agricultural income	3609.8	48.7	3910.9	44.1	301.1	-4.6
Crop	2532.2	34.2	2657.6	30.0	125.4	-4.2
Livestock	600.7	8.1	743.4	8.4	142.7	0.3
Others	476.9	6.4	509.9	5.7	33.0	-0.7

Groups	2007		2012		Change	
	VND	%	VND	%	VND	%
Wages	1365.2	18.4	2038.7	23.0	673.5	4.6
Nonfarm income	402.7	5.4	378.6	4.3	-24.1	-1.2
Other income	862.9	11.6	1026.2	11.6	163.3	-0.1
Total	**7408.0**	**100.0**	**8868.3**	**100.0**	**1460.3**	**0.0**

Note: The income is measured in the price in January 2012.

Agriculture remains the most important income source for households in mountainous and economically disadvantaged regions of Vietnam. Over the period 2007-2012, income generated from agricultural activities increased in absolute values but its share in total household income declined across most of ethnic groups. By 2012, income from agricultural activities accounted for 44.1 percent of total income for the ethnic minorities and 33.6 percent for the Kinh. Respectively, the share for agricultural activities decreased by 4.4 percent for the Kinh majority and 4.6 percent for the minorities.

Income from wage had become increasingly important for households at extremely difficult communes. Wage earnings might have come from hiring work for other households or seasonal jobs. Over the period 2007-2012, income from wage had increased in the share of total income by 6 percent for the Kinh and 4.6 percent for the minorities. Khmer and Ba Na were the only two ethnic groups with a decrease in share of wage in total income. Tay, and Co Tu groups experienced the highest increase in share of wage, at 13.1 percent and 10.8 percent respectively. By region, a notable increase in wage share of approximately 8 percent was shown for the groups in the north and the central of the country except the south. This situation indicates that ethnic groups in the south do not rely on wage and employment opportunities.

Nonfarm income took up a significant part for the Kinh but this source of income was rather negligible for the ethnic minorities. This situation rests among the major difference in income structure between the ethnic minorities and the ethnic majority. Among three geographical regions, the south experienced the highest increase in share of nonfarm income as compared to the other regions.

5.2. Land holdings

With high dependence on agricultural activities, land presents the most important asset for the ethnic minorities living in the extremely difficult communes. Our study provides information on land holdings of households in these areas. Table 5.3 presents the per

capita area of annual crop land (excluding paddy land) and the per capita area of paddy land. In general, households allocate their biggest land areas for rice and other annual crops. However, there is a great variation in annual crop land use patterns among ethnic groups and regions. Rice remains the primary staples of households, in particular for the Kinh, Tay. For some ethnic minority groups such as Co Tu, Muong and Hre the paddy land area is much smaller than other ethnic minority groups. An important issue of crop lands is quality of land. However, measuring the fertility of the land is difficult, and there is no information on land fertility in the surveys.

Table 5.3. Per capita annual crop land and paddy land

Groups	Per capita annual crop land (m2)			Per capita paddy land (m2)		
	2007	2012	Change	2007	2012	Change
Kinh	5162.1	4589.1	-573.0	4769.4	4654.4	-115.0
Tay	3846.6	3622.1	-224.5	3840.2	3241.6	-598.6
Thai	8842.1	9747.7	905.6	4757.1	4343.3	-413.8
Muong	3901.2	3997.0	95.8	2796.4	2669.9	-126.5
Nung	4794.3	5986.5	1192.2	3954.6	2982.6	-972.0
H'mong	12005.5	10105.3	-1900.2	4681.1	3547.8	-1133.3
Dao	8114.7	6973.3	-1141.4	4262.3	3673.5	-588.8
Khmer	5554.7	5219.9	-334.8	9781.7	8173.6	-1608.1
Hre	6495.8	3602.0	-2893.8	4580.9	2969.5	-1611.4
Ba Na	11586.4	12807.9	1221.5	5650.2	5627.7	-22.5
Co Tu	7603.9	13913.5	6309.6	4965.2	2574.9	-2390.3
Others	10024.0	11523.8	1499.8	4239.0	3954.6	-284.4
Poverty						
Poor	5562.7	5888.3	325.6	3468.3	3176.5	-291.8
Non poor	7577.5	6951.9	-625.6	5935.3	5190.0	-745.3
Region						
North	6981.3	6739.9	-241.4	3571.3	3151.6	-419.7
Central	4986.8	5704.8	718.0	3390.1	2825.7	-564.4
South	7411.2	6449.5	-961.7	9624.1	8805.9	-818.2
Total	6636.4	6454.7	-181.7	4783.5	4249.9	-533.6

Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Figure 5.1: Land areas in 2012 by ethnic groups
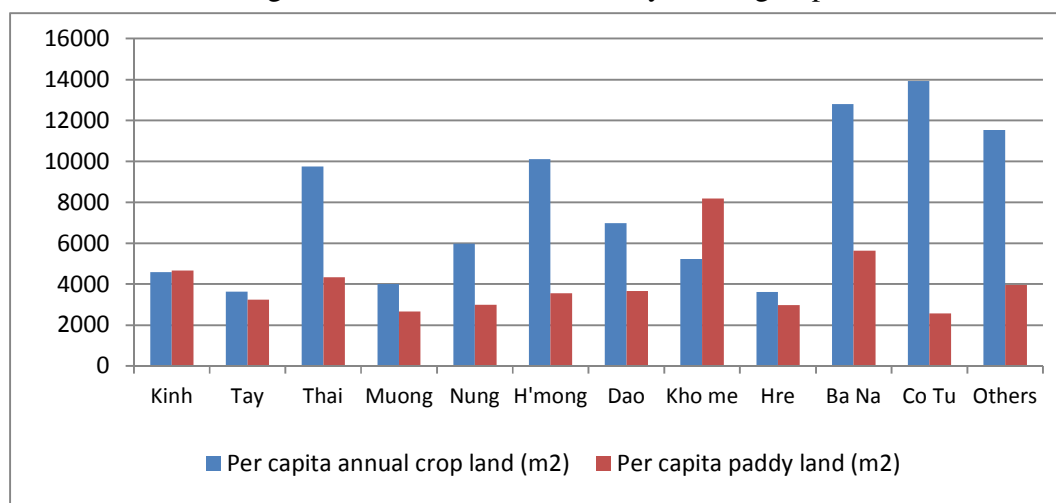
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Perennial crops do not represent a highly important source of income for most ethnic groups in the Northern Uplands. Except for the Tay, the remaining ethnic groups in the Northern Upland areas experienced a reduction in per capita perennial crop land areas. Among the ethnic groups in the Northern Uplands region, the Kinh, Tay, and Dao had the largest perennial crop land areas in 2012. It is noted that tea was one of key perennial crop of the Dao. The Khmer possessed the least area of perennial crop land, of 95.7 m^2 per capita. As the Khmer resides mostly in the Mekong River Delta, agricultural activities of this group rely heavily on rice. The Co Tu, mostly residing on the Northern Central region and South Central coastal region, demonstrated a remarkable increase by 5382.3 m^2 with regard to possession of perennial crop land. In contrast, the H're, populated in the Central Highlands and the South Central Coastal region, experienced the most dramatic drop in perennial crop land ownership of 4037 m^2 per capita. Further studies are required to look more in-depth into the reasons behind these changes in land holdings for each ethnic minorities and how the changes affected their modes of livelihood and standard of living.

Table 5.4. Per capita perennial crop land and forestry land

Groups	Per capita perennial crop land (m2)			Per capita forestry land (m2)		
	2007	2012	Change	2007	2012	Change
Kinh	2268.0	2047.8	-220.2	2988.9	2481.7	-507.2
Tay	833.3	2301.0	1467.7	11897.0	7847.4	-4049.6
Thai	937.5	882.3	-55.2	7650.6	1576.6	-6074.0
Muong	1739.6	995.3	-744.3	8907.3	5732.0	-3175.3
Nung	2125.7	1452.4	-673.3	10887.4	5397.0	-5490.4
H'mong	579.2	325.6	-253.6	5496.4	2216.0	-3280.4
Dao	2009.6	1895.1	-114.5	22744.4	10411.4	-12333.0

19

Groups	Per capita perennial crop land (m2)			Per capita forestry land (m2)		
	2007	2012	Change	2007	2012	Change
Khmer	426.4	95.7	-330.7	0.0	0.0	0.0
Hre	4924.7	887.7	-4037.0	5382.8	7095.3	1712.5
Ba Na	731.7	1747.0	1015.3	654.4	1499.5	845.1
Co Tu	332.1	5382.3	5050.2	2499.9	9716.8	7216.9
Others	2898.5	2998.4	99.9	7060.3	2103.0	-4957.3
Poverty						
Poor	1118.8	1085.7	-33.1	7480.3	3803.3	-3677.0
Non poor	2103.2	2020.3	-82.9	6237.2	3599.7	-2637.5
Region						
North	969.5	1207.8	238.3	9747.1	5117.5	-4629.6
Central	3826.7	2757.8	-1068.9	5530.4	3434.1	-2096.3
South	1222.5	1392.7	170.2	21.9	0.0	-21.9
Total	1643.4	1583.4	-60.0	6817.9	3694.9	-3123.0
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.						

Forestry accounts for the majority of ethnic minority land holdings in extremely difficult communes. However, income from forestry remains modest. Most ethnic groups possess a certain area of forestry land except for the Khmer that has no forestry land endowment. There was a reduction in forestry land holdings across most of ethnic groups in the Northern Uplands region. Among these ethnic groups, the Dao was endowed with the largest land holdings despite the substantial decrease over the period 2007-2012. In contrast, the H're, Ba Na and Co Tu, the three big ethnic groups in the Central Highlands and the South Central Coastal region, indicated an increase in per capita forestry land, making their lands holding comparable to those in the North West regions. In particular, the Co Tu experienced a 7216.9 m^2 increase. These changes might indicate a gradual change for the ethnic groups in the Central and South Central Coastal region as they would develop forestry activities as another important form of livelihood.

5.3. Employment

Employment is one of the most important economic factors and employment-related factors such as labor market participation plays a central role in formulation of poverty reduction policy and programs. This part provides information on labor participation and labor allocation in extremely difficult communes of Vietnam.

Table 5.5. The proportion of working people and annual working hours

Groups	% working people			Number of annual working hours		
	2007	2012	Change	2007	2012	Change
Kinh	89.7	87.5	-2.2	1338.2	1615.4	277.1
Tay	97.2	93.7	-3.4	1385.2	1851.1	465.9
Thai	97.4	93.9	-3.5	1262.9	1627.4	364.5
Muong	95.6	93.9	-1.6	1523.6	1673.2	149.6
Nung	97.7	96.7	-1.0	1433.7	1796.7	363.0
H'mong	98.8	96.9	-1.9	1706.2	1991.3	285.1
Dao	97.7	96.1	-1.7	1500.2	1745.9	245.7
Khmer	90.8	83.8	-7.1	1457.2	1462.0	4.8
Hre	98.7	94.8	-3.9	676.4	1201.3	524.9
Ba Na	98.0	95.1	-2.9	1480.2	2084.1	603.9
Co Tu	96.2	93.3	-2.9	1183.5	1485.4	302.0
Others	97.0	94.5	-2.5	1312.9	1660.0	347.1
Poverty						
Poor	97.1	94.7	-2.4	1500.2	1819.5	319.4
Non poor	96.7	93.8	-2.9	1130.7	1537.7	407.0
Total	**94.7**	**92.1**	**-2.6**	**1394.0**	**1697.7**	**303.7**

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Employment rates in the poorest communes were generally high across every ethnic groups. For most of ethnic groups, more than 90 percent of people aged 15 – 60 had jobs. Two ethnic groups with the highest income level (the Kinh and Khmer) had the lowest labor participation rate: 87.5 percent and 83.8 percent respectively. The fact employment rates for poorer ethnic groups were higher than the higher-income groups might suggest that people with lower income cannot afford to be out of the labor forces. In addition, poorer ethnic gropus participate more on labor market but their work provides much lower earnings than the better-off groups with lower labor participation rate.

In terms of working hours, the Ba Na and H'mong were two groups with the highest annual working hours per capita in 2012: 603.9 hours and 285.1 hours respectively. These two groups also experienced considerable increase in working hours over the period 2007-2012. Large number of working hours might explain the reasons why these two ethnic groups experienced the highest increase in income level over the period 2007-2012. The lowest number of annual working hours was 1201.3 of the H're, brining it among the ethnic groups with the lowest income increase. It is interesting that annual working hours of the poor was on average 271.8 hours higher than the non-poor.

Table 5.6. The proportion of people working in agriculture and working for wages

	% people working in agriculture			% people working for wages		
	2007	2012	Change	2007	2012	Change
Kinh	64.2	64.3	0.1	38.4	41.0	2.7
Tay	88.0	86.7	-1.4	25.1	25.4	0.2
Thai	92.7	92.5	-0.2	16.9	21.4	4.5
Muong	81.0	80.8	-0.3	35.3	34.5	-0.8
Nung	89.9	91.8	1.9	24.1	20.8	-3.3
H'mong	97.8	97.7	0.0	11.9	22.3	10.4
Dao	93.8	94.7	0.9	15.8	17.0	1.2
Khmer	61.0	63.0	2.0	64.0	58.6	-5.4
Hre	95.7	92.2	-3.6	35.2	42.7	7.5
Ba Na	97.0	97.4	0.4	31.4	31.3	-0.1
Co Tu	93.0	80.6	-12.4	15.7	28.6	12.9
Others	93.7	94.1	0.5	25.1	29.0	4.0
Poverty						
Poor	88.8	87.7	-1.1	21.0	24.5	3.6
Non poor	85.6	85.2	-0.5	31.8	36.8	5.0
Total	**81.8**	**82.5**	**0.6**	**29.4**	**31.4**	**2.0**

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Table 5.6 shows labor allocation for two major income-generating forms of employment within the labor market: agriculture and wage. Being the highest-income groups, the Kinh and the Khmer shared similar labor structure. These two groups indicated a relatively high labor participation in wage employment as compared to other groups: 41 percent for the Kinh and 58.6 percent for the Khmer in 2012. Except for the H're with 42.7 percent of participation in wage employment, the remaining ethnic groups had their participation rate below 35 percent. The Kinh and the Khmer also had a significantly lower labor participation in agricultural activities as compared to remaing ethnic groups. The proportion of people working in agriculture for the Kinh and the Khmer stood at 64.3 percent and 63 percent respectively, while the corresponding figures for their counterparts fluctuated within the range 80 – 97 percent. By poverty status, there exists only a slight different in labor participation in agriculture between the poor and the non-poor. However, the non-poor participates more actively in wage employment by 12.3 percentage point as compared to the poor in 2012.

5.4. Health and Education

Health

Vietnam has done a notable job in increasing health insurance coverage for the ethnic minorities. Health insurance coverage was more than 90 percent for most of the ethnic minority groups except the Khmer, Co Tu, Muong and Tay. While more than 80 percent of the Co Tu, Muong and Tay had health insurance, the Khmer experienced the lowest health insurance coverage at 63 percent, which was slightly lower than that of the ethnic majority. It is notable that the Co Tu experienced a substantial drop in health insurance coverage of 12.4 percentage point over the period 2007-2012 while the remaining ethnic group only showed slight fluctuation.

Table 5.7. The proportion of insured people and healthcare utilization

	% people having health insurance			Annual healthcare contacts		
	2007	2012	Change	2007	2012	Change
Kinh	64.2	64.3	0.1	38.4	41.0	2.7
Tay	88.0	86.7	-1.4	25.1	25.4	0.2
Thai	92.7	92.5	-0.2	16.9	21.4	4.5
Muong	81.0	80.8	-0.3	35.3	34.5	-0.8
Nung	89.9	91.8	1.9	24.1	20.8	-3.3
H'mong	97.8	97.7	0.0	11.9	22.3	10.4
Dao	93.8	94.7	0.9	15.8	17.0	1.2
Khmer	61.0	63.0	2.0	64.0	58.6	-5.4
Hre	95.7	92.2	-3.6	35.2	42.7	7.5
Ba Na	97.0	97.4	0.4	31.4	31.3	-0.1
Co Tu	93.0	80.6	-12.4	15.7	28.6	12.9
Others	93.7	94.1	0.5	25.1	29.0	4.0
Poverty						
Poor	88.8	87.7	-1.1	21.0	24.5	3.6
Non poor	85.6	85.2	-0.5	31.8	36.8	5.0
Region	55.1	60.1	5.0	53.6	49.3	-4.3
North						
Central	91.1	89.4	-1.7	24.8	28.7	3.8
South	73.3	76.0	2.7	33.5	33.9	0.4
Total	**81.8**	**82.5**	**0.6**	**29.4**	**31.4**	**2.0**

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

The proportion of patients receiving reduction/exemption of healthcare fees for each ethnic minority group also reflected their level of access to health insurance. Even though the Khmer experienced the largest increase in proportion of patients receiving reduction/exemption of health fees, the Khmer group still had the lowest proportion of patients receiving reduction/exemption of healthcare fees by 2012. Only 48.4 percent of Khmer patients received reduction/exemption of healthcare fees, the corresponding figures for other ethnic minority groups fluctuates around 80 percent. This disparity can be explained by the fact that the group had the lowest health insurance coverage among all

studied ethnic minority groups. It is therefore important to identify the reasons behind this phenomenon so that support health programs can be designed to improve health access for this disadvantaged ethnic minority group.

Table 5.8. Proportion of patients receiving reduction/exemption of healthcare fees

	2007	2012	Change
Kinh	45.06	45.02	-0.04
Tay	76.67	82.25	5.58
Thai	81.84	69.49	-12.35
Muong	48.20	54.67	6.47
Nung	84.81	83.58	-1.23
H'mong	82.38	85.81	3.43
Dao	74.18	81.37	7.19
Khmer	35.04	48.44	13.40
Hre	87.40	79.18	-8.22
Ba Na	77.89	79.77	1.88
Co Tu	94.83	95.40	0.57
Others	83.19	81.31	-1.88
Poverty			
Poor	72.58	71.42	-1.16
Non poor	66.58	67.31	0.73
Region	38.11	43.74	5.63
North			
Central	70.35	70.32	-0.03
South	57.69	59.48	1.79
Total	**63.55**	**64.46**	**0.91**

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Education

Education is widely found in the literature of development economics as a determining factor of household welfare, labor market participation and earnings. Important aspects of education include education access and quality of education. This study looks into the aspect of education access through a number of traditional indicators: net enrolment rate, years of schooling and literacy rate. At primary education level, H're showed the biggest improvement in net enrolment rate, with an increase of 8.1 percentage point over the period 2007-2012. Most of ethnic groups experienced increase in net enrolment rate except for Tay, Thai, H'mong and Co Tu. In particular, Co Tu group showed the highest drop in net enrolment rate at every basic educational level. Over the period 2007-2012, this group experienced 17.5 percentage point drop in lower secondary education and 11.9 percentage point drop in upper secondary education.

Table 5.9. The net enrolment rate

	Primary school (%)			Lower-secondary school (%)			Upper-secondary school (%)		
	2007	2012	Change	2007	2012	Change	2007	2012	Change
Kinh	93.6	96.6	3.0	79.7	78.5	-1.2	50.7	55.3	4.5
Tay	95.4	94.4	-1.1	85.7	89.5	3.8	53.9	52.6	-1.2
Thai	90.2	89.7	-0.4	70.5	74.7	4.2	27.4	30.2	2.9
Muong	93.5	95.1	1.6	87.7	89.4	1.7	50.3	56.0	5.7
Nung	91.2	91.5	0.3	83.5	75.9	-7.6	46.0	40.1	-6.0
H'mong	71.4	68.7	-2.7	36.2	39.1	2.8	6.0	11.3	5.4
Dao	87.1	88.6	1.5	50.2	61.2	11.0	21.0	19.3	-1.7
Khmer	85.7	91.5	5.8	49.0	68.4	19.4	15.2	29.4	14.2
Hre	86.5	94.6	8.1	54.6	64.0	9.4	12.6	26.4	13.9
Ba Na	82.2	84.4	2.2	42.3	44.5	2.2	0.0	8.9	8.9
Co Tu	85.7	80.9	-4.8	92.1	74.7	-17.5	57.0	45.1	-11.9
Others	84.2	80.8	-3.4	50.3	49.6	-0.6	11.8	22.3	10.5
Poverty									
Poor	85.2	83.3	-2.0	65.4	66.6	1.2	36.0	32.3	-3.7
Non poor	89.9	90.2	0.2	71.3	68.7	-2.6	39.9	45.3	5.4
Region	88.4	93.8	5.5	53.6	65.8	12.2	23.4	32.1	8.7
North									
Central	83.5	83.7	0.2	58.3	62.1	3.8	28.2	26.3	-1.9
South	92.0	91.6	-0.4	72.1	74.0	1.9	41.3	46.2	4.9
Total	**86.9**	**86.7**	**-0.2**	**64.8**	**67.0**	**2.2**	**34.9**	**35.3**	**0.5**

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

H're group showed a relatively large improvement in access to every basic educational level as compared to other ethnic groups, even though their net enrolment rate remained low for secondary education. At both lower secondary and upper secondary education, the Khmer demonstrated the highest increase in net enrolment rates at 19.4 and 14.2 percentage points respectively. Kinh, Nung and Co Tu groups are the only three groups with decrease in net enrolment rate at lower secondary education: 1.2, 7.6 and 17.5 percentage point respectively. At upper secondary school, the percentage of children going to school at the right age remained lower for every ethnic group. The highest rates in 2012 came from Muong, Kinh, Tay (56 percent, 55.3 percent, and 52.6 percent respectively). The lowest net enrolment rate belongs to three groups: Ba Na, H'mong, and Dao. Apart from the Khmer, the H're is the second group with significant rise in net enrolment rate of 13.9 percentage point. Similar to lower secondary education, Nung group experienced a noticeable drop in upper secondary school net enrolment rate of 6 percentage point.

Education access varies across regions. At higher educational level, the regional difference gets larger. The south has higher net enrolment rate at upper secondary school as compared to the central region. At lower secondary school, net enrolment rate for the

south stood at 74 percent, 11.9 percentage point higher than its corresponding counterpart in the central. At upper secondary school, the disparity got larger over the period 2007-2012. By 2012, 46.2 percent of children of the south attended school at the right age while the corresponding figure for the north was 19.9 percentage point lower.

Figure 5.2: Literacy rate by ethnic groups
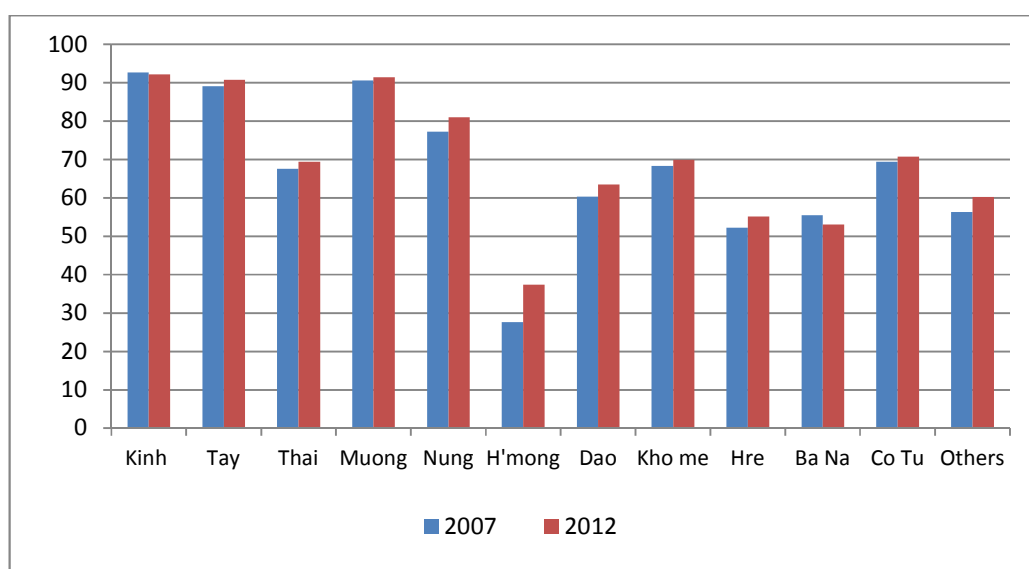
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Literacy rates for population aged 15 and older were the highest for Kinh, Tay, and Muong groups, all above 90 percent in 2012. These ethnic groups also had relatively higher net enrolment rates at every basic education level as compared to other ethnic groups. H'mong group has the lowest literacy rate at 37.4 percent in 2012, even though this group experienced the highest increase in literacy rate over the period 2007-2012. The group with the second lowest literacy rate in 2012 was Ba Na, with 53.1 percent, indicating a 2.4 percentage point decrease from 2007.

Figure 5.5: Number years of schooling by ethnic groups
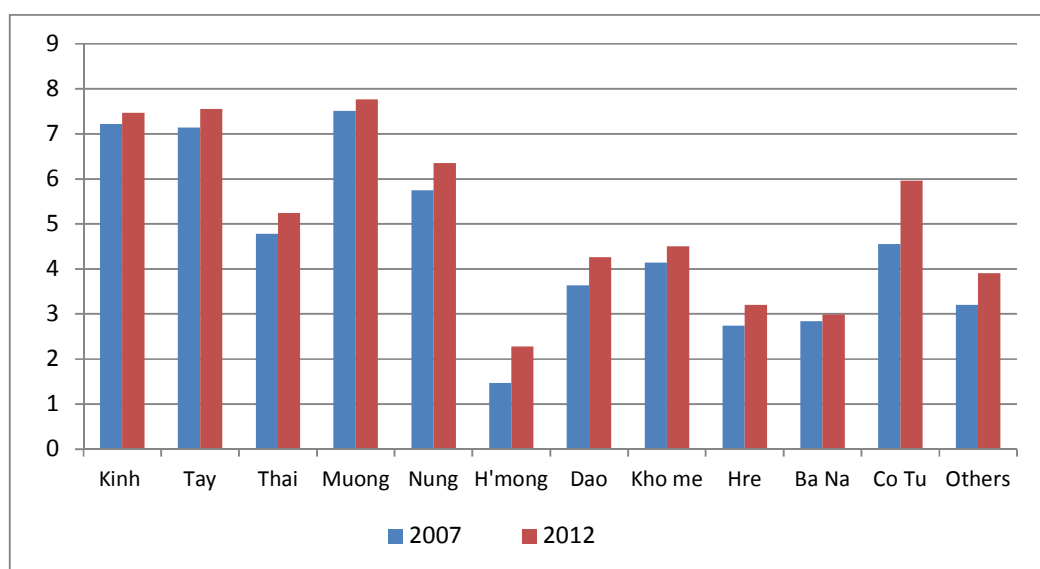
Year of schooling also reflected access to education. The three groups with the highest literacy rate and net enrolment rates also enjoyed the highest number of schooling years. Respectively, numbers of schooling years for the Kinh, Tay, and Muong were 7.47, 7.55, and 7.77 in 2012. H'mong group had the lowest number of schooling years among every ethnic group, of 2.28 years in 2012. This is also the result of extremely low net enrolment rates at every basic educational level of H'mong group. Other ethnic minority groups with low number of schoolings year in 2012 were Ba Na, and H're (2.99 and 3.2 respectively). Co Tu experienced the biggest increase in number of schooling year: 1.41 years over the period 2007-2012. This is a surprising fact, provided that this group has the highest drop in net enrolment rate at every basic educational level. Over the past few years, many development support programs have made tremendous effort in encourage school enrolment at basic education for the ethnic minority groups. Our results show positive progress and outcome in terms of education access. Nevertheless, more attention in education support should be given to the three groups: H'mong, H're, Ba Na in order to promote school enrolment and education quality.

5.5. Living conditions

Housing condition reflects an essential aspect of living standard. Table 5.10 shows that per capita living area for every ethnic group had increased over the period 2007-2012. Housing condition for most of ethnic minority groups had improved, indicated by an increase in the proportion of households with solid/semi-solid houses. It is notable that H'mong was the only ethnic group in the study with a decrease in proportion of households with solid/semi-solid houses over the period 2007-2012. Other ethnic groups showed a progress in housing condition: most notably, Ba Na and Tay groups exprienced significant increase in proportion of households with solid/semi-solid house by 29.8 and 25.0 percentage point respectively. Among extremely difficult communes of Vietnam, Tay, H're, Muong, Nung groups had better housing conditions than the remaining groups. Khmer and H'mong were two groups with the lowest proportion of households with solid/semi-solid houses. By region, housing condition in the south was to a large extent worse-off than housing condition in the north and the central. In 2012, only 54.1 percent of households in the south lived in solid/semi-solid houses while the corresponding figures for the north and the central were above 80 percent.

Table 5.10. Living area and housing type

Groups	Per capita living area (m2)			% households with solid/semi-solid house		
	2007	2012	Change	2007	2012	Change
Kinh	15.0	20.1	5.1	66.0	79.8	13.8
Tay	15.0	22.0	7.0	67.3	92.3	25.0
Thai	11.6	15.4	3.8	73.7	82.1	8.4
Muong	14.0	19.6	5.6	70.6	88.0	17.4
Nung	14.5	21.2	6.7	79.1	89.8	10.7
H'mong	10.1	14.4	4.3	67.3	59.3	-8.0
Dao	13.1	17.4	4.3	66.9	83.0	16.1
Khmer	14.7	22.1	7.4	29.2	46.8	17.6
Hre	11.0	12.6	1.6	85.5	93.4	7.9
Ba Na	7.0	8.3	1.3	56.6	86.4	29.8
Co Tu	8.1	11.2	3.1	68.5	75.5	7.0
Others	9.2	11.5	2.3	62.0	78.8	16.8
Poverty						
Poor	10.8	15.7	4.9	58.8	75.7	16.9
Non poor	15.4	20.5	5.1	70.5	80.9	10.4
Region						
North	12.9	18.9	6.0	71.3	85.0	13.7
Central	12.5	15.8	3.3	74.8	84.3	9.5
South	15.2	19.1	3.9	37.3	54.1	16.8
Total	13.3	18.3	5.0	65.0	78.5	13.5

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Living condition is not only described by housing condition but also greatly affected by water and sanitation access. Inadequate water and sanitation in low-income rural areas had been an enduring problem of developing countries, creating negative impact on health status of the communities. Consequently, recent development policies have put strong emphasis on water and sanitation for the rural and economic hardship areas of developing countries. In general, access to hygienic latrines remained limited across every ethnic minority group. Improvement in access to hygienic latrines took place at the slowest rate for H'mong group; by 2012, only 3.2 percent of H'mong households used hygienic latrines. Co Tu group experienced the most significant improvement in access to hygienic latrine with 63.3 percentage point increase over the five-year period. By 2012, 64.4 percent of Co Tu households used hygienic latrines, the highest rate among all ethnic groups in the extremely difficult communes of Vietnam. Other groups such as the ethnic majority, Tay, Muong, and Khmer also had considerable improvement in access to hygienic latrines over the same period.

With regard to clean water, the Kinh and Khmer have the highest access to clean water: by 2012, 82.1 percent of Kinh households and 97.3 percent of Khmer households used clean water. In contrast to the access to hygienic latrines, the Co Tu indicated the lowest level of access to clean water, with only 2 percent in 2012. The Co Tu's level of access to clean water even declined over the period 2007-2012. Except for the Tay, and the Thai, the remaining ethnic groups experienced deteriorating situation of sanitation in terms of clean water. Especially, H're households showed a striking 32.8 percentage point decrease in access to clean water. Together with the Co Tu, the H'mong, the Dao, and the Thai, the H're is among ethnic groups with the lowest access to clean water. This serious situation of water and sanitation requires adequate attention and support from the Government and development partners, in particularly for the most disadvantaged groups.

By region, households in the south have much better access to clean water as compared to households in the north and the central. In 2012, 96.6 percent of households in the south had access to clean water while the corresponding figures in the north and the central stood at 37 percent and 48.9 percent respectively. This situation was in contrast with housing condition whereby proportion of households with solid/semi-solid houses in the south was significantly lower to those of the north and the central.

Table 5.11: The percentage of households with hyginic latrines and clean water

	% households with hygienic latrine			% households with clean water		
	2007	2012	Change	2007	2012	Change
Kinh	31.0	54.2	23.2	84.8	82.1	-2.7
Tay	15.7	40.7	25.0	44.6	45.9	1.3

	% households with hygienic latrine			% households with clean water		
	2007	2012	Change	2007	2012	Change
Thai	6.0	25.9	19.9	30.6	18.6	-12.0
Muong	21.0	51.7	30.7	58.0	51.7	-6.3
Nung	13.7	32.2	18.5	29.4	40.7	11.3
H'mong	1.7	3.2	1.5	22.0	17.7	-4.3
Dao	8.5	23.2	14.7	16.8	17.1	0.3
Khmer	18.9	47.0	28.1	97.3	97.3	0.0
Hre	2.8	16.7	13.9	48.5	15.7	-32.8
Ba Na	0.0	17.9	17.9	36.4	31.1	-5.3
Co Tu	1.1	64.4	63.3	5.4	2.0	-3.4
Others	2.5	21.4	18.9	26.9	33.3	6.4
Poverty						
Poor	9.1	30.2	21.1	43.4	40.7	-2.7
Non poor	23.3	44.4	21.1	64.7	61.8	-2.9
Region						
North	16.2	37.3	21.1	42.4	37.0	-5.4
Central	14.4	37.8	23.4	50.7	48.9	-1.8
South	20.6	38.8	18.2	93.5	96.6	3.1
Total	16.7	37.7	21.0	54.8	51.9	-2.9

Note: Hygienic latrines include flush, suilabh, and double vault composite latrines. The clean water is defined based on the water sources. Thus clean water includes tap water, water from deep well, well-constructed well, bottled water, rain water and other water with purification.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Apart from income, ownership of durable goods and assets is an important indicator of households' well-being. This study focuses on households' ownership of durable assets including telephone, television and motorbike. Every ethnic group demonstrated a substantial rise in ownership of all three durable goods over the period 2007-2012. This phenomenon implies a positive change on households' financial condition in extremely difficult communes. The most significant change was dramatic increase in households' ownership of telephone, indicating an increase in access to information and telecommunication. Ownership of durable assets for each ethnic group reflects the extent to which their income was increased. The ethnic groups with larger increase in income level tended to have stronger rise in ownership of durable assets such as the Ba Na, the H'mong, the Nung. The H're experienced the slowest improvement in asset ownership, with a 5.9 percentage point increase in color television ownership and 14.6 percentage point increase in motorbike ownership while corresponding figures for remaining groups stood around 20 percentage point.
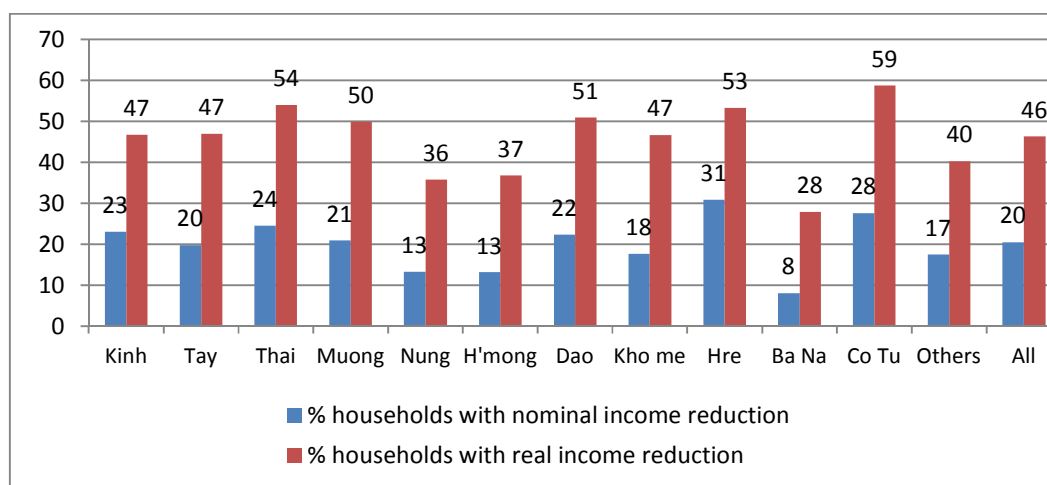
Our analysis indicates a big variation in income level and living standard among different ethnic minority groups that resides on different regions of the country. Certain groups show consistent higher living standard across most of living standard indicators such as housing condition, access to water and sanitation as compared to other groups.

The Kinh majority and ethnic minority groups with high assimilation to the majority experienced higher living standard as compared to other groups. Two groups with the most improvement in income were H're and Ba Na. Nevertheless, these two groups did not show consistently distinct improvement on living standard and welfare indicators over other groups with lower income improvement. The reasons behind the progress made on income improvement and poverty reduction is examined in the following section.

6. The most and the least successul households in income growth

Even though average income of households had increased during the period 2007-2012, our research study shows that 20 percent of households experienced decrease in nominal income (inflation had not been adjusted), and 46 percent of households experienced a decrease in real income (inflation was taken into consideration). Co Tu, Thai and H're groups have the highest proportion of households experiencing a decrease in income. Ba Na, H'Mong and Nung groups have the lowest proportion of households experiencing a decrease in income.

Figure 6.1: Proportion of households experiencing a decrease in income in 2007-2012

To examine who are most or least successful in income growth, we follow Haughton et al. (2001) to define a so-called 'shooting stars' group and 'sinking stones' group. To define these groups, we first classify households into income quintiles in 2007 and income quintiles in 2012. The 'shooting stars' group is defined as households whose position in the income distribution moved up by at least two quintiles between 2007 and 2012. On the

contrary, the 'sinking stones' group includes households whose position in the income distribution moved down by at least two quintiles between 2007 and 2012. Tables 6.1 and 6.2 present the number of 'shooting stars' households (highlighted in green) and the number of 'sinking stones' households (highlighted in red).

Table 6.1: Shooting stars and sinking stones: all households

		Per capita income quintile in 2012					
		Poorest	Near poorest	Middle	Near richest	Richest	Total
Per capita income quintile in 2007	Poorest	513	375	219	152	62	1,321
	Near poorest	357	357	270	205	96	1,285
	Middle	200	278	281	252	131	1,142
	Near richest	156	169	218	265	216	1,024
	Richest	69	79	96	202	414	860
	Total	1,295	1,258	1,084	1,076	919	5,632

Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012

Table 6.2: Shooting stars and sinking stones: ethnic minority households

		Per capita income quintile in 2012					
		Poorest	Near poorest	Middle	Near richest	Richest	Total
Per capita income quintile in 2007	Poorest	466	341	189	132	35	1,163
	Near poorest	320	321	233	173	63	1,110
	Middle	176	244	230	203	85	938
	Near richest	134	134	174	203	140	785
	Richest	44	59	63	130	211	507
	Total	1,140	1,099	889	841	534	4,503

Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012

Figure 6.2 shows that Ba Na, H'Mong and Muong are the three ethnic groups who have the highest proprotion of shooting stars households. Ba Na and H'Mong are also those groups with the lowest proportion of sinking stones households. Hre, Khmer and Thai have the highest proportion of sinking stones households.

Figure 6.2: Shooting stars and sinking stones by ethnic minorities
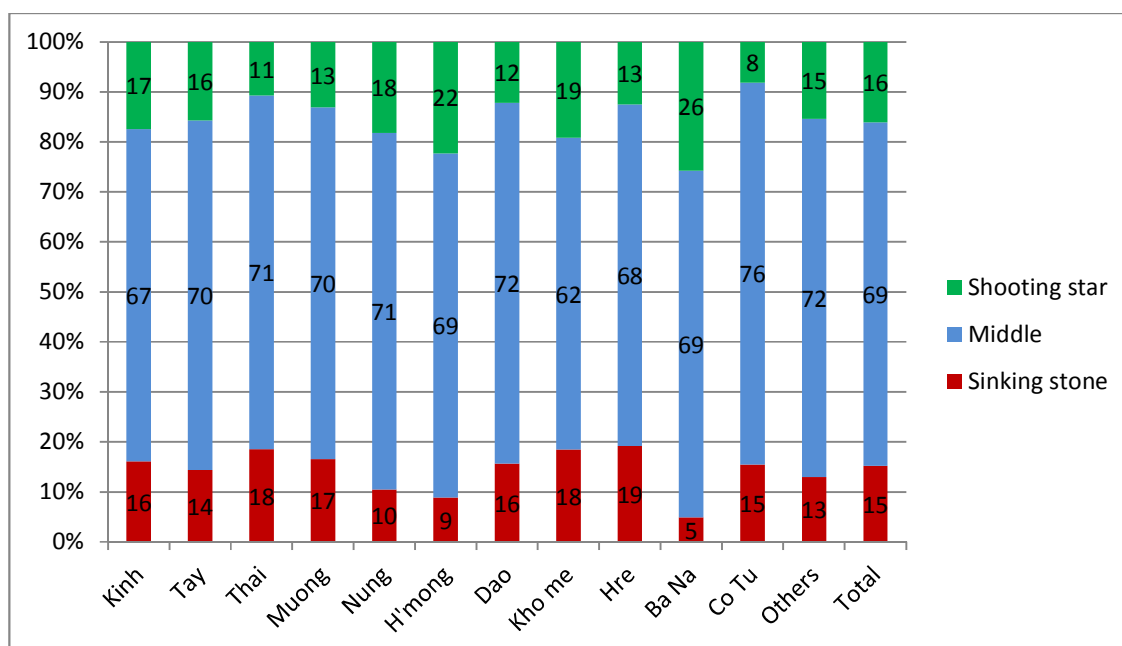
We further examine the success and failure of households in income growth by estimate the income growth rate for all the households, then classified households by quintiles of this income growth rate. Table 6.3 shows that per capita income of the lowest growth households decreased by 68.7%, while per capita income of the lowest growth households incresed by 305.5% during the period 2007-2012.

Table 6.3: Income change 2007-2012

Quintile of income growth	All households				Ethnic minority households			
	Per capita income in 2007 (thousand VND)	Per capita income in 2012 (thousand VND)	Change in income (thousand VND)	Income growth rate (%)	Per capita income in 2007 (thousand VND)	Per capita income in 2012 (thousand VND)	Change in income (thousand VND)	Income growth rate (%)
Lowest	10567.4	3310.1	-7257.3	-68.7	8928.3	3057.1	-5871.2	-65.8
Near lowest	8419.4	6782.9	-1636.5	-19.4	6930.3	5447.2	-1483.2	-21.4
Middle	7333.1	8641.4	1308.3	17.8	6330.7	7385.4	1054.7	16.7
Near highest	6330.2	10384.5	4054.4	64.0	5515.9	8982.1	3466.1	62.8
Highest	3752.0	15215.8	11463.7	305.5	3314.9	11959.2	8644.2	260.8
Total	7317.6	8799.9	1482.3	20.3	6218.6	7341.1	1122.4	18.0

Figure 6.3 present the quintiles of income growth rate by ethnic minorities. It shows that there are losers and gainers in all the ethnic minority groups including Kinh group. Ba Na households is the most successful group who have a very high proportion of households having high income growth during 2007-2012. H'Mong, Nung and Kinh also have a high proportion of households with high income growth. On the contrary, Hre and Co Tu have a low proportion of households with high income growth but a high proportion of households with low income growth. Thai is also a group with low income growth during this period.

Figure 6.3: Quintiles of income growth rate by ethnic minorities
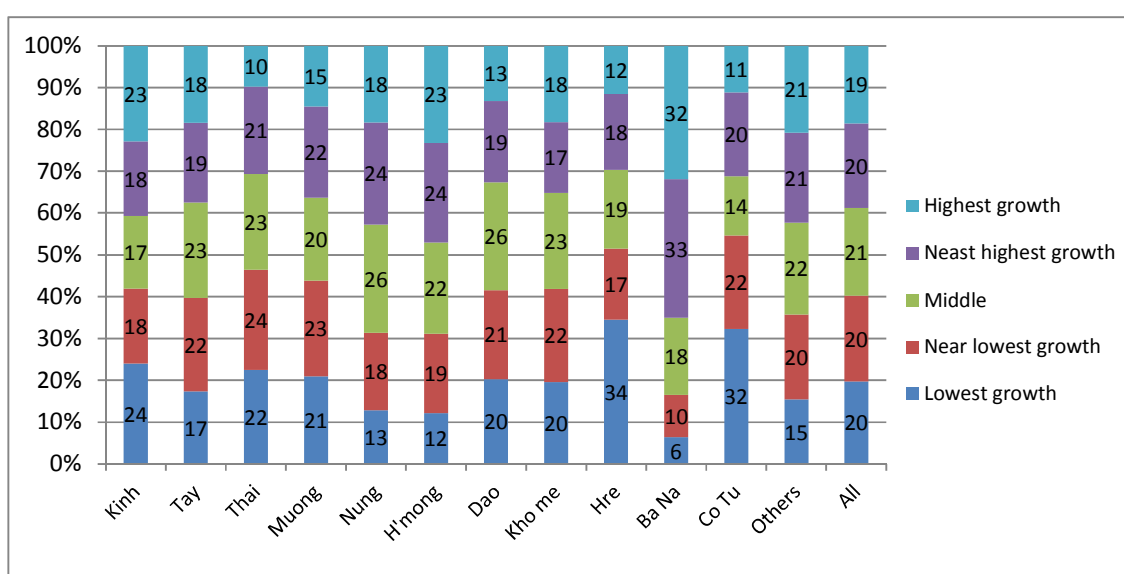
7. Why are households successul in income growth?

In this study, we used the decomposition methods to analyse the income change of all households, and different household groups including households with highest income growth, households with decreased income, Thai households and H'Mong households.

Table 7.1 presents the decomposition results. We decompose the income changes during 2007-2012 for different groups of households. The first is the decomposition of the income change for all the ethnic minority households (the decomposition including Kinh households is presented in tables in Appendix). The difference in per capita income o ethnic minorities between 2007 and 2012 is 960 thousand VND. The income increase is

mainly caused by the increase in the average working time of workers. More specifically, 103.6% of the income is attributed to the difference in the number of average working hour of worker. The income per hour decreased the income change slightly by around 9.2%, while non-farm income contributed to the income increase during this period by around 10%.

We decompose the income change for ethnic minority households with lowest and highest income growth (the bottom and top quintiles of income growth rates presested in Table 6.3). These decomposition results are similar to the decompostion results applied for the shooting stars and sinking stones groups. Thus, we do not report the the decompostion results for the shooting stars and sinking stones groups.

Table 7.1 shows that the per capita income of the least succesful households decreased by 5,067.7 thousand VND during 2007-2012. The change in income per working hours contributes 95.1% of the income reduction. Non-employment reduction also causes the household income to decrease. Although the number of working hours of these households increased, it cannot help household income increase.

For the most successful households, the per capita income increased by 7,334.7 thousand VND between 2007 and 2012. The change in income per working hours contributes 71.4% of the income increase. Total working time and non-employment income contribute to the remaining income increase. The findings imply that labor productivity measured by labor income per hours plays the key role in household income growth.

Table 7.1. Decomposition of income change by working time: ethnic minority households

	All ethnic minority households		Ethnic minority households with lowest income growth		Ethnic minority households with highest income growth	
	Change in income	%	Change in income	%	Change in income	%
Per capita income in 2012	6,720.0***		2,792.7***		10,586.1***	
	(233.5)		(153.4)		(436.3)	
Per capita income in 2007	5,759.3***		7,860.4***		3,251.4***	
	(217.7)		(381.3)		(128.0)	
Change in per capita income	960.7***	100	-5,067.7***	100	7,334.7***	100
	(301.5)		(412.8)		(462.7)	
Change in income per hour	-88.7	-9.2	-4,819.0***	95.1***	5,235.6***	71.4***
	(288.4)	(109.9)	(372.1)	(5.6)	(459.8)	(3.5)
Change in working hours	995.5***	103.6	877.4***	-17.3***	1,026.0***	14.0***
	(137.5)	(123.3)	(193.8)	(4.2)	(273.9)	(4.0)
Change in the proportion of	-45.2	-4.7	-243.7**	4.8**	193.8	2.6

	All ethnic minority households		Ethnic minority households with lowest income growth		Ethnic minority households with highest income growth	
	Change in income	%	Change in income	%	Change in income	%
working members	(78.3)	(17.2)	(115.5)	(2.3)	(159.2)	(2.1)
Change in non-employment income	99.5	10.4	-852.1***	16.8***	899.0***	12.3***
	(72.8)	(10.0)	(210.1)	(3.4)	(130.8)	(1.6)
Remainders	-0.4	-0.0	-30.3**	0.6**	-19.7	-0.3
	(2.1)	(0.3)	(14.0)	(0.3)	(15.8)	(0.2)
Observations	9,018		1,788		1,828	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

In Table 7.2, we conduct the income decompostion for two ethnic minority groups: Thai group who have the lowest income growth rate during 2007-2012 and H'Mong group who have the second-hghest income growth rate during 2007-2012. Ba Na has the highest income growth rate. However, there are only 88 Ba Na households sampled in the data sets, and the small number of observation can result in a large sampling estimation errors. Thus we use H'Mong - who have a large number of sampled households - for decomposition analysis.

Thai households have a decrease in average income per hour but an increase in the total working hours during 2007-2012. As a result, their income is slightly increased. If Thai households can maintain their income per hour, i.e., labor productivity, and increase the working hours at the same time, their income would increase remarkably. H'Mong households' income increased because they increased not only the labor productivity per hour but also the total working hours. The labor productivity is still an important factor, since it accounts for 51.2% of the total income increase.

Table 7.2. Decomposition of income change by working time: Thai and H'Mong households

	Thai households		H'Mong households	
	Change in income	%	Change in income	%
Per capita income in 2012	5,831.0***		4,970.9***	
	(495.5)		(238.7)	
Per capita income in 2007	5,692.7***		3,462.2***	
	(465.3)		(143.3)	
Change in per capita income	138.3		1,508.7***	

	Thai households		H'Mong households	
	Change in income	%	Change in income	%
	(701.7)		(281.2)	
Change in income per hour	-1,079.2	-780.3	772.9**	51.2**
	(674.9)	(2,698.4)	(370.1)	(20.4)
Change in working hour	1,282.4***	927.1	473.0**	31.4*
	(340.7)	(2,778.4)	(201.6)	(16.7)
Change in the proportion of working members	-67.7	-48.9	66.5	4.4
	(167.6)	(176.3)	(105.3)	(7.4)
Change in non-employment income	16.5	11.9	193.2***	12.8***
	(119.4)	(160.4)	(41.6)	(3.1)
Remainders	-13.6	-9.8	3.1	0.2
	(9.7)	(24.5)	(2.6)	(0.2)
Observations	1,090		1,566	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

We further decompose the income change between 2007 and 2012 into the changes due to the working productivity (measured by income per hour) and the changes due to the working time of different production activities including farm, non-farm and wage. For the whole ethnic minority group, increases in wage per hour, in wage working hours, farm working hours, and non-employment income are the main factors contributing to income growth. Farm productivity which is measured by the average farm income per hour is the main reason for income decrease.

For households who experienced largest income reduction, a decrease in farm productivity contributes mainly to the income reduction, around 73.7%. Reduction in wage working time and non-employment incomes are also reasons for income reduction. The income increase of the most successful households results from different sources including increased farm productivity and wage rate, increased time working for wage, increased non-farm working time, and increased non-employment income. The most important factor for their income increase is the farm productivity (measured by the farm income per hour).

Table 7.3. Decomposition of income change by income sources: ethnic minority househlds

	All ethnic minority households		Ethnic minority households with lowest income growth		Ethnic minority households with highest income growth	
	Change in income	%	Change in income	%	Change in income	%
Change in per capita income	960.7***		-5,067.7***		7,334.7***	
	(301.5)		(412.8)		(462.7)	
Change in wage per hour	248.8**	25.9	-226.7	4.5	777.8***	10.6***
	(107.2)	(57.0)	(219.2)	(4.4)	(191.6)	(2.6)
Change in working hours for wage	211.6	22.0	-897.8***	17.7***	1,605.1***	21.9***
	(238.5)	(41.7)	(324.7)	(6.2)	(342.2)	(3.8)
Change in farm income per hour	-399.4*	-41.6	-3,736.3***	73.7***	2,899.0***	39.5***
	(221.1)	(114.5)	(347.6)	(5.8)	(298.5)	(3.1)
Change in working hours for farm	667.3***	69.5	997.7***	-19.7***	187.9	2.6
	(152.8)	(108.9)	(224.7)	(4.4)	(241.2)	(3.4)
Change in non-farm income per hour	-34.3	-3.6	-280.5*	5.5*	355.5**	4.8**
	(65.1)	(12.8)	(151.4)	(3.0)	(153.3)	(2.1)
Change in working hours for nonfarm	-36.0	-3.7	-71.7	1.4	-33.2	-0.5
	(125.1)	(40.9)	(98.6)	(1.9)	(180.6)	(2.5)
Change in non-employment income	99.5	10.4	-852.1***	16.8***	899.0***	12.3***
	(72.8)	(10.0)	(210.1)	(3.4)	(130.8)	(1.6)
Remainders	203.1***	21.1***	-0.4	0.0	643.6***	8.8***
	(14.3)	(2.0)	(63.0)	(1.3)	(40.3)	(0.5)
Observations	9,018		1,788		1,828	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

For Thai households, their farm productivity decreased but their farm working hours increased between 2007 and 2012. For H'Mong households, the main reason for their income growth is the increase in both the farm working productivity and farm working time.

Table 7.4. Decomposition of income change by income sources: Thai and H'Mong househlds

	Thai households		H'Mong households	
	Change in income	%	Change in income	%
Change in per capita income	138.3		1,508.7***	
	(701.7)		(281.2)	
Change in wage per hour	131.7	95.2	124.2	8.2
	(142.9)	(438.0)	(113.8)	(7.3)
Change in working hours for wage	305.7	221.0	11.4	0.8
	(269.5)	(705.6)	(131.8)	(9.3)
Change in farm income per	-1,290.1**	-932.7	536.2	35.5*

	Thai households		H'Mong households	
	Change in income	%	Change in income	%
hour	(626.7)	(3,051.6)	(328.6)	(19.8)
Change in working hours for farm	949.7***	686.6	483.3**	32.0*
	(317.2)	(2,176.5)	(212.7)	(17.0)
Change in non-farm income per hour	-19.9	-14.4	-118.6	-7.9
	(81.9)	(234.1)	(318.8)	(23.6)
Change in working hours for nonfarm	-53.7	-38.8	28.2	1.9
	(89.7)	(337.8)	(263.0)	(20.1)
Change in non-employment income	16.5	11.9	193.2***	12.8***
	(119.4)	(160.4)	(41.6)	(3.1)
Remainders	98.4***	71.1***	250.7***	16.6***
	(0.1)	(0.4)	(52.1)	(3.4)
Observations	1,090		1,566	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

The above analysis shows that farm income, especially farm productivity plays the most important role in income changes of households during the period 2007-2012. Thus, we further decompose the farm income of households by outputs and income units of different farm products. It should be noted that we cannot apply the decomposition by productivity and working time since there are no data on working time spent on different farm products.

For all the households, the farm income is almost unchanged between 2007 and 2012. We focus on interpretation of households who are most and least successful in income growth. The farm income of the least successful households decreased by 10,745 thousand VND. This reduction is mainly caused by decreases in quantity and income unit of rice, quantity of other annual crops and perennial crops.

For the most successful households, quantity of annual crops (not including rice), perennial crops and ruminants (consisting of cow, buffalo and goat, sheep) is the main reason for their farm income increase.

Table 7.5. Decompostion of agricultural income of ethnic minority households

VARIABLES	All ethnic minority households		Ethnic minority households with lowest income growth		Ethnic minority households with highest income growth	
	Change in income	%	Change in income	%	Change in income	%
Agricultural income in 2012	14,012.5***		17,242.6***		8,964.7***	
	(690.8)		(1,403.4)		(364.7)	
Agricultural income in 2007	14,031.3***		6,497.7***		19,079.1***	
	(645.9)		(367.4)		(952.1)	
Change in income	18.8		-10,744.9***		10,114.4***	
	(419.1)		(1,142.1)		(742.7)	
Price of rice	344.4***	1,833.8	-224.4	2.1	486.7***	4.8***
	(76.3)	(4,661.7)	(153.4)	(1.4)	(90.6)	(1.0)
Quantity of rice	-451.1***	-2,401.4	-2,633.5***	24.5***	1,270.7***	12.6***
	(142.6)	(4,408.8)	(353.5)	(3.2)	(208.3)	(2.2)
Price of annual crop	-599.8***	-3,193.3	-1,778.4***	16.6***	-90.2	-0.9
	(132.7)	(5,667.0)	(522.2)	(3.9)	(133.5)	(1.4)
Quantity of annual crop	-508.4	-2,706.6	-5,261.8***	49.0***	4,104.5***	40.6***
	(510.0)	(2,180.0)	(1,955.4)	(14.6)	(607.9)	(5.0)
Price of perennial crop	19.7	104.8	-667.1***	6.2***	66.8	0.7
	(89.3)	(404.4)	(234.3)	(2.4)	(102.8)	(1.0)
Quantity of perennial crop	19.9	105.8	-2,805.9***	26.1***	2,516.8***	24.9***
	(194.0)	(1,473.0)	(762.6)	(7.5)	(721.5)	(7.6)
Price of fruit	77.3***	411.4	84.2**	-0.8*	59.7**	0.6**
	(17.8)	(700.1)	(40.5)	(0.4)	(27.2)	(0.3)
Quantity of fruit	-118.3***	-630.0	-382.2***	3.6***	40.9	0.4
	(30.5)	(1,501.0)	(61.8)	(0.7)	(47.9)	(0.5)
Price of pigs	221.2***	1,177.7	-176.6	1.6	279.8***	2.8***
	(37.5)	(1,967.2)	(120.9)	(1.3)	(47.1)	(0.5)
Quantity of pigs	-147.1**	-783.1	-825.5***	7.7***	669.4***	6.6***
	(70.3)	(1,650.5)	(119.7)	(1.4)	(142.2)	(1.3)
Price of ruminant	55.4*	295.2	-55.9	0.5	38.1*	0.4*
	(28.9)	(454.0)	(127.7)	(1.2)	(20.2)	(0.2)
Quantity of ruminant	1,220.9***	6,500.4	-525.1***	4.9***	3,069.7***	30.3***
	(156.4)	(12,463.7)	(145.6)	(1.4)	(525.7)	(4.6)
Price of poultry	84.5***	449.8	-72.0	0.7	105.4***	1.0***
	(24.5)	(624.1)	(56.9)	(0.6)	(30.1)	(0.3)
Quantity of poultry	-313.7***	-1,670.2	-862.4***	8.0***	122.8*	1.2*
	(56.3)	(3,174.7)	(92.8)	(1.1)	(69.8)	(0.7)
Remainder	113.8	605.8	5,441.8***	-50.6***	-2,626.7***	-26.0***
	(392.6)	(4,760.5)	(1,701.3)	(13.8)	(778.0)	(8.1)
Observations	4,508		894		913	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

Regarding Thai households, their farm income decreased by 3,254 thousand VND. The main reason for this decrease is the decreases in quantity of rices and other annual crops, quantity of poultry, and the rice price. The quantity of ruminant of Thai households

increased, but this increase cannot compensate for the decrease caused by other factors. H'Mong households increased farm income by around 2,860 thousand VND. This income increase is mainly due to the increase in quantity of ruminants. For both Thai and H'Mong, there is evidence that households tend to move from crop production to livestock production, especially the ruminant animals.

Table 7.6. Decompostion of agricultural income of Thai and H'Mong households

VARIABLES	Thai households		H'Mong households	
	Change in income	%	Change in income	%
Agricultural income in 2012	19,635.2***		13,790.8***	
	(2,906.2)		(715.1)	
Agricultural income in 2007	16,380.9***		16,650.8***	
	(2,328.2)		(988.9)	
Change in income	-3,254.3**		2,860.0***	
	(1,590.4)		(990.0)	
Price of rice	400.8	-12.3	432.9***	15.1
	(283.5)	(314.7)	(138.1)	(16.1)
Quantity of rice	-803.9**	24.7	-376.6*	-13.2
	(344.1)	(485.1)	(226.7)	(31.9)
Price of annual crop	-1,213.9	37.3	-259.7	-9.1
	(865.0)	(590.4)	(179.7)	(15.9)
Quantity of annual crop	-5,804.7	178.4	684.3	23.9
	(3,553.6)	(254.6)	(702.3)	(34.8)
Price of perennial crop	29.4	-0.9	117.4**	4.1
	(117.2)	(266.1)	(46.9)	(3.5)
Quantity of perennial crop	52.7	-1.6	244.5	8.5
	(158.9)	(198.7)	(210.4)	(9.6)
Price of fruit	11.5	-0.4	85.5***	3.0
	(59.8)	(26.7)	(31.3)	(3.7)
Quantity of fruit	-71.9	2.2	-145.3***	-5.1
	(84.8)	(62.1)	(49.8)	(6.5)
Price of pigs	84.8	-2.6	248.5***	8.7
	(89.9)	(188.5)	(54.6)	(6.8)
Quantity of pigs	-252.3	7.8	-186.0**	-6.5
	(197.7)	(458.2)	(81.1)	(8.9)
Price of ruminant	-6.1	0.2	161.2**	5.6
	(85.1)	(35.9)	(64.0)	(4.2)
Quantity of ruminant	2,008.0***	-61.7	2,477.8***	86.6
	(435.3)	(882.3)	(563.6)	(76.1)
Price of poultry	151.9***	-4.7	135.0**	4.7
	(50.8)	(106.0)	(55.5)	(4.7)
Quantity of poultry	-498.4***	15.3	-319.7***	-11.2
	(118.8)	(169.5)	(62.6)	(12.0)
Remainder	2,657.8	-81.7	-439.8	-15.4
	(2,649.3)	(390.4)	(416.4)	(23.6)
Observations	545		783	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

7.2 Regression analysis

Instead of examining the income sources, we investigate how household and community characteristics can affect or at least be correlated with the success and failure of households in income growth. To do so, we use the regression method.

Table 7.7 presents OLS regressions of per capita income and poverty status. All the regressions are corrected for sampling weights and cluster correlation between households within districts. Kinh households are excluded from these regressions.[3]

For each outcome, we use three specification models. The first model uses the basic characteristics of households. The second model focuses on several policies targeted at the household level including credit and cash transfers. The third model focuses on the effect of several projects targeted at the commune and village level. We do not include all these variables in one model to avoid the multi-collinearity problem. Although the multi-collinearity problem does not cause estimates biased, it can increase the standard error of estimates and make the interpretation difficult.

Households with large household size and high proportions of children and elderly are more likely to have low income and high poverty rate. These findings are commonly found in other empirical studies. Land is important for household income. Perennial crop land has positive but not statistically significant effect on household income. Annual crop lands and forestry lands have significant effects on household income and poverty reduction. However, the effect of land is small, for example an increase of 1,000 m2 in per capita annual crop land is associated with around 3.1% increase in per capita income of households. This finding is similar to the finding of the positive effect of land on consumption at the nation level in Nguyen and Tran (2013).

Share of non-farm income in total income is positively but not significantly correlated with household income. Share of wage income is positively correlated with per capita income, albeit with very small correlation. The small effect of non-farm and wage income might be because that ethnic minorities rely mainly on farm income.

The positive role of credit and transfers in poverty reduction in Vietnam is found in a large number of studies (e.g., Quach and Mullineux, 2007; Nguyen, 2008; Van den Berg and Nguyen, 2011; Nguyen, 2013). However, there are no studies on the effect of these variables on ethnic minorities, especially those in poorest areas. Interestingly, it is found that credit and tranfers also help ethnic minorities increase income and reduce

---

[3] We tried regressions including Kinh households. The main findings are similar to regressions in which Kinh households are dropped.

poverty. Micro-credit from the Vietnam Bank for Social Policies and informal credit are positively and significantly associated with per capita income. Formal credit also has positive but not significant effect on per capita income. Social allownace have quite strong effect: A million VND increase social allowances can reduce the probability of being poor by 0.0165.

Regarding the projects, only village road project and irrigation projects are significantly positively correlated with household income. Possibly, these projects are directly correlated with household income than other projects such as market, water and electricity project.

Table 7.7. OLS regression of log of per capita income and poverty status

Explanatory variables	Log of per capita income	Log of per capita income	Log of per capita income	Household is poor (yes=1, no=0)	Household is poor (yes=1, no=0)	Household is poor (yes=1, no=0)
Household size	-0.0693***	-0.0964***	-0.0964***	0.0376***	0.0480***	0.0474***
	(0.0229)	(0.0200)	(0.0193)	(0.0087)	(0.0076)	(0.0074)
Proportion of children under 15	-0.2180*	-0.2372**	-0.2243*	0.1893**	0.2005***	0.1938**
	(0.1178)	(0.1130)	(0.1148)	(0.0771)	(0.0750)	(0.0762)
Proportion of people above 60	0.5141**	0.3777*	0.4639**	-0.2840**	-0.2343*	-0.2595**
	(0.2396)	(0.2094)	(0.2070)	(0.1340)	(0.1295)	(0.1225)
Dummy variable of 2012	-0.0782	0.0324	0.0187	-0.0088	-0.0468**	-0.0483**
	(0.0593)	(0.0484)	(0.0443)	(0.0324)	(0.0227)	(0.0231)
Proportion of members working	0.1642*			-0.0451		
	(0.0852)			(0.0433)		
Per capita annual crop land (1000 m2)	0.0312***	0.0309***	0.0315***	-0.0145***	-0.0143***	-0.0149***
	(0.0105)	(0.0107)	(0.0107)	(0.0049)	(0.0048)	(0.0050)
Per capita perennial crop land (1000 m2)	0.0104	0.0110	0.0110	-0.0042	-0.0043	-0.0047
	(0.0088)	(0.0097)	(0.0099)	(0.0042)	(0.0043)	(0.0045)
Per capita forestry land (1000 m2)	0.0068***	0.0084***	0.0084***	-0.0029***	-0.0036***	-0.0036***
	(0.0023)	(0.0026)	(0.0027)	(0.0011)	(0.0012)	(0.0013)
Per capita living area (m2)	0.1710***			-0.0658**		
	(0.0575)			(0.0270)		
Number of schooling grades of hh head	0.0226*			-0.0112*		
	(0.0129)			(0.0058)		
Share of non-farm income in total income	0.0033			-0.0005		
	(0.0025)			(0.0016)		
Share of wage income in total income	0.0061***			-0.0021***		
	(0.0010)			(0.0006)		
Credit from formal sources (million VND)		0.0003			-0.0011	
		(0.0030)			(0.0007)	
Credit from informal sources (million VND)		0.0037*			-0.0015	
		(0.0020)			(0.0011)	
Credit from Vietnam Bank for Social Policies		0.0072**			-0.0024	
		(0.0034)			(0.0018)	
Social allowance (million VND)		0.0371***			-0.0165***	
		(0.0052)			(0.0029)	
Private remittances (million VND)		0.0263**			-0.0075*	
		(0.0109)			(0.0043)	
Commune road project			-0.0551			0.0370

Explanatory variables	Log of per capita income	Log of per capita income	Log of per capita income	Household is poor (yes=1, no=0)	Household is poor (yes=1, no=0)	Household is poor (yes=1, no=0)
			(0.0631)			(0.0278)
Village road project			0.0620*			-0.0050
			(0.0341)			(0.0244)
Irrigation project			0.1480**			-0.0410
			(0.0610)			(0.0285)
Market project			-0.1044			0.0689
			(0.1013)			(0.0672)
Clean water project			0.0340			-0.0527*
			(0.0435)			(0.0304)
Electricity project			0.0248			0.0276
			(0.0515)			(0.0324)
Constant	8.0900***	8.8311***	8.8573***	0.5767***	0.2978***	0.2824***
	(0.2833)	(0.0960)	(0.1096)	(0.1037)	(0.0500)	(0.0485)
Observations	9,016	9,016	9,016	9,016	9,016	9,016
R-squared	0.088	0.071	0.053	0.072	0.068	0.059
Number of hhid	4,508	4,508	4,508	4,508	4,508	4,508

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

In Table 7.8, we examine the correlation between household characteristics and the probability of being the most or least successful in income growth between 2005 and 2012. The most successful groups are 'shooting stars' households and households in the highest quintile of income growth. The least successful groups are 'sinking stones' households and households in the lowest quintile of income growth.

Table 7.8 shows that the most successful households tend to have smaller household size, large crop lands, and higher wage share in total income. On the contrary, households with large household size, higher number of children, low education and small land tend to have higher probability of having income decrease.

It shows that Ba Na and H'Mong are more likely to be included in the successful groups, while Thai and Co Tu are less likely to be in the successful groups. It should be noted that we tried to control for dummies of other ethnic minority groups, but these dummy variables are not statistically significant, and not included.

Table 7.8. Regression of the most and the least successful groups

Explanatory variables	Shooting star group (yes=1, no=0)	Top quintile of income group (yes=1, no=0)	Sinking stone group (yes=1, no=0)	Bottom quintile of income group (yes=1, no=0)
Change in household size	-0.0205***	-0.0310***	0.0209***	0.0265***
	(0.0050)	(0.0071)	(0.0054)	(0.0062)
Change in proportion of children under 15	-0.0386	-0.0237	0.1157***	0.1125***
	(0.0433)	(0.0558)	(0.0423)	(0.0359)
Change in proportion of people above 60	0.0495	0.0969	-0.0855	-0.1476*
	(0.0720)	(0.0926)	(0.0733)	(0.0856)
Dummy variable of 2012	0.1047***	0.1493***	0.1582***	0.2266***
	(0.0192)	(0.0192)	(0.0207)	(0.0224)

Explanatory variables	Shooting star group (yes=1, no=0)	Top quintile of income group (yes=1, no=0)	Sinking stone group (yes=1, no=0)	Bottom quintile of income group (yes=1, no=0)
Change in proportion of members working	0.0425	0.0448**	-0.0412	-0.0413
	(0.0263)	(0.0223)	(0.0309)	(0.0275)
Change in Per capita annual crop land (1000 m2)	0.0074**	0.0107***	-0.0094***	-0.0125***
	(0.0029)	(0.0039)	(0.0028)	(0.0036)
Change in Per capita perennial crop land (1000 m2)	0.0019	0.0025	-0.0030	-0.0055*
	(0.0026)	(0.0036)	(0.0029)	(0.0031)
Change in Per capita forestry land (1000 m2)	0.0016***	0.0023***	-0.0020*	-0.0029***
	(0.0006)	(0.0007)	(0.0011)	(0.0011)
Change in Per capita living area	0.0357**	0.0159	-0.0149	-0.0129
	(0.0163)	(0.0132)	(0.0129)	(0.0167)
Change in Number of schooling grades of hh head	0.0003	0.0009	-0.0061*	-0.0067**
	(0.0037)	(0.0038)	(0.0033)	(0.0034)
Change in Share of non-farm income in total income	0.0011	0.0014	0.0005	-0.0009
	(0.0008)	(0.0009)	(0.0009)	(0.0008)
Change in Share of wage income in total income	0.0018***	0.0019***	-0.0004	-0.0017***
	(0.0003)	(0.0004)	(0.0004)	(0.0004)
H'Mong	0.1092***	0.1123***	-0.0727***	-0.1085***
	(0.0391)	(0.0413)	(0.0201)	(0.0304)
Thai	-0.0282	-0.0531**	0.0315	0.0147
	(0.0228)	(0.0253)	(0.0311)	(0.0435)
Ba Na	0.1454*	0.2078**	-0.1154***	-0.1377**
	(0.0766)	(0.1038)	(0.0391)	(0.0571)
Co Tu	-0.0764***	-0.0627***	0.0259	0.1276***
	(0.0220)	(0.0174)	(0.0381)	(0.0187)
Constant	-0.0259	-0.2323***	-0.0186	0.2500***
	(0.0510)	(0.0571)	(0.0560)	(0.0797)
Observations	9,016	9,016	9,016	9,016
R-squared	0.208	0.230	0.188	0.231
Number of hhid	4,508	4,508	4,508	4,508

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

According to Table 7.9, credit from difference sources, public and private transfers help households increase the probability of being successful in income growth. These variables are negatively correlated with the probability of having income decrease.

Table 7.9. Regression of most and least successful groups: the role of credit and transfers

Explanatory variables	Shooting star group (yes=1, no=0)	Top quintile of income group (yes=1, no=0)	Sinking stone group (yes=1, no=0)	Bottom quintile of income group (yes=1, no=0)
Change in Household size	-0.0264***	-0.0294***	0.0236***	0.0236***
	(0.0055)	(0.0060)	(0.0045)	(0.0056)
Change in Proportion of children under 15	-0.0393	-0.0250	0.1283***	0.1167***
	(0.0412)	(0.0534)	(0.0426)	(0.0342)
Change in Proportion of people above 60	0.0348	0.0733	-0.0753	-0.1156
	(0.0710)	(0.0765)	(0.0760)	(0.0850)
Dummy variable of 2012	0.1445***	0.1858***	0.1659***	0.1931***
	(0.0106)	(0.0150)	(0.0122)	(0.0141)
Change in Per capita annual crop land (1000 m2)	0.0072**	0.0103***	-0.0093***	-0.0121***
	(0.0029)	(0.0038)	(0.0028)	(0.0035)
Change in Per capita perennial crop land	0.0014	0.0015	-0.0032	-0.0050

Explanatory variables	Shooting star group (yes=1, no=0)	Top quintile of income group (yes=1, no=0)	Sinking stone group (yes=1, no=0)	Bottom quintile of income group (yes=1, no=0)
(1000 m2)	(0.0026)	(0.0035)	(0.0028)	(0.0032)
Change in Per capita forestry land (1000 m2)	0.0021***	0.0027***	-0.0021*	-0.0033***
	(0.0006)	(0.0008)	(0.0011)	(0.0012)
Change in Credit from formal sources (million VND)	0.0010*	0.0013**	-0.0001	-0.0007
	(0.0005)	(0.0006)	(0.0004)	(0.0005)
Change in Credit from informal sources (million VND)	0.0015**	0.0017**	-0.0006	-0.0008
	(0.0007)	(0.0007)	(0.0005)	(0.0006)
Change in Credit from Vietnam Bank for Social Policies	0.0008	0.0017*	-0.0008	-0.0020
	(0.0009)	(0.0009)	(0.0011)	(0.0012)
Change in Social allowance (million VND)	0.0059***	0.0108***	-0.0106***	-0.0104***
	(0.0013)	(0.0016)	(0.0020)	(0.0028)
Change in Private remittances (million VND)	0.0045*	0.0075**	-0.0040	-0.0083***
	(0.0026)	(0.0033)	(0.0028)	(0.0020)
H'Mong	0.0729*	0.0724*	-0.0639***	-0.0730**
	(0.0399)	(0.0431)	(0.0188)	(0.0296)
Thai	-0.0540**	-0.0820***	0.0403	0.0415
	(0.0233)	(0.0246)	(0.0301)	(0.0419)
Ba Na	0.1029	0.1625	-0.0999***	-0.0951*
	(0.0739)	(0.1020)	(0.0381)	(0.0551)
Co Tu	-0.0897***	-0.0740***	0.0136	0.1319***
	(0.0220)	(0.0166)	(0.0354)	(0.0182)
Constant	0.1146***	-0.1562***	-0.1252***	0.1603***
	(0.0264)	(0.0287)	(0.0264)	(0.0284)
Observations	9,016	9,016	9,016	9,016
R-squared	0.192	0.227	0.196	0.229
Number of hhid	4,508	4,508	4,508	4,508

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

Regarding the impact of village and commune projects, only the irrigation project has positive effect on the probability of being in top income growth quintile. However, the projects of village road, irrigation and electricity tend to reduce the probability of households having income reduction during 2007-2012.

Table 7.10. Regression of most and least successful groups: the role of projects

Explanatory variables	Shooting star group (yes=1, no=0)	Top quintile of income group (yes=1, no=0)	Sinking stone group (yes=1, no=0)	Bottom quintile of income group (yes=1, no=0)
Change in Household size	-0.0257***	-0.0295***	0.0234***	0.0241***
	(0.0055)	(0.0058)	(0.0045)	(0.0054)
Change in Proportion of children under 15	-0.0375	-0.0218	0.1227***	0.1099***
	(0.0420)	(0.0544)	(0.0439)	(0.0337)
Change in Proportion of people above 60	0.0457	0.0955	-0.0948	-0.1332
	(0.0696)	(0.0860)	(0.0732)	(0.0827)
Dummy variable of 2012	0.1465***	0.1845***	0.1686***	0.1959***
	(0.0102)	(0.0147)	(0.0126)	(0.0138)
Change in Per capita annual crop land (1000 m2)	0.0074**	0.0106***	-0.0094***	-0.0121***
	(0.0029)	(0.0039)	(0.0027)	(0.0035)
Change in Per capita perennial crop land (1000 m2)	0.0018	0.0020	-0.0033	-0.0051
	(0.0028)	(0.0038)	(0.0028)	(0.0032)

Explanatory variables	Shooting star group (yes=1, no=0)	Top quintile of income group (yes=1, no=0)	Sinking stone group (yes=1, no=0)	Bottom quintile of income group (yes=1, no=0)
Change in Per capita forestry land (1000 m2)	0.0021***	0.0027***	-0.0021*	-0.0032***
	(0.0006)	(0.0008)	(0.0012)	(0.0012)
Change in Commune road project	-0.0131	-0.0166	0.0207	-0.0008
	(0.0155)	(0.0202)	(0.0166)	(0.0179)
Change in Village road project	-0.0005	-0.0110	-0.0276*	-0.0441***
	(0.0169)	(0.0163)	(0.0158)	(0.0156)
Change in Irrigation project	0.0106	0.0416**	-0.0348**	-0.0322**
	(0.0129)	(0.0174)	(0.0157)	(0.0150)
Change in Market project	-0.0033	-0.0051	-0.0053	-0.0094
	(0.0277)	(0.0380)	(0.0219)	(0.0274)
Change in Clean water project	0.0172	0.0182	-0.0064	-0.0056
	(0.0186)	(0.0178)	(0.0187)	(0.0176)
Change in Electricity project	-0.0025	0.0083	-0.0347*	-0.0157
	(0.0180)	(0.0210)	(0.0204)	(0.0230)
H'Mong	0.0704*	0.0727*	-0.0691***	-0.0784***
	(0.0374)	(0.0396)	(0.0184)	(0.0289)
Thai	-0.0500**	-0.0746***	0.0462	0.0503
	(0.0232)	(0.0242)	(0.0300)	(0.0395)
Ba Na	0.1082	0.1752*	-0.1122***	-0.1123**
	(0.0696)	(0.0946)	(0.0341)	(0.0541)
Co Tu	-0.0916***	-0.0706***	0.0260	0.1453***
	(0.0227)	(0.0206)	(0.0364)	(0.0220)
Constant	0.1226***	-0.1411***	-0.1229***	0.1603***
	(0.0264)	(0.0302)	(0.0262)	(0.0269)
Observations	9,016	9,016	9,016	9,016
R-squared	0.185	0.214	0.190	0.221
Number of hhid	4,508	4,508	4,508	4,508

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

8. Conclusions

Using household panel data from Baseline Survey 2007 and Endline Survey 2012 of Program 135 Phase II, this study examines the living standards, income, poverty and inequality of ethnic minorities in the poorest communes of Vietnam. It finds that living standard, expressed through multiple aspects such as education, health, and housing condition, has improved during the period 2007-2012, albeit at a slower rate. There is still a gap in education, healthcare utilization, sanitation and clean water between small ethnic groups and Kinh and several large ethnic groups such as Tay and Muong even these ethnic groups as well as Kinh are living in the same poor communes. Some ethnic minorities such as H're, Co Tu, and H'Mong have very low living standard levels.

The average income of all the ethnic minorities analysed in this study increased between 2007 and 2012. Ba Na and H'Mong households gained the highest income

growth rate, while Thai, Tay and Hre households experienced the lowest income growth rate. There is a great heterogeneity in income growth at the household level. There are 46% of households who suffered from falling real income during 2007-2012. Total income inequality as well as income inequality within each ethnic group regardless of measures increased significantly from 2007 to 2012. The increase in income inequality comes primarily from income inequality within each ethnic minority group. The income inequality between ethnic groups also contributes to the total inequality but at the small proportion.

During the period 2007-2012, there is almost no transition from farm to non-farm sector for ethnic minorities in the Program 135 areas. Farm income of ethnic minorities still accounts for a large share of total income. More than 90% of workers are working in agricultural sectors.

The income poverty rate is falling for all ethnic minority groups except Thai group. H'Mong and Ba Na are the two groups having the largest reduction in income poverty rate. Although the poverty rate decreased, the poverty depth and severity indexes were almost unchanged. The gap between the poor's income and the income poverty line remain very high. Multidimensional poverty decreased for all ethnic minority groups. The multidimensional poverty presents the slightly different pattern from the income poverty, since households can be poor by income measurement but not multi-dimensionally poor and vice versa.

To understand sources of income growth of the most successful group as well as sources of income reduction of the least successful group, we decompose the income change between 2007 and 2012 of households into changes due working productivity (measured by average earnings per hours) and changes due to working time. It shows that labor productivity in farm sector is the main reason for income growth as well as income reduction. The most successful group was able to increase their farm earnings per hours, while the least successful group suffered from the decrease in farm earnings per hours. Crops still are still the most important for households, but there is a tendency that households move from crop production to livestock production, especially the ruminant animals.

Land and education remain important for household income. Programs targeted at the household level including credit and transfers are more effective in income increase and poverty reduction than programs targeted at the village and commune level. Among the village and commune projects, village road project and irrigation projects tend to help

local people increase their income and reduce poverty than other projects such as commune road, market and clean waters.

The findings in this study suggest that support programs are still very important for ethnic minority households since their living standard remains very low compared with the national level. The economic growth is low and not spread to all the households. There are a large proportion of households with falling income overtime. In the short-run, support programs for agricultural productions are very important for income growth. The agricultural programs can aim to increase the farm productivity (both crops and livestock) for ethnic minorities. The support programs should be targeted at the household level such as credit and transfers to households. Transition from farm to non-farm sector is a long run process which requires the development of infrastructure and market.

References

Lanjouw, Peter & Marra, Marleen & Nguyen, Cuong, 2013. "Vietnam's evolving poverty map : patterns and implications for policy," Policy Research Working Paper Series 6355, The World Bank.

Alkire, S. and Foster, J. E. (2007), 'Counting and Multidimensional Poverty Measures', *Working Paper 7, Oxford,* Poverty and Human Development Initiative, University of Oxford.

Alkire, S. and Foster, J. E. (2011a), 'Counting and Multidimensional Poverty Measurement', *Journal of Public Economics,* Vol. 95, 476-487.

Lerman, R.I. and S. Yitzhaki. 1985. Income inequality effects by income source: A new approach and applications to the United States. Review of Economics and Statistics 67: 151-156.

Stark, O., J.E. Taylor and S. Yitzhaki. 1986. Remittances and inequality. Economic Journal 96: 722-740.

IRC (2012), "Tác động của chương trình 135 giai đoạn II qua lăng kính hai cuộc điều tra đầu kỳ và cuối kỳ".

Pham. H., Le. T, Nguyen C. (2011), "Poverty of the Ethnic Minorities in Vietnam: Situation and Challenges from the CT 135-II Communes", Research report for State Committee for Ethnic Minority Affairs of Vietnam and United Nations Development Program, Hanoi, Vietnam.

Wells-Dang, Andrew (2012) *Ethnic Minority Development in Vietnam: What Leads to Success?,* background paper prepared for the 2012 Poverty Assessment, April.

World Bank (2009) *Country Social Analysis: Ethnicity and Development in Vietnam.* Washington.

World Bank (2012), "Well Begun, Not Yet Done: Vietnam's Remarkable Progress on Poverty Reduction and the Emerging Challenges", The Work Bank.

Haughton, D., Haughton, J., Le L., Nguyen, P. (2001), "Shooting Stars and Sinking Stones", Chapter 5 in "Living Standards During an Economic Boom Vietnam 1993-1998"

Nguyen, C, and Tran, A. (2013), "The role of crop land during economic development: evidence from rural Vietnam", *European Review of Agricultural Economics*, pp. 1–22, doi:10.1093/erae/jbt032

Nguyen, V.C. 2008. "Is a Governmental Microcredit Program for the Poor really Pro-poor? Evidence from Vietnam." *The Developing Economies* 46 (2), pp: 151 – 187.

Quach, M. H. and A. W. Mullineux. 2007. "The Impact of Access to Credit on Household Welfare in Rural Vietnam." *Research In Accounting In Emerging Economies* Vol. 7, pp: 279–307.

Van den Berg, M., and Nguyen V. C., 2011. "Impact of Public and Private Cash Transfers on Poverty and Inequality: Evidence from Vietnam," Development Policy Review, Overseas Development Institute, vol. 29(6), pages 689-728, November.

Nguyen V. C., 2013. "The Impact of Social Security on Household Welfare: Evidence from a Transition Country,"The European Journal of Development Research, Palgrave Macmillan, vol. 25(5), pages 737-757, December.

Pham, T.H., Le, D. T, Nguyen .V.C, (2011) "Poverty of Ethnic Minorities in Vietnam: Situation and Challenges in Programme 135 Phase II Communes, 2006-2007"

UNDP and IRC (2012) "Impact of Program 135 – Phase II through the lens of Baseline and Endline Surveys"

Dang, Hai-Anh (2012) "Vietnam: A widening Poverty Gap for Ethnic Minorities". The World Bank

Appendix 1: Estimation methods

Income Poverty Measurement

We calculate poverty by three Foster-Greer-Thorbecke poverty indexes, which can all be calculated using the following formula (Foster, Greer and Thorbecke, 1984):

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left[\frac{z - Y_i}{z} \right]^\alpha , \qquad (A.1)$$

where Y_i is a welfare indicator for person i. We use consumption expenditure per capita as the welfare indicator, since, as is well known, consumption is a better proxy for well-being than income. z is the expenditure poverty line, n is the number of people in the sample population, q is the number of poor people, and α can be interpreted as a measure of inequality aversion.

When $\alpha = 0$, we have the headcount index H, which measures the proportion of people below the poverty line. When $\alpha = 1$ and $\alpha = 2$, we obtain the poverty gap PG, which measures the depth of poverty, and the squared poverty gap P_2 which measures the severity of poverty, respectively.

Multi-Dimensional Poverty Measurement

Besides the approach of assessing poverty based on income, this study employs the methodology used by Alkire and Foster (2007, 2011) to measure multi-dimensional poverty. The multidimensional poverty index (MPI) is defined based on a number of dimensions of welfare of households. Each dimension is measured by several sub-indicators (denoted by I_k). For each household i, we first estimate a deprivation score as follows:

$$c_i = \sum_{k=1}^{K} w_k I_{ki} \qquad (A.2)$$

where w_k is the weight of indicator k, and I_{ki} is the value of indicator k of household i, and K is the number of all the sub-indicators. The sum of the weights is equal to 1, i.e.,

$\sum\limits_{i=1}^{K} w_k = 1$. It should be noted that all the indicators are binary, and an indicator of a household is equal to 1 if the household lacks that indicator.

We need to define a cut-off or threshold to identify the multi-dimensionally poor, which in the Alkire-Foster methodology is called the poverty cut-off, denoted by L. A household is considered as multi-dimensionally poor if $c_i \geq L$. Denote the number of the multi-dimensionally poor household by q, and the total number of household by n, we compute the multidimensional headcount ratio (H):

$$H = \frac{q}{n} \tag{A.3}$$

The multidimensional headcount ratio measures the proportion of the multi-dimensionally poor. This is the first component of the multidimensional poverty index. The second component is called the intensity of poverty (A):

$$A = \frac{\sum\limits_{i=1}^{n} c_i(L)}{n} \tag{A.4}$$

where $c_i(L)$ is called censored deprivation score, which is defined from the original deprivation score, c_i, as follows:

$c_i(L) = c_i$ if the household is multi-dimensionally poor, i.e., $c_i \geq L$

$c_i(L) = 0$ if the household is not multi-dimensionally poor, i.e., $c_i < L$

Finally, the MPI is the product of both: MPI = $H \times A$. The higher value of MPI means higher multidimensional poverty level. According to Alkire and Foster (2007, 2011), the MPI represents the share of the population that is multi-dimensionally poor adjusted by the intensity of the deprivation suffered the poor. The MPI takes into account not only the proportion of the multi-dimensionally poor but also the poverty intensity of these poor.

It should be noted that we can estimate the MPI at the individual level by adjusting the above formulas by household size of households.

Inequality measures

To measure inequality, we use three common measures of inequality: the Gini coefficient, Theil's L index of inequality, and Theil's T index of inequality. The Gini index can be calculated from the individual expenditure in the population (Deaton, 1997):

$$G = \frac{n+1}{n-1} - \frac{2}{n(n-1)\overline{Y}} \sum_{i=1}^{n} \rho_i Y_i \qquad (A.5)$$

where $\overline{Y}$ is the average per capita expenditure, ρ_i is the rank of person i in the Y-distribution, counting from the richest so that the richest has the rank of 1.

The Gini coefficient is area between the diagonal line and the Lorenz curve. The value of the Gini coefficient varies from 0 when everyone has the same income to 1 when one person has everything. The closer a Gini coefficient is to one, the more unequal is the income distribution.

The Gini coefficient of total income can be decomposed by inequality of income sources as follows (Lerman and Yitzhaki 1985, and Stark et al. 1986):

$$G = \sum_{k=1}^{K} S_k G_k R_k \qquad (A.6)$$

where S_k is the share of income from source k in total income, G_k is the Gini index of income from source k. R_k is the Gini correlation of income source with total income which is computed by: $R_k = \frac{Cov[Y_k, F(Y)]}{Cov[Y_k, F(Y_k)]}$, where F(Y) and F(Yk) are the cumulative distributions of total income and income from source k.

The contribution of income inequality of source k is equal to:

$$C_k = \frac{S_k G_k R_k}{G} \qquad (A.7)$$

We can compute the the percent change in total inequality due to a small percent change in income from source k by the following elasticity:

$$\frac{\partial G / \partial Y_k}{G} = \frac{S_k G_k R_k}{G} - S_k \qquad (A.8)$$

As mentioned, we also use Theil's indexes to measure income inequality. More specifically, the Theil's L index of inequality is calculated as follows:

$$Theil\_L = \frac{1}{n} \sum_{i=1}^{n} \ln\left(\frac{\overline{Y}}{Y_i}\right), \qquad (5.9)$$

The Theil's L index ranges from 0 to infinity. A higher value of Theil's L indicates more inequality.

The Theil's T index of inequality is calculated as:

$$Theil\_T = \frac{1}{n}\sum_{i=1}^{n}\frac{Y_i}{\overline{Y}}\ln\left(\frac{Y_i}{\overline{Y}}\right)$$ (A.10)

The Theil's T index ranges from 0 (lowest inequality) to ln(N) (highest inequality).

The Theil's indexes can be decomposed into inequality within subgroups and inequality among those subgroups. For example, we can decompose the Theil's L as follows:

$$Theil\_L = \frac{1}{M}\sum_{m=1}^{M}Theil\_L_m + \frac{1}{M}\sum_{m=1}^{M}\ln\left(\frac{\overline{Y}}{\overline{Y}_m}\right)$$ (A.11)

where $Theil\_L$ is the total inequality, and M is the number of groups. $Theil\_L_m$ and $\overline{Y}_m$ are Theil's L index and income mean of group m, respectively.

The decomposition analysis of $Theil\_T$ by ethnic minority groups is quite similar to that of $Theil\_L$ in this study. Thus we do not report the $Theil\_T$ decomposition analysis.

Income Decomposition Methods

Per capita income of households changed over the period 2007-2012. Some households experienced very high income growth, while some households suffered from income reduction. To examine the sources of income changes, we decompose households' income change between 2007 and 2012 into different components. Following Haughton et al. (2001), we decompose household income into income from employment activates and income from non-employment activities (such as rental and transfers):

$$Y = Y_e + Y_{ne},$$ (A.12)

where Y is household income, Y_e and Y_{ne} are employment income and non-employment income, respectively. Per capita income can be expressed as follows:

$$\frac{Y}{N} = \frac{Y_e}{N} + \frac{Y_{ne}}{N} = \left(\frac{Y_e}{H}\right)\times\left(\frac{H}{L}\right)\times\left(\frac{L}{N}\right) + \left(\frac{Y_{ne}}{N}\right),$$ (A.13)

where N is household size, H is the total number of working hours of workers (age above 14), L is the number of workers. The income difference between 2007 and 2012 is decomposed into a change in income per working hour, a change in the working hours of a worker, and a change in the proportion of working members to household size, the change in non-employment income, and a remainder as follows:

$$\Delta\left(\frac{Y}{N}\right) = \left(\frac{Y}{N}\right)_{2012} - \left(\frac{Y}{N}\right)_{2007} = \left[\left(\frac{Y_e}{H}\right)\left(\frac{H}{L}\right)\right]_A \Delta\left(\frac{L}{N}\right) + \left[\left(\frac{Y_e}{H}\right)\left(\frac{L}{N}\right)\right]_A \Delta\left(\frac{H}{L}\right)$$
$$+ \left[\left(\frac{H}{L}\right)\left(\frac{L}{N}\right)\right]_A \Delta\left(\frac{Y_e}{H}\right) + \Delta\left(\frac{Y_{ne}}{N}\right) + R. \qquad \text{(A.14)}$$

The term in bracket with low subscript 'A' is the average level of per capita income 2007 and per capita income income 2012. R denotes the remaining income.

We further decompose the income gap into the gap in income of different sources: wages, farm and non-farm income, and non-employment income.

$$\frac{Y}{N} = \frac{Y_w}{N} + \frac{Y_f}{N} + \frac{Y_{nf}}{N} + \frac{Y_{ne}}{N}$$
$$= \left(\frac{Y_w}{H_w}\right)\left(\frac{H_w}{N}\right) + \left(\frac{Y_f}{H_f}\right)\left(\frac{H_f}{N}\right) + \left(\frac{Y_{nf}}{H_{nf}}\right)\left(\frac{H_{nf}}{N}\right) + \left(\frac{Y_{ne}}{N}\right), \qquad \text{(A.15)}$$

where the lower subscript 'w', 'f', and 'nf' denote 'wage', 'farm' and 'non-farm', respectively. For simplicity, in decomposition in equation (7.4) the component 'proportion of working members in households' is dropped. The income change of households between 2007 and 2012 is decomposed as follows:

$$\Delta\left(\frac{Y}{N}\right) = \left(\frac{Y}{N}\right)_{2012} - \left(\frac{Y}{N}\right)_{2007}$$
$$= \left[\left(\frac{H_w}{N}\right)_A \Delta\left(\frac{Y_w}{H_w}\right) + \Delta\left(\frac{H_w}{N}\right)\left(\frac{Y_w}{H_w}\right)_A\right] + \left[\left(\frac{H_f}{N}\right)_A \Delta\left(\frac{Y_f}{H_f}\right) + \Delta\left(\frac{H_f}{N}\right)\left(\frac{Y_f}{H_f}\right)_A\right]$$
$$+ \left[\left(\frac{H_{nf}}{N}\right)_A \Delta\left(\frac{Y_{nf}}{H_{nf}}\right) + \Delta\left(\frac{H_{nf}}{N}\right)\left(\frac{Y_{nf}}{H_{nf}}\right)_A\right] + \Delta\left(\frac{Y_{ne}}{N}\right).$$

(A.16)

Since agricultural production accounts for a large share of income of ethnic minorities, we decompose the change in the agricultural income into the income changes due the quantity and income unit of crops and livestock. More specifically, the income change is expressed as follows:

$$YA_{2012} - YA_{2007} = \sum_i (Q_{i2012} - Q_{i2007})P_{i2007} + \sum_i (P_{i2012} - P_{i2007})Q_{i2007} + R \qquad \text{(A.17)}$$

$$R = \sum_i (Q_{i2012} - Q_{i2007})(P_{i2012} - P_{i2007}) \qquad \text{(A.18)}$$

Where YA_{2012} and YA_{2007} are agricultural income of households in 2012 and 2007, respectively. Q_{i2012} and Q_{i2007} are quantity of an agricultural product i of households in 2012 and 2007, respectively. The agricultural products include both crops and livestock. P_{i2012} and P_{i2007} are income unit of an agricultural product i of households in 2012 and 2007, respectively. The income unit is equal to the difference between the sale of an unit and the average production cost of the unit.

According to (7.6), the change in the agricultural income over 2007-2012 is decomposed to the change in agricultural outputs and the change in the income unit. Using this decomposition, we can examine which crops and livestock can bring income growth for households.

In this study, we used the decomposition methods to analyse the income change of all households, and different household groups including households with highest income growth, households with decreased income, Thai households and H'Mong households.

Regression methods

We use regressions to examine factors associated with the per capita income, the poverty, and the probability of households having the income increase or income reduction during 2007-2012. We assume log of per capita income and poverty status of household have the following functions:

$$\ln(Y_{ijt}) = \beta_0 + T_t\beta_1 + X_{ijt}\beta_2 + C_{jt}\beta_3 + v_{ij} + u_{ijt}, \qquad \text{(A.19)}$$

where, Y_{ijt} is per capita income of household i in commune j at the time t. T_t is the dummy variable of year t, which is equal one for 2012 and zero for 2007. X_{ijt} is a vector of households characteristics, and C_{jt} is a vector of commune characteristics. v_{ij} and u_{ijt} are unobserved variables that are time-invariant and time-variant, respectively.

We use a similar model as (7.8) to estimate the effect of household and commune variables on poverty status of households. To reduce the problem of endogeneity, we use

household fixed-effect regressions to estimate the model of income and poverty. The household fixed-effect regressions eliminate the unobserved variable v_{ij}.

We also use regression to explain why some households experienced high income growth and some households experienced income decrease during 2007-2012. We regress the probability of households having income increase or income decrease during 2007-2012 on change of commune and household variables overtime.

Appendix 2: Tables

Table A.1. Per capita agricultural income and share in total income

Group	2007 Per capita VND	2007 % in total income	2012 Per capita VND	2012 % in total income	Change Per capita VND	Change % in total income
Kinh	3850.0	38.0	4168.6	33.6	318.6	-4.4
Tay	3880.1	53.5	4066.5	51.0	186.4	-2.6
Thai	4306.8	73.7	3955.5	65.2	-351.3	-8.4
Muong	3661.9	50.0	3269.3	38.7	-392.6	-11.3
Nung	4166.0	63.9	5289.0	62.5	1123.0	-1.5
H'mong	3124.9	83.6	4345.0	78.6	1220.1	-5.0
Dao	3979.8	78.6	3955.0	67.5	-24.8	-11.2
Khmer	2698.4	28.6	3607.1	31.8	908.7	3.2
Hre	2480.8	52.6	2128.0	40.8	-352.8	-11.8
Ba Na	3344.4	80.2	5926.7	79.5	2582.3	-0.7
Co Tu	2504.9	50.1	2217.3	39.1	-287.6	-11.0
Others	3458.6	65.3	3781.5	57.3	322.9	-8.0
Poverty						
Poor	1925.5	65.7	3005.9	50.1	1080.4	-15.5
Non poor	5236.1	46.1	4857.4	42.6	-378.7	-3.5
Region						
North	3906.6	58.6	4418.5	52.7	511.9	-5.9
Central	3376.1	49.5	3592.6	43.5	216.5	-5.9
South	3373.3	33.2	3193.1	29.3	-180.2	-3.9
Total	3681.8	49.7	3988.2	45.0	306.4	-4.7

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Table A.2. Per capita nonfarm income and share in total income

Group	2007		2012		Change	
	Per capita VND	% in total income	Per capita VND	% in total income	Per capita VND	% in total income
Kinh	1306.4	12.9	1908.4	15.4	602.0	2.5
Tay	463.7	6.4	230.0	2.9	-233.7	-3.5
Thai	162.0	2.8	63.4	1.0	-98.6	-1.7
Muong	667.2	9.1	657.7	7.8	-9.5	-1.3
Nung	239.3	3.7	99.7	1.2	-139.6	-2.5
H'mong	118.4	3.2	134.7	2.4	16.3	-0.7
Dao	144.1	2.8	208.1	3.5	64.0	0.7
Khmer	1458.3	15.5	1788.4	15.7	330.1	0.3
Hre	65.7	1.4	93.6	1.8	27.9	0.4
Ba Na	49.8	1.2	30.2	0.4	-19.6	-0.8
Co Tu	31.0	0.6	10.3	0.2	-20.7	-0.4
Others	46.3	0.9	39.0	0.6	-7.3	-0.3
Poverty						
Poor	20.6	0.7	316.0	5.3	295.4	4.6
Non poor	1251.7	11.0	1298.7	11.4	47.0	0.4
Region						
North	440.5	6.6	530.7	6.3	90.2	-0.3
Central	513.7	7.5	515.7	6.3	2.0	-1.3
South	1507.8	14.8	2053.7	18.8	545.9	4.0
Total	673.7	9.1	837.4	9.4	163.7	0.3

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Table A.3. Per capita wage income and share in total income

Groups	2007		2012		Change	
	Per capita VND	% in total income	Per capita VND	% in total income	Per capita VND	% in total income
Kinh	2745.3	27.1	4107.5	33.1	1362.2	6.0
Tay	1294.7	17.9	2467.3	30.9	1172.6	13.1
Thai	806.1	13.8	1407.6	23.2	601.5	9.4
Muong	2000.0	27.3	3012.4	35.7	1012.4	8.4
Nung	1223.9	18.8	1969.9	23.3	746.0	4.5
H'mong	281.2	7.5	620.9	11.2	339.7	3.7
Dao	566.5	11.2	1075.4	18.3	508.9	7.1
Khmer	4006.9	42.5	4219.1	37.1	212.2	-5.3
Hre	1251.0	26.5	1633.7	31.3	382.7	4.8
Ba Na	586.7	14.1	778.3	10.4	191.6	-3.6
Co Tu	1120.9	22.4	1886.8	33.3	765.9	10.8
Others	993.2	18.8	1781.9	27.0	788.7	8.2
Poverty						
Poor	525.6	17.9	1753.9	29.2	1228.3	11.3
Non poor	2888.2	25.4	3460.2	30.3	572.0	4.9
Region						
North	1263.0	19.0	2291.8	27.3	1028.8	8.4
Central	1676.9	24.6	2712.6	32.9	1035.7	8.3
South	3353.3	33.0	3643.8	33.4	290.5	0.4
Total	1779.1	24.0	2659.1	30.0	880.0	6.0

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Table A.4: Literacy rate and the number of schooling years

	Percentage of literate people (age from 15)			The number of schooling years of people (age above 18)		
	2007	2012	Change	2007	2012	Change
Kinh	92.7	92.2	-0.5	7.22	7.47	0.25
Tay	89.1	90.7	1.5	7.14	7.55	0.41
Thai	67.6	69.4	1.8	4.78	5.24	0.46
Muong	90.6	91.4	0.8	7.51	7.77	0.26
Nung	77.3	81.0	3.7	5.75	6.35	0.60
H'mong	27.6	37.4	9.9	1.47	2.28	0.81
Dao	60.3	63.5	3.2	3.64	4.26	0.62
Khmer	68.3	69.9	1.5	4.14	4.50	0.36
Hre	52.3	55.1	2.8	2.74	3.20	0.46
Ba Na	55.5	53.1	-2.4	2.84	2.99	0.15
Co Tu	69.4	70.8	1.4	4.55	5.96	1.41
Others	56.3	60.2	3.9	3.20	3.91	0.71
Poverty						
Poor	71.4	74.4	3.1	5.48	6.00	0.52
Non poor	76.4	76.9	0.5	5.58	5.99	0.41
Region	81.2	80.4	-0.8	5.22	5.42	0.20
North						
Central	65.0	68.0	3.0	4.28	4.80	0.52
South	82.9	83.3	0.4	6.49	6.82	0.33
Total	**74.5**	**76.1**	**1.6**	**5.45**	**5.89**	**0.44**

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Table A.5. The proportion of households with electricity and telephone

	% households with electricity			% households with telephone		
	2007	2012	Change	2007	2012	Change
Kinh	92.4	98.3	5.9	37.5	79.7	42.2
Tay	83.1	93.4	10.3	15.8	71.9	56.1
Thai	63.8	78.5	14.7	4.6	59.1	54.5
Muong	92.6	99.7	7.1	14.1	82.6	68.5
Nung	76.1	92.4	16.3	15.4	79.3	63.9
H'mong	37.0	61.8	24.8	1.5	58.5	57.0
Dao	37.5	65.6	28.1	6.0	79.7	73.7
Khmer	83.9	89.5	5.6	26.9	75.1	48.2
Hre	71.1	91.9	20.8	2.6	43.5	40.9
Ba Na	97.1	99.2	2.1	0.2	63.3	63.1
Co Tu	64.3	61.4	-2.9	2.0	48.1	46.1
Others	65.7	78.8	13.1	5.1	58.8	53.7
Poverty						
Poor	66.2	82.3	16.1	6.2	66.3	60.1
Non poor	84.5	92.0	7.5	29.6	76.5	46.9
Region						
North	69.6	83.7	14.1	13.9	71.8	57.9
Central	85.4	90.9	5.5	16.5	67.1	50.6
South	83.5	94.5	11.0	34.3	76.2	41.9
Total	75.9	87.5	11.6	18.7	71.7	53.0

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

<p style="text-align:center">Table A.6. The proportion of households with televison and motorbike</p>

	% households with color television			% households with motorbike		
	2007	2012	Change	2007	2012	Change
Kinh	73.5	89.6	16.1	57.0	76.4	19.4
Tay	61.6	82.3	20.7	55.1	78.5	23.4
Thai	48.2	74.4	26.2	53.8	73.7	19.9
Muong	66.4	89.7	23.3	50.2	73.9	23.7
Nung	49.6	78.3	28.7	52.1	77.0	24.9
H'mong	12.1	41.5	29.4	23.9	53.1	29.2
Dao	32.0	58.8	26.8	47.2	72.4	25.2
Khmer	47.7	75.3	27.6	46.0	69.1	23.1
Hre	46.6	52.5	5.9	36.7	51.3	14.6
Ba Na	54.2	83.1	28.9	67.5	83.2	15.7
Co Tu	41.3	72.8	31.5	15.4	44.2	28.8
Others	51.1	68.1	17.0	44.2	61.1	16.9
Poverty						
Poor	40.3	67.4	27.1	36.6	64.7	28.1
Non poor	67.7	85.0	17.3	60.7	77.3	16.6
Region						
North	52.2	73.7	21.5	51.2	73.5	22.3
Central	61.0	78.8	17.8	47.8	68.3	20.5
South	57.4	83.3	25.9	47.4	68.9	21.5
Total	55.2	76.8	21.6	49.7	71.4	21.7

Note: The income is measured in the price in January 2012.
Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Table A.7. Headcount ratio of multidimensional poverty

Ethnic groups	Cut-off = 0.2			Cut-off = 1/3			Cut-off = 0.4		
	2007	2012	Change	2007	2012	Change	2007	2012	Change
Kinh	94.6	91.0	-3.6	78.1	71.5	-6.6	59.0	46.2	-12.8
Tay	96.2	87.9	-8.3	72.6	59.6	-13.0	53.8	38.0	-15.8
Thai	99.7	96.3	-3.3	93.2	82.7	-10.5	86.8	66.2	-20.7
Muong	90.3	86.0	-4.3	70.4	59.1	-11.3	52.9	39.7	-13.2
Nung	93.5	93.7	0.2	78.0	70.5	-7.5	65.3	51.3	-14.1
H'mong	99.9	99.6	-0.4	99.6	94.1	-5.5	97.9	89.2	-8.6
Dao	98.6	97.3	-1.3	92.6	89.7	-3.0	85.3	75.9	-9.5
Khmer	99.0	97.5	-1.5	94.4	90.5	-4.0	91.2	76.5	-14.7
Hre	97.3	100.0	2.7	97.0	97.2	0.2	90.1	77.1	-13.0
Ba Na	100.0	95.9	-4.1	97.7	76.6	-21.1	92.4	65.7	-26.7
Co Tu	100.0	91.8	-8.2	97.8	84.2	-13.6	90.5	69.8	-20.7
Others	99.9	97.2	-2.6	97.5	88.8	-8.8	91.5	77.1	-14.3
Total	**96.6**	**93.3**	**-3.3**	**84.8**	**76.9**	**-8.0**	**72.6**	**58.6**	**-14.0**

Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Table A.8. The censored index of multidimensional poverty

Ethnic groups	Cut-off = 0.2			Cut-off = 1/3			Cut-off = 0.4		
	2007	2012	Change	2007	2012	Change	2007	2012	Change
Kinh	0.45	0.39	-0.06	0.40	0.34	-0.07	0.33	0.24	-0.09
Tay	0.42	0.35	-0.07	0.35	0.27	-0.08	0.28	0.19	-0.09
Thai	0.56	0.47	-0.10	0.55	0.43	-0.12	0.52	0.37	-0.15
Muong	0.39	0.35	-0.04	0.34	0.27	-0.06	0.27	0.20	-0.07
Nung	0.46	0.41	-0.05	0.42	0.35	-0.07	0.37	0.28	-0.09
H'mong	0.65	0.58	-0.06	0.65	0.57	-0.08	0.64	0.55	-0.09
Dao	0.57	0.50	-0.06	0.55	0.48	-0.07	0.52	0.43	-0.09
Khmer	0.59	0.50	-0.10	0.58	0.48	-0.10	0.57	0.43	-0.14
Hre	0.55	0.51	-0.04	0.55	0.50	-0.05	0.52	0.43	-0.10
Ba Na	0.57	0.44	-0.12	0.56	0.39	-0.17	0.54	0.35	-0.19
Co Tu	0.56	0.45	-0.11	0.55	0.43	-0.12	0.52	0.37	-0.15
Others	0.59	0.50	-0.09	0.58	0.48	-0.10	0.56	0.44	-0.12
Total	**0.50**	**0.43**	-0.07	**0.47**	**0.39**	**-0.08**	**0.43**	**0.32**	**-0.10**

Source: Estimation from Baseline Survey 2007 and Endline Survey 2012.

Table A.9. Decomposition of income change: all househlds

	ALL households		Households with lowest income growth		Households with highest income growth	
	Change in income	*%*	Change in income	*%*	Change in income	*%*
Per capita income in 2012	8,063.0***		3,165.5***		13,940.1***	
	(319.7)		(196.7)		(941.3)	
Per capita income in 2007	6,753.9***		9,548.9***		3,830.3***	
	(247.9)		(487.9)		(179.0)	
Change in per capita income	1,309.1***	100	-6,383.5***	100	10,109.8***	100
	(426.8)		(538.9)		(960.0)	
Change in income per hour	143.8	11.0	-5,891.6***	92.3***	7,572.5***	74.9***
	(399.5)	(311.3)	(510.0)	(5.8)	(866.0)	(2.7)
Change in working hour	1,182.8***	90.4	991.5***	-15.5***	1,347.8***	13.3***
	(155.7)	(416.2)	(265.3)	(4.4)	(261.4)	(2.6)
Change in the proportion of working members	-82.2	-6.3	-485.7***	7.6***	259.5	2.6
	(88.7)	(55.2)	(161.6)	(2.4)	(182.1)	(1.8)
Change in non-employment income	62.6	4.8	-949.0***	14.9***	962.5***	9.5***
	(90.4)	(53.6)	(198.7)	(2.7)	(130.0)	(1.3)
Remainders	2.0	0.2	-48.6***	0.8***	-32.4	-0.3
	(7.3)	(1.9)	(17.1)	(0.3)	(57.7)	(0.6)
Observations	11,336		2,128		2,242	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

Table A.10. Decomposition by income sources: all househlds

	ALL households		Households with lowest income growth		Households with highest income growth	
	Change in income	%	Change in income	%	Change in income	%
Change in per capita income	1,309.1***	100	-6,383.5***	100	10,109.8***	100
	(426.8)		(538.9)		(960.0)	
Change in wage per hour	318.7***	24.3	-287.8*	4.5*	931.0***	9.2***
	(112.5)	(168.7)	(164.1)	(2.6)	(208.9)	(2.0)
Change in working hours for wage	315.1	24.1	-992.6***	15.5***	2,268.2***	22.4***
	(238.8)	(70.0)	(301.5)	(4.0)	(370.6)	(3.3)
Change in farm income per hour	-348.3	-26.6	-4,506.3***	70.6***	4,014.6***	39.7***
	(267.7)	(294.8)	(478.3)	(7.1)	(559.4)	(4.0)
Change in working hours for farm	657.6***	50.2	1,017.4***	-15.9***	-48.4	-0.5
	(195.9)	(326.9)	(346.6)	(5.4)	(252.8)	(2.5)
Change in non-farm income per hour	78.7	6.0	-483.6***	7.6***	1,273.3***	12.6***
	(101.5)	(27.7)	(127.3)	(1.9)	(358.7)	(2.9)
Change in working hours for nonfarm	-1.1	-0.1	-255.7**	4.0**	163.5	1.6
	(162.8)	(76.2)	(128.2)	(1.9)	(265.9)	(2.5)
Change in non-employment income	62.6	4.8	-949.0***	14.9***	962.5***	9.5***
	(90.4)	(53.6)	(198.7)	(2.7)	(130.0)	(1.3)
Remainders	225.8***	17.2	74.1	-1.2	545.0**	5.4**
	(66.3)	(35.6)	(216.9)	(3.4)	(239.0)	(2.5)
Observations	11,336		2,128		2,242	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.

Table A.11. Decompostion of agricultural income: all households

VARIABLES	ALL households		Households with lowest income growth		Households with highest income growth	
	Change in income	%	Change in income	%	Change in income	%
Agricultural income in 2012	14,184.1***		16,558.5***		11,275.6***	
	(613.4)		(1,218.5)		(738.1)	
Agricultural income in 2007	14,414.0***		6,189.6***		23,224.9***	
	(598.3)		(375.3)		(1,467.0)	
Change in income	230.0		-10,368.9***		11,949.3***	
	(365.4)		(952.8)		(1,223.4)	
Price of rice	262.0***	113.9	-631.9***	6.1***	564.8***	4.7***
	(93.3)	(1,073.4)	(181.4)	(1.9)	(115.4)	(1.1)
Quantity of rice	-39.0	-16.9	-2,405.3***	23.2***	2,526.3***	21.1***
	(165.0)	(1,266.9)	(293.1)	(2.9)	(604.6)	(5.3)
Price of annual crop	-562.5***	-244.6	-1,330.1***	12.8***	-206.5*	-1.7*
	(104.1)	(1,824.7)	(377.4)	(3.0)	(110.6)	(1.0)
Quantity of annual crop	-124.2	-54.0	-3,565.0**	34.4***	4,032.7***	33.7***
	(393.6)	(836.9)	(1,426.1)	(11.8)	(625.5)	(5.7)
Price of perennial crop	218.8	95.2	-300.0	2.9	1,260.3**	10.5**
	(139.0)	(507.5)	(300.9)	(3.0)	(529.5)	(4.6)
Quantity of perennial crop	-246.2	-107.1	-3,523.8***	34.0***	2,803.8*	23.5
	(421.0)	(1,216.2)	(887.1)	(8.4)	(1,599.7)	(14.4)
Price of fruit	87.5***	38.1	71.8**	-0.7**	91.1***	0.8***
	(19.0)	(330.1)	(32.8)	(0.3)	(31.4)	(0.3)
Quantity of fruit	-182.6***	-79.4	-426.7***	4.1***	-106.7*	-0.9*
	(35.0)	(714.0)	(70.0)	(0.8)	(56.7)	(0.5)
Price of pigs	204.3***	88.9	-193.0*	1.9	288.9***	2.4***
	(37.4)	(821.6)	(116.8)	(1.2)	(50.7)	(0.5)
Quantity of pigs	-26.2	-11.4	-855.1***	8.2***	1,210.1***	10.1***
	(74.6)	(380.3)	(136.9)	(1.4)	(309.6)	(2.5)
Price of ruminant	67.6***	29.4	7.6	-0.1	57.3***	0.5***
	(25.1)	(294.6)	(102.7)	(1.0)	(20.5)	(0.2)
Quantity of ruminant	899.3***	391.1	-497.6***	4.8***	2,109.9***	17.7***
	(124.2)	(3,318.1)	(109.1)	(1.1)	(325.0)	(3.4)
Price of poultry	77.8***	33.8	-119.7**	1.2**	106.2***	0.9***
	(22.1)	(297.5)	(46.8)	(0.5)	(31.2)	(0.3)
Quantity of poultry	-256.0***	-111.3	-671.5***	6.5***	287.0***	2.4***
	(49.5)	(1,179.9)	(89.2)	(1.0)	(98.4)	(0.9)
Remainder	-150.7	-65.6	4,071.5***	-39.3***	-3,076.0**	-25.7*
	(456.4)	(2,100.9)	(1,380.0)	(12.0)	(1,552.1)	(14.9)
Observations	5,666		1,064		1,119	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from Baseline Survey 135 and Endline Survey 135 during 2007-2012.