

**Income Diversification and Poverty Reduction
in the Northern Uplands of Vietnam**

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Abstract:

In the context of the economic development, income diversification is sometimes defined as the process by which households switch from growing low-value staple food crops to growing a mix of food crops and higher-value commercial crops (crop diversification) and from farming to non-farm activities (non-farm diversification). The literature on income diversification has measured trends, identified determinants, and speculated on the constraints to diversification, but there has been relatively little analysis of the contribution of diversification to income growth. This paper uses household survey data from 1993 and 1998 to quantify the contribution of crop diversification and non-farm diversification to the growth of household income in the northern upland region of Vietnam. We find that rural incomes have increased substantially over this period, but non-farm income has increased at the same rate as farm income. Poor households are particularly dependent on crop income growth, while higher-income households rely more on non-farm diversification to increase their incomes. Crop diversification has made a non-negligible contribution to rising living standards in the northern uplands, but the contribution of yield growth is substantially greater. Crop income growth among poor households is based heavily on yield increases, while income growth among richer households is associated with area expansion and crop diversification. These results have implications for policies and investment to improve rural living standards.

Key words: Income growth, diversification, Vietnam

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1 Introduction

Vietnam has maintained an annual economic growth rate of 6-8 percent since the early 1990. Furthermore, this economic expansion has had concrete benefits for low-income households, reducing the rural poverty from 66 percent in 1993 to 45 percent in 1998 (Joint Government-World Bank-NGO Working Group, 2000). Part of the reduction in poverty is due to higher yields of rice and other crops, which have allowed Vietnam to become the second largest rice exporter with no expansion in rice area and no reduction in domestic consumption (Minot and Goletti, 2000). In addition, Vietnamese farmers have diversified into higher-value crops. Vietnam has become the second largest coffee producer in the world, and production and export of fruits and vegetables have risen dramatically over this period. And part of the income growth and poverty reduction is undoubtedly due to diversification into non-crop activities such as aquaculture, livestock raising, and non-farm activities.

The importance of each of these factors in rural income growth and poverty reduction has implications for policy and public investment. If most rural income growth comes from technological change which increases yields, then investments in agricultural research and extension deserve priority¹. If income growth derives largely from crop diversification, then attention needs to be focused on agricultural credit, transportation, and market information to facilitate this process. And if income growth or poverty rises mostly due to diversification into non-farm activities, then perhaps the focus should be on training, electrification, and commercial credit to stimulate non-farm employment growth.

It should be noted, however, that there may be a trade-off between raising rural incomes in general and poverty alleviation. For example, the factors that contribute to income growth for poor households may differ from those that drive income growth among other households. Thus, it is important to look at the sources of growth for different income groups.

¹ In theory, investment decisions should be made based on the size of the *marginal* contribution to growth from alternative investments. However, since this information is generally not available, a reasonable approximation is to allocate investment among growth strategies according to the *average* contribution to economic growth.

This study focuses on the patterns of income growth in the northern uplands, consisting of 14 provinces. This region is characterized by rugged topography, poor infrastructure, a relatively low population density, and a high proportion of ethnic minority households. Thus, it is not surprising that the region has the highest poverty rate in the country. According to one study, the ten poorest provinces in Vietnam are located in the northern uplands (Minot and Baulch, 2002).

In light of the lack of information on the sources of growth, this study will focus on the following questions:

- What is the relative importance of various sources of rural income growth in Vietnam: yield increases, crop price increases, diversification into high-value crops, growth in livestock and aquaculture, or the shift toward non-farm activities.
- What is the relative importance of these factors in the dramatic reduction in rural poverty in Vietnam?
- How do the sources of income growth and poverty reduction vary by region and by type of household?

Section 2 provides a brief review of studies of the causes and effects of income diversification. Section 3 describes the data and methods used to decompose income growth and measure the contribution of diversification. In Section 4, we describe the patterns of rural growth in income and expenditure between the two surveys. Section 5 decomposes rural income growth for different groups of households, focusing on the contribution of diversification to growth. And Section 6 summarizes the results and discusses some policy implications.

2 Background

Crop diversification is a somewhat ambiguous concept, being associated with both subsistence farmers and commercialization. In some contexts, poor, semi-subsistence farmers grow a wide variety of food crops in order to reduce the risk of weather- or disease-related crop failure or to meet diverse home consumption needs. This is particularly relevant for farmers in remote regions, growing crops under rain-fed conditions where rainfall is not reliable, as in many parts of sub-Saharan Africa. In contrast, in areas where poor farmers are heavily dependent on a staple crop (such as the rice economies of Asia), crop diversification is associated with the process of commercialization, in which farmers begin to combining food crops with higher-value commercial crops (Delgado and

Siamwalla, 1997). Joshi et al (2002) estimate crop diversity using state-level time-series data from India and find that it is negatively related to rainfall but positively related to road density, per capita income, and urbanization. In Cote d'Ivoire, the 1994 currency devaluation increased the incentive to diversify into cocoa, cotton, and other export crops, but richer households were better able to take advantage of this opportunity, presumably due to greater liquidity (Barrett et al, 2001). A study of Vietnam found that diversification away from rice is associated with small farms, small irrigated area, and more education (Pederson and Annou, 2002).

Income diversification is usually defined in terms of diversification into non-agricultural (or sometime non-crop) income sources. Research on this topic has examined the importance of rural non-farm income, its relationship with income and other household characteristics, the efficiency of small enterprises and their prospects for survival, and the role of farm-non-farm linkages (see for example Lanjouw and Lanjouw, 2001; Delgado et al, 2000; Reardon, 1997; and Hazell and Roell, 1983). Reardon (1997) summarizes the results of 27 studies of rural non-farm employment in sub-Saharan Africa, finding that a) wage labor is more important than enterprise income, b) non-farm rural income is more important near cities in areas with high population density and good infrastructure, and c) non-farm rural income is more common among higher-income rural households. A study of three African countries finds that income diversity is greater among high-income rural households, contradicting the idea that diversification is a risk-reduction strategy. Unskilled labor income is more common among poor households, but other types of non-farm income are more prevalent among richer households (Barrett et al, 2000). In Ecuador, the share of rural income from non-farm enterprises is positively correlated with education, electrification, proximity to markets, and the value of crop production per hectare (Escobal, 2001). And a study of the northern uplands in Vietnam asked farmers about the main constraints to income diversification and poverty reduction. The responses included lack of capital, shortage of paddy land, poor access to markets, poor irrigation infrastructure, and insufficient education (Henin, 2002).

3 Data and methods

What is income diversification and how do we measure it? Before analyzing the patterns and trends in income diversification in the north mountain region of Vietnam, it is important to address these two questions. In this section, we briefly describe the data used in this section, the definitions of diversification adopted, and the measures of diversification used.

3.1 Data

This report uses two national household surveys to examine the patterns and trends in income diversification. The first Vietnam Living Standards Survey (VLSS) was carried out in 1992-93 by the State Planning Committee and the General Statistics Office, with financial contributions from the United Nations Development Programme (UNDP) and the Swedish International Development Agency (SIDA) and technical assistance from the World Bank. The 110-page questionnaire was administered to 4800 households between October 1992 and October 1993 (see SPC/GSO, 1994 for more details). Because the bulk of the data collection took place in 1993, we will refer to it as the 1993 VLSS.

The second Vietnam Living Standards Survey was conducted in 1997-98 by the General Statistics Office, with financial support from the UNDP and SIDA and technical assistance from the World Bank. The household questionnaire covers the same topics as the 1993 VLSS, with only slight changes in the questions and format. The sample contains 6000 households, including most of the households from the 1993 VLSS, as well as additional households to provide better coverage of urban areas and the Central Highlands². The data collection took place between December 1997 and December 1998, so we refer to this survey as the 1998 VLSS.

3.2 Definitions of diversification

The term “income diversification” has been used to describe many different concepts. One definition of income diversification relates to the number of income sources and the balance among

² Because the 1993 VLSS sample was designed to be proportional to the population, the sample for the sparsely populated Central Highlands was just 128 households. Two clusters from the 1993 VLSS sample in the Red River Delta were dropped and 1290 households were added.

them (see Joshi et al, forthcoming). Diversification is sometimes defined as the process of switching from subsistence production of staple crops to commercial production of a wider range of agricultural commodities and to non-farm activities. A number of studies focus on diversification from farm to non-farm activities. Finally, diversification is often used to refer to the process by which farmers switch from low-value crops and activities to higher-value crops and activities.

The measures of diversification discussed above are static measures in that they quantify the degree of income diversification (however defined) at one point in time. We are also interested in measuring the *process* of diversification over time. In particular, we would like to measure the contribution of diversification to income growth. If we simply calculate the average value of crop production per hectare at two points in time, we are including the effect of price changes and yield changes to income growth. Thus, in order to assess the contribution of diversification, it is necessary to develop a way of decomposing income growth into various components, one of which is diversification.

3.3 Decomposing rural income growth

We can measure the contribution of income diversification to income growth by decomposing growth into increases in crop income and increases in other income, then separating crop income growth into four components: changes in yield, changes in real prices, changes in total area sown, and crop diversification, where crop diversification is the effect of reallocating land among crops on income, holding prices, yields, and total area constant.

We start with an expression for total net revenue in terms of crop income and non-crop income. Crop income can be rewritten as the product of the area planted, the average yield, and the average value per kilogram. Area, in turn, can be divided up into total area and the shares allocated to each crop:

$$R = \sum_i A_i Y_i P_i + NCY = \left(\sum_i a_i Y_i P_i \right) \sum_i A_i + NCY$$

where R = net revenue from crop production
 Y_i = yield of crop i (production per unit of area sown)
 P_i = real net income from crop i per unit of output
 A_i = area sown with crop i

a = share of crop sown area allocated to crop i
 NCY = non-crop income

Next, we take the total derivative of both sides:

$$dR \cong \left(\sum_i a_i Y_i P_i \right) d \left(\sum_i A_i \right) + \left(\sum_i A_i \right) d \left(\sum_i a_i Y_i P_i \right) + dNCY$$

The second term on the right-hand side can be switched from the change in a sum to the sum of changes:

$$dR \cong \left(\sum_i a_i Y_i P_i \right) d \left(\sum_i A_i \right) + \sum_i A_i \sum_i d(a_i Y_i P_i) + dNCY$$

$$dR \cong \left(\sum_i a_i Y_i P_i \right) d \left(\sum_i A_i \right) + \sum_i A_i \sum_i a_i Y_i dP_i + \sum_i A_i \sum_i a_i P_i dY_i + \sum_i A_i \sum_i Y_i P_i da_i + dNCY$$

The five terms on the right-hand side of the equation can be described as follows:

- The first term on the right side represents the change in crop revenue due to the change in total area allocated to crops. The expression $\sum a_i Y_i P_i$ is the weighted average net income per hectare, where the weights are the proportion of total sown area allocated to each crop (a_i).
- The second term on the right side is the change in crop revenue attributable to the change in real prices of the crops. The first summation is the total area, while the second represents the change in average gross revenue per hectare due to price changes.
- The third term is the change in gross crop revenue due to changes in yields. The first summation is the total area, while the second is the change in average gross revenue per hectare due to yield increases.
- The fourth term on the right side represents the change in agricultural revenue due to crop diversification, that is, the shift in the percentage allocation of land among crops. Again, the first summation is the total area, while the second is the change in average gross revenue due to shifts in the allocation of land among the crops. This term will be zero if there is no reallocation of land among crops ($da_i = 0$ for all crops). It will also be zero if the revenue per hectare is the same for all crops, since $\sum da_i = 0$.
- And the fifth term is simply the change in non-crop income. Non-crop activities can be further disaggregated into livestock activities, fishery activities (including aquaculture), forestry, wages, non-farm enterprise activities, transfers, and other income. These different terms have been combined to simplify the exposition.

Thus, the contribution of crop diversification to overall growth in crop income is measured by calculating the income change that would occur if cropland were reallocated among crops the way it

actually was between 1993 and 1998, but yield, prices, and total area remained constant. Dividing both sides of the equation by the overall change in income (dR) will give the proportional contribution of each component to overall growth. Naturally, this decomposition can be carried out for any region, income group, or any other category of households.

In interpreting the results, there are three qualifications that should be kept in mind. First, the decomposition is only approximate because there is an interaction term that reflects, for example, the effect of higher yields on the additional area planted.

Second, as mentioned in Section 2.2, the VLSS questionnaire does not link some inputs (hired labor, equipment rental, and storage costs) to a specific crop, so these costs are allocated in proportion to the value of output. Furthermore, the VLSS does not provide information on the cost of planting tree crops unless they were planted in the year of the survey.

Third, for fruit trees and industrial tree crops, the VLSS gives respondents the choice of expressing the total area and the productive area in hectares or in the number of trees. Since the decomposition of crop income relies on area estimates in hectares, we need to impute the area of tree crops for households that only gave the number of trees. This was done by estimating the average yield (output per hectare of productive land) based on the responses of those who gave area figures in hectares. For farms that only gave the number of trees, the productive area in hectares was calculated by dividing household output by the average yield for that crop and that region (or using a national average yield if necessary). With information on the productive area and the productive number of trees, the unproductive area was imputed from the number of unproductive trees, assuming that the tree density was the same for productive and unproductive areas.

4 Sources of income and patterns in growth

How do rural households in the Northern Upland earn their living? Based on the results of the 1998 VLSS, virtually all rural households in the Northern Uplands (100 percent of the sample) have some crop production, and it accounts for 38 percent of net household income. The most widespread crops are rice (grown by 91 percent of the rural households), maize (62 percent), water morning glory (58 percent), cassava (49 percent), and bananas (47 percent). In value terms, rice is

the most important crop, accounting for 46 percent of the total net value of crop production, followed by maize (15 percent). Tea, cassava, and litchi/longan/rambutan, each account for 5-10 percent of the value of crop production

How have the material standards of living of rural Vietnamese households changed between 1993 when the first VLSS was carried out and 1998 when the second one was. Two measures of standard of living are used: per capita consumption expenditure and per capita net income. Per capita expenditure is defined as the sum of purchases on consumption goods, the value of food produced by the household for home consumption, and the rental value of consumer durables and housing. These variables were calculated by the team of analysts at the GSO and the World Bank that first processed the results of each survey. The expenditure variables are constructed to be comparable with each other³. Per capita net income was calculated for this report. Both are expressed in constant Vietnamese dong at prices of January 2002.

The results confirm that the rapid economic growth recorded in national accounts has translated into concrete gains for rural households. Between 1993 and 1998, estimated per capita expenditure in rural areas rose 32 percent, while estimated per capita income in rural areas rose 80 percent (see Table 1 and Table 2). It is not clear whether the higher estimated income growth reflects reality or not.⁴

Female-headed households do not seem to be disadvantaged, either in terms of the level of standard of living or in terms of participation in the gains from economic growth. If anything, female-headed households may be somewhat better off, at least in terms of material well-being. On the other hand, both income and expenditure data indicate that ethnic minorities are considerably poorer than the majority Kinh/Hoa. The expenditure data (which is probably more reliable) suggest that the

³ Some minor types of expenditure were excluded from the 1998 VLSS analysis because data on those expenditures had not been collected as part of the 1993 VLSS.

⁴ One possibility is that incomes have increased more rapidly than expenditure, implying a large increase in household savings and/or investment. A second possibility is that these results are accurate for the years of the survey, but reflect annual volatility in income rather than a trend. A third possibility is sampling or non-sampling error contribute to this discrepancy. It should be noted that income and expenditure were not constructed to match each other. For example, expenditure includes the rental equivalent of housing and consumer durables because it was designed to measure the standard of living, but income excludes this component because the purpose was to focus on sources of income. Thus, it is not possible to interpret differences between income and expenditure as savings.

standard of living of ethnic minorities is 30-38 percent below that of Kinh/Hoa households and that it has risen but more slowly than that Kinh/Hoa households.

If we divide the sample for each year into expenditure quintiles⁵, then the growth in per capita expenditure is higher for the richer quintiles. The patterns for income are less clear, but growth in per capita income over 1993-98 for the poorest quintile (40 percent) is substantially than growth in the other four quintiles (72-101 percent). These results indicate that the gap between rich and poor is widening, even though the standard of living of the poor is rising.

Table 1. Summary changes in expenditure for rural households

	Per capita expenditure		Change
	1993	1998	1993-1998
	--(1000 VND/year)--		(percent)
Sex of household			
Male	1,837	2,429	32
Female	2,053	2,703	32
Ethnicity			
Kinh/Hoa	1,972	2,637	34
Minority	1,363	1,704	25
Expenditure Category			
Poorest	930	1,206	30
2	1,341	1,774	32
3	1,724	2,297	33
4	2,271	3,155	39
Richest	3,866	5,432	41
Region			
North Upland	1,529	2,008	31
Red River Delta	1,759	2,560	46
North Central Coast	1,616	2,342	45
South Central Coast	1,988	2,462	24
Central Highland	1,751	2,231	27
Southeast	2,475	3,909	58
Mekong River Delta	2,250	2,530	12
All rural areas	1,886	2,488	32

Source: Analysis of the 1993 and 1998 VLSS.

⁵ The expenditure categories are defined in terms of national quintiles for that year. For example, the first quintile in the 1993 data includes rural households that were below the 20th percentile nationally in 1993. Because the quintiles are defined nationally, each quintile will not necessarily represent 20 percent of the *rural* population. Because the quintiles are defined for each year, expenditure ranges for each quintile vary across years.

Table 2. Summary changes in income for rural households

	Per capita income		Change
	1993	1998	1993-1998
	-- (1000 VND/year) --		(percent)
Sex of household			
Male	1,565	2,818	80
Female	1,622	2,913	80
Ethnicity			
Kinh/Hoa	1,641	3,029	85
Minority	1,197	1,833	53
Expenditure Category			
Poorest	970	1,359	40
2	1,122	2,159	92
3	1,624	2,787	72
4	1,832	3,691	101
Richest	3,178	6,017	89
Region			
North Upland	1,474	2,252	53
Red River Delta	1,593	2,618	64
North Central Coast	1,172	2,375	103
South Central Coast	1,142	2,480	117
Central Highland	1,318	3,104	136
Southeast	2,163	4,081	89
Mekong River Delta	1,946	3,186	64
All rural areas	1,578	2,838	80

Source: Analysis of the 1993 and 1998 VLSS.

The regional results also show some divergence. According to expenditure data, the households in the Southeast have gained the most over the 1993-98 period (58 percent growth), while those in the Mekong Delta have gained the least (12 percent). Looking at the income data, households in the Central Highlands had the fastest growth over 1993-98, probably reflecting the expansion in coffee production over this period. The Northern Uplands experienced average growth in per capita expenditure over both periods. It should be kept in mind that the in-migration of poor households into a region will lower the average growth rate.

5 Decomposition of rural income growth

This section measures the contribution of different components of income to overall growth in rural income. First, we examine the contribution of diversification from crop production into higher-value activities such as livestock, fisheries, non-farm enterprises, and wage income. The contribution of a given activity is calculated as the change in income from that source as a percentage of the overall change in income. Second, we explore the contribution of crop diversification to the growth in overall net revenue from crop production. In this case, diversification is measured as the increase

in income that can be attributed to the reallocation of land among crops, holding constant yields, prices, and total area cropped. The method is described in more detail in Section 2.4.

5.1 Income diversification

Income diversification in the Northern Uplands

Among rural households in the Northern Uplands, net income increased from 6.9 million VND per household per year in 1993 to 11.0 million VND in 1998 (expressed in constant terms at January 2002 prices). These imply growth rates of 59 percent over 1993-1998⁶. The composition of income has changed slowly over time, with agriculture and enterprise income becoming less important and wage and forestry income becoming more important. Income from livestock, fisheries, and transfers remained roughly constant as a proportion of the total. Although the importance of crop income has declined, crop and livestock income still represent over half of the rural income in the Northern Uplands (see Table 3).

Table 3. Contribution to overall growth of each source of income in the rural Northern Uplands

Source	Net income		Share of income	
	1993	1998	1993	1998
	(1000 VND/hh/year)		-- (percent) --	
Crops	3,249	5,065	47	46
Livestock	785	1,097	11	10
Fisheries	214	310	3	3
Forestry	137	380	2	3
Enterprise	1,309	1,941	19	18
Wages	539	982	8	9
Transfers	680	1,146	10	10
Other	14	64	0	1
Total	6,928	10,985	100	100

Source: Analysis of the 1993 and 1998 VLSS.

Table 4 shows the growth rates for income from each source and the contribution of each type of income to overall income growth. For example, between 1993 and 1998 crop income rose from 3.2 million VND to 5.1 million VND in 1998, while total income rose from 6.9 million VND to 11.0 million VND. Thus, the increase in net income from crop production (1.9 million VND) contributed 45 percent of the increase in total net revenue (4.0 million VND) over this period.

⁶ These growth rates differ somewhat from the per capita income growth rates reported in Table 2 because of changes in the average household size.

Table 4. Growth of income from each source and contribution to overall growth of each source in the rural Northern Uplands

Source	Growth	Contribution
	1993-98	to total growth 1993-98
	---- (percent) ----	
Crops	56	45
Livestock	40	8
Fisheries	45	2
Forestry	178	6
Enterprise	48	16
Wages	82	11
Transfers	69	11
Other	344	1
Total	59	100

Source: Analysis of the 1993 and 1998 VLSS.

Applying similar calculations to other activities, it appears that the growth in enterprise income accounts for 16 percent of the overall growth. This is somewhat surprising in light of the results presented in Section 5.1 showing that the proportion of households with enterprise income fell substantially between the 1993 and 1998 VLSS surveys. Given that the proportion of rural households in the region with enterprise income has fallen but the total enterprise income increased 48 percent in real terms, the data suggest that the small enterprise sector is undergoing some form of consolidation, as hypothesized in Section 5.1. In other words, fewer households operate enterprises but the average size of the enterprises is rising.

The growth in wage income and in transfers each account for 11 percent of the overall growth in the net revenue of rural households in the Northern Uplands over 1993-98, while growth in livestock income accounts for 8 percent of the total growth. Although forestry income shows the fastest growth among the eight income sources, its contribution to overall growth is still relatively small (6 percent) because it is such a small source of income (see Table 4).

If we define livestock, fisheries, and forestry as high value agricultural activities, then the growth in high value agricultural activities accounts for 16 percent of the growth in overall income. If we consider non-farm enterprises and wage labor together, then growth in non-farm activities represents 27 percent of the overall growth in income.

Income diversification in other regions

How does the contribution of each income source to overall growth in rural income vary across regions? Over the period 1993-98, the contribution of crop production to income growth varied from 30 percent in the North Central Coast and the Southeast to 75 percent in the Central Highlands. The small contribution in the Southeast is due to the high level of urbanization and the availability of non-farm employment which mean that wages are an important source of income growth in this region. The large contribution of crop income in the Central Highlands is linked to the boom in coffee production during the mid-1990s. In the other three regions (the two Deltas and the South Central Coast), crop production accounts for 47-58 percent of the overall growth (see Table 5).

In spite of the variation in the contribution of crop production growth to overall growth, it is noteworthy that crop production is the most important source of rural income growth in all seven regions of Vietnam. The second largest contributor to rural income growth varies across regions. In the Northern Uplands, the Red River Delta, the Central Highlands, and the Mekong River Delta, non-farm enterprise income is the second largest contributor to rural income growth. In the South Central Coast and the Southeast, wages are the second largest contributor (see Table 5). In contrast, for urban households (not shown in the table), the sources of income growth are split almost exactly between wages, 50 percent, and non-farm enterprise income, 49 percent.

Table 5. Contribution to overall growth of each income source in rural areas by region period 1993-1998

Source	N. Uplands	Red River Delta	N.C. Coast	S.C. Coast	C. High-lands	South-east	Mekong River Delta	Rural average
	----- (percent of overall income growth) -----							
Crops	45	47	30	55	75	30	58	48
Livestock	8	-1	7	8	10	10	9	7
Fisheries	2	4	3	0	1	1	8	3
Forestry	6	0	5	2	0	2	-2	2
Enterprise	16	21	7	2	11	10	12	11
Wages	11	16	17	30	1	26	7	15
Transfers	11	12	28	3	1	18	11	13
Other	1	1	3	-1	1	3	-3	1
Total	100	100	100	100	100	100	100	100

Source: Analysis of the 1993 and 1998 VLSS.

Income diversification by income group

This section compares rich and poor households in terms of the income growth over 1993-98 and the contribution of each income source to overall growth over this period. There are two ways to

define the income categories. The top half of Table 6 divides households according to the national quintile of per capita expenditure *for that year*. In other words, it compares the poorest 20 percent in 1993 with the poorest 20 percent in 1998. The average income in the poorest quintile rose 46 percent while the average income in the richest quintile rose 125 percent. This implies that the gap between the poor and rich has widened, even though the poor have benefited from solid income growth.

The bottom half of Table 6 makes use of the fact that the 1998 VLSS contains many of the same households that were in the 1993 VLSS. In this section, we limit our analysis to households that were in both surveys, of which there are 4,299 in total and 635 in the rural Northern Uplands. By doing this, we can classify households according to their standard of living *in the base year 1993*, regardless of how much their incomes changed over the period 1993-98. More specifically, the sample is divided into quintiles according to the value of per capita expenditure in 1993. When the households are organized in this way, the growth in net income over 1993-98 does not show any consistent pattern across expenditure quintiles. The growth in net income among the poorest quintile was 57 percent, compared to 46 percent in the highest quintile. The paradoxical result is that the gap between the poor and the rich in the rural areas of Vietnam has widened, but those who were poor in 1993 gained as much as those who were rich in 1993, on average.

Table 6. Income growth between 1993 and 1998 by expenditure category

Expenditure category in each year	Net Income		Growth 1993-98 (percent)
	1993	1998	
	--- (1000 VND/hh/year) ---		
Poorest	4,715	6,8837	46
2	6,238	11,219	80
3	8,691	12,128	40
4	8,765	16,606	89
Richest	11,385	25,624	125
Expenditure category in 1993	Net Income		Growth 1993-98 (percent)
	1993	1998	
	--- (1000 VND/hh/year) ---		
Poorest	4,823	7,5577	57
2	6,296	9,520	51
3	8,808	13,836	57
4	9,113	14,818	63
Richest	11,385	16,656	46

Source: Analysis of the 1993 and 1998 VLSS. Top half of the table includes all households. Bottom half includes only households in both 1993 and 1998 samples.

The contribution of each type of income to overall growth for each income group is shown in Table 7. Here, the quintiles are defined in each year (1993 and 1998), as in the top half of the

previous table⁷. The table shows that growth in crop production is the most important source of income growth for poor households, accounting for two-thirds of the income growth. Furthermore, the contribution of crop production to income growth declines among higher-income households. Growth in crop production accounts for 69 percent of the income growth among households in the poorest group but just 14 percent of income growth among those in the richest group.

In contrast, the contribution of non-farm enterprise income to rural income growth is greatest among higher income households. Among the poorest households, enterprise income actually declined, so its “contribution” was –12 percent. In the middle three quintiles, the contribution of enterprise income ranged from -13 to 39 percent. In the highest income category, growth in non-farm enterprise income accounted for almost half of the overall income growth. Livestock and forestry income make a greater contribution to the income growth of poor households than rich, while the contribution of wage income seems to be greatest in the middle income categories.

Table 7. Contribution to overall income growth of each income source by expenditure category in the rural Northern Uplands, 1993-1998

Income source	Poorest	2	3	4	Richest	Average
	---- (percent of overall income growth) ----					
Crops	69	55	63	23	14	45
Livestock	15	7	3	7	7	8
Fisheries	2	2	4	4	1	2
Forestry	12	6	7	2	2	6
Enterprise	-12	14	-13	34	49	16
Wages	5	14	20	15	3	11
Transfers	10	3	14	16	19	11
Other	0	0	2	0	5	1
Total	100	100	100	100	100	100

Source: Analysis of the 1993 and 1998 VLSS

Income diversification by sex of the head of household

Are the sources of income growth different between male- and female-headed households in the rural Northern Uplands? As discussed earlier, female-headed households have per capita income levels equal to or slightly above those of male-headed households, on average, and the growth in income appears to be similar for both groups. Table 10 shows the contribution of each source to overall income growth for male- and female-headed households. Almost half (46 percent) of the

⁷ Although not shown here, the results are very similar if the income categories are defined in terms of the 1993 quintile, using only households interviewed in both years.

income growth of male-headed households can be attributed to growth in crop production, compared to just 33 percent among female-headed households. The other difference between them is that transfer income has grown more for female-headed households, contributing 40 percent of total income growth. These transfers are mainly remittances from family members (who may include a husband) working elsewhere. By contrast, for male-headed households, growth in transfers represents just 7 percent of the total.

Table 8. Contribution to overall income growth of each income source by gender of head of household in the rural Northern Uplands, 1993-1998

Income source	Head of household		Average
	Male	Female	
	(percent of overall income growth)		
Crops	46	33	45
Livestock	8	4	8
Fisheries	1	9	2
Forestry	6	5	6
Enterprise	19	-10	16
Wages	11	12	11
Transfers	7	40	11
Other	0	8	1
Total	100	100	100

Source: Analysis of the 1993 and 1998 VLSS

Income diversification by ethnicity of the head of household

Have income growth patterns differed between Kinh/Hoa households and ethnic minority households in the rural Northern Uplands? Earlier in this chapter, we showed that ethnic minority households tend to be poorer than average and that the growth in their income has also been below average. Here, we compare the composition of the income growth between 1993 and 1998. Growth in crop income accounts for three-quarters of the income growth of ethnic minority households. Forestry and wages are also important, each contributing 10-12 percent of the total. Enterprise income has declined, resulting in a negative contribution (see Table 9).

In contrast, crop income barely contributed one-quarter of the total income growth for Kinh/Hoa households. The largest contributor to income growth was enterprise income, which accounted for over one-third (34 percent) of the total. Forestry is much less important as a source of income growth for these households compared to ethnic minority households.

Table 9. Contribution to overall income growth of each income source by ethnicity in the rural Northern Uplands, 1993-1998

Income source	Ethnicity of head of household		Average
	Kinh/Hoa	Minority	
	(percent of overall income growth)		
Crops	26	74	45
Livestock	8	7	8
Fisheries	2	3	2
Forestry	2	12	6
Enterprise	34	-13	16
Wages	12	10	11
Transfers	14	7	11
Other	2	0	1
Total	100	100	100

Source: Analysis of the 1993 and 1998 VLSS

5.2 Crop diversification

The previous section compared the contribution of crop production and other economic activities to overall rural income growth. This section focuses on the composition of the growth in crop income.

Crop diversification in the Northern Uplands

According to the Vietnam Living Standards Surveys, the net revenue from crop production among rural farmers in the Northern Uplands increased by about 2.0 million VND/farm/year in real terms between 1993 and 1998.⁸ This section shows the composition of this growth by crop and by source of growth: area expansion, higher prices, yield improvement, and diversification into higher-value crops. The calculations for this analysis are explained in Section 2.4.

The last column in Table 10 shows the growth in net income from different crops between the two VLSS surveys. The growth in net income from rice was 602 thousand VND per household per year, about 30 percent of the overall increase in net income from crops. Sugarcane and litchi/longan each contributed another 18-20 percent of the overall increase in net income from crop production. No other crop represents more than 6 percent of the total growth in crop income.

The other way to disaggregate the growth in crop income is by the source of the growth: overall area increase, increased prices, higher yields, and diversification toward higher-value crops.

⁸ The income figures in this section differ somewhat from the ones presented in Table 3 for two reasons. First, the sample for this analysis is smaller, being restricted to rural households in the Northern Uplands *who grow crops* rather than all rural households in the Northern Uplands. Second, crop production was defined earlier to include by-products such as straw, hay, stems, and leaves. Since these by-products are not linked to specific crops in the questionnaire, they were excluded from this analysis.

This decomposition is shown in each row of Table 10. For example, of the VND 602 thousand increase in the net income from rice production, about three-quarters is due to yield increases and slightly less than one-quarter is due to area increases (this refers to sown area, so it includes cropping intensification).

Price increases did not contribute much to the growth in the value of rice production, but it did explain much of the growth in value of sweet potatoes, cassava, and sugar cane. In the case of sugar cane, the higher prices are due to the government policy to achieve sugar self-sufficiency by restricting imports, which has raised the domestic price of sugar (and indirectly sugarcane) far above the international price.

Table 10. Composition of growth in crop income in the rural Northern Uplands, 1993-1998

Crop	Area	Price	Higher	Crop diver-	Total
	Expansion	Increases	yields	sification	change
----- (1000 VND/household/year) -----					
Rice	147	19	454	-50	602
Maize	29	42	78	-78	48
Sweet potatoes	5	114	-3	-16	66
Potatoes	1	9	-2	6	17
Cassava	16	107	-17	6	112
Other staple crops	1	-1	2	5	6
Kohlrabi, cabbage, caulif.	5	47	1	-2	55
Other leafy greens	3	18	-2	3	24
Tomatoes	2	28	-3	-6	12
Water morning glory	5	44	23	-7	80
Fresh legumes	1	3	-1	0	3
Other vegetables	3	10	-1	14	32
Soybeans	8	-6	19	19	45
Peanuts	9	-28	45	4	16
Sugar cane	11	184	-20	106	417
Tobacco	5	17	16	-17	12
Other annual crops	1	43	1	-3	3
Tea	5	0	42	-20	13
Other industrial tree crops	0	-6	-3	97	-6
Citrus	1	0	-2	11	8
Pineapple	0	0	-2	3	-1
Bananas	4	-5	3	25	29
Mango	1	-1	-8	12	-7
Apple	0	-1	41	-3	3
Plum	1	6	2	1	13
Papaya	0	2	10	-2	9
Litchi, longan & rambutan	5	24	88	35	354
Custard apple	1	1	1	8	15
Jackfruit, durian	3	10	-9	4	4
Other fruit trees	3	5	16	14	18
Total	276	685	768	169	2,002
Row percentage	14%	34%	38%	8%	100%

Source: Analysis of the 1993 and 1998 VLSS

Note: See Section 2.4 and accompanying text for explanation. Columns may not add up to total because interaction term is not shown.

The diversification column gives the increase in the value of crop income due to reallocation of land away from or toward that crop, holding prices, yields, and total cropped area constant.

Expansion of sugarcane, litchi/longan, and “other industrial tree crops” all represented an increase in crop income due to crop diversification.

The bottom two rows of Table 10 shows the disaggregation of crop income by source, summing across all crops. The largest factor in the growth of crop income in the Northern Uplands was yield increases, which accounted for 768 VND/farm/year in additional income or 38 percent of the total increase in crop income. In fact, yield increases in rice alone account for almost one quarter (23 percent) of the overall increase in crop income. Price increases represented about 34 percent of the crop income growth, while expansion in cropped area accounts for 14 percent of the total. According to the comparison of the 1993 and 1998 VLSS studies, crop diversification increased the average annual net revenue from crop production in the Northern Uplands by VND 169 thousand/farm. In other words, if farmers in the Northern Uplands had maintained the same total crop area, the same yields, and the same real price, but had reallocated their land among crops following the historical pattern between 1993 and 1998, their crop income would have increased VND 169 thousand/farm. This represents about 8 percent of the total increase in income from crop production between the two surveys. Overall, these results indicate that, while crop diversification has contributed to income growth in the rural Northern Uplands, it has not been as important as growth in yields and increases in real prices.

Crop diversification in other regions

The same analysis can be carried out for the rural areas of the other regions. In the interest of saving space, we do not present the crop-level results, but Table 11 summarizes the contribution of each results, each row representing the In the rural areas of the other six regions, the contribution of each factor in crop income growth. Area expansion plays a modest role in crop income growth in the Red River Delta and the two central coast regions. In fact, the Red River Delta shows a negative contribution, implying that the area cropped per farm household declined slightly between the two surveys. This is not surprising given that the growth of Hanoi and the high value of land are leading to the conversion of agricultural land to residential, industrial, and commercial uses. In contrast, area expansion is the most important growth factor in the Southeast. Although the growth of Ho Chi Minh

City is also leading to conversion of farmland, the sown area per farm household has still increased.

Increased cropping intensity probably accounts for much of this growth in sown area.

Table 11. Sources of growth in net income from crop production by region, 1993-1998

Region	Areas expansion	Price increase	Higher yield	Crop diversification	Interaction	Total
N Uplands	14	34	38	8	7	100
Red R Delta	-21	85	53	13	-30	100
NC Coast	3	59	30	7	1	100
SC Coast	6	50	71	4	-31	100
C Highlands	17	41	34	17	-9	100
Southeast	76	53	-12	8	-25	100
Mekong Delta	33	32	44	39	-48	100
Average	17	50	39	17	-23	100

Source: Analysis of the 1993 and 1998 VLSSs.

On a national level, crop diversification accounted for 17 percent of the growth in crop income between 1993 and 1998. The contribution of crop diversification to crop income growth is highest in the Mekong River Delta. This is not surprising given that farmers there are in the process of reallocating land from rice to the cultivation of fruit and other higher-value commercial crops for export and sale to Ho Chi Minh City. At the national level, yield increases represented 39 percent of the growth, and higher real prices contributed 50 percent.

Crop diversification by income group

The growth rate in crop income does not vary in a consistent way with the level of per capita expenditure in 1993. In other words, poor households in the rural Northern Uplands experienced as much growth in crop production income as higher income households in that region. The composition of this growth does, however, vary across income groups. Among the poorest farmers, the increase in yields represents about 61 percent of the increase in crop income (see Table 12).

The contributions of area expansion, yield increases, higher prices, and crop diversification to crop income growth in the rural Northern Uplands shows a fairly erratic pattern. Area expansion seems to have played a more important role in crop income growth among the households that had relatively high income. This result suggests that households with relatively high incomes in 1993 were able to use those resources to secure more land for planting crops, either through the land allocation process, through the (formal or informal) purchase of land-use certificates, or through land rental. The contribution of yield increases, though inconsistent, seems to indicate that this factor

plays a more important role in the crop income growth of poor rural households. This result is plausible since yields can be increased by applying labor more intensively and through the use of improved seed and fertilizer, which are generally scale neutral forms of agricultural technology⁹. Crop diversification may play a somewhat greater role in the crop income growth of higher income rural households, though again the pattern is not consistent. The most we can say is that the average contribution of diversification is greater in the upper two quintiles than it is in the lower two quintiles.

Table 12. Sources of growth in net income from crop production by expenditure category

Expenditure category	Areas expansion	Price increase	Higher yield	Crop diversification	Interaction	Total
Poorest	-1	29	61	10	2	100
2	8	27	54	3	9	100
3	-30	57	83	33	-44	100
4	25	48	34	-1	-6	100
Richest	60	34	24	24	-32	100
Average	18	39	45	13	-15	100

Source: Analysis of the 1993 and 1998 VLSSs (panel households only).

Note: Expenditure categories are defined according to the level in 1993.

These patterns are also seen across quintiles in other regions. Combining all the rural farm households together and classifying them by expenditure quintile, we see that crop diversification and area expansion contribute more to crop income growth among higher income households than among poor households. Furthermore, as in the Northern Uplands, poor households rely more on yield increases to boost the value of their crop income. On a national level, crop diversification accounts for 27 percent of the growth in crop income in our sample of rural farm households that were in both the 1993 and 1998 VLSS surveys¹⁰.

6 Summary and discussion

The comparison of the two surveys indicates substantial growth in income and expenditure over 1993-98. The gains for rural households have been widespread across regions and types of households. In the rural Northern Uplands, per capita expenditure grew 31 percent between 1993 and 1998, roughly equal to the national average for rural households. Although the gap between poor and

⁹ Because seed and fertilizer are divisible, this type of agricultural technology is considered more scale-neutral than mechanical technology.

¹⁰ When we consider the full samples of rural households in each survey, the contribution of crop diversification to crop income growth was 22 percent, as discussed above.

rich households widened between 1993 and 1998, paradoxically those who were poor in 1993 gained as much on average as those who were “rich” in 1993. Thus, there is little evidence that the rural poor have, in general, gotten poorer or been left behind in the rise in standards of living over the 1990s.

At the same time, crop production continues to be the most important source of income for rural households, accounting for 46 percent of the net income in the Northern Uplands. Poor rural households depend even more on crop income than other rural households. Staple food crops, particularly rice, continue to play a dominant role in crop production. Rice alone accounts for 46 percent of the net value of crop production.

Non-crop income among rural households in the Northern Uplands represented 54 percent of the total, so it is important but its share did not grow over the period 1993-98. This implies that growth in non-crop income accounted for slightly over half of total growth, but the growth rates of crop and non-crop income were almost identical. Similarly, non-*agricultural* income was stable at about 37 percent of the total. National accounts statistics indicate that, over 1995-2000, the non-agricultural sector grew from 53 to 58 percent of regional gross domestic product. If the VLSS estimates are accurate, then the expansion in the relative expansion in the non-agricultural sector may be limited to urban areas.

Over 1993-1998, the growth in crop income accounted for 45 percent of the growth in overall income for the average rural household in the Northern Uplands, but crop income contributes an even higher percentage among the poorest rural households (69 percent) and among ethnic minority households (74 percent).

Decomposing crop income growth, 38 percent is attributable to higher yields, 34 percent to higher real prices, 14 percent to area expansion, and 8 percent to crop diversification. The crop diversification in the northern uplands is mainly in the form of farmers reducing the area planted with rice and increasing the area planted to sugarcane and fruit. Nationally, crop diversification accounts for 17 percent of the growth in crop income. The contribution of crop diversification is highest in the Mekong Delta, where farmers have converted rice land to expand production of fruit and aquaculture.

The sources of crop income growth vary across income groups. Poor households increased their crop income largely by achieving higher yields, particularly for rice, while richer households

increased their incomes by expanding the area cultivated. The contribution of diversification shows an erratic pattern across income categories, but appears to be less important for poor rural households than others.

Four implications can be drawn from these results. First, national economic growth has been translated into rapid improvements in standards of living in the poorest area of rural Vietnam. Although the income gap is widening, there is no general tendency for the poor to get poorer, be left behind, or even experience lower-than-average growth rates. Second, this growth has been based largely on growth in crop production, in particular from price and yield increases. This suggests that crop production is not necessarily a “dead-end” for small farmers. Third, assuming that resources should be allocated toward factors in proportion to their contribution to growth, priority should be given to agricultural research and extension in the northern uplands. This does not imply that programs to foster diversification should be eliminated, but they should not be allowed to divert resources from technology development. Fourth, the importance of crop diversification varies widely by region, being much more important among farmers in the Mekong Delta. Finally, since income from wages and non-farm enterprises is positively correlated with household income, untargeted efforts to assist existing non-farm enterprises will generally favor high-income rural households.

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