Does Agriculture Help Poverty and Inequality Reduction? Evidence from Vietnam

Nguyen Viet Cuong*

Abstract

This paper measures impacts of production of crops, forestry, livestock and aquaculture on household welfare, poverty and inequality in rural Vietnam using fixed-effects regressions. Data used in this paper are from Vietnam Household Living Standard Surveys 2002 and 2004. It is found that impact estimates of the production of crops and forestry on per capita income and consumption expenditure are not statistically significant. Impact estimates of the livestock production are positive and statistically significant for per capita income, but not statistically significant for per capita expenditure. However, the aquacultural production has positive and statistically significant impacts on both income and expenditure. As a result, the aquacultural production helps the producing households reduce the poverty incidence by 4.3 percentage points. It also decreases the poverty gap and poverty severity indexes of the producing households by around 13 percent and 15 percent, respectively. The aquacultural production also reduces the rural expenditure inequality, albeit at an extremely small magnitude.

Keywords: *Agriculture, farm households, welfare, poverty, inequality, Vietnam.*

JEL Classification: I32, Q12, O13

Introduction

There is wide consent that agriculture plays an important role in economic development and poverty reduction. Agriculture can contribute to economic growth through different channels such as provision of food and employment (e.g., see Johnston and Mellor 1961; Ranis et al. 1990; Irz et al. 2001; Timmer 2002; World Bank 2008, etc.). Together with the trend of trade liberalization, agricultural export can bring important sources of income for countries, especially the developing ones[1]. A large proportion of the poor are often agriculture-based, and agricultural growth can be a key to pro-poor growth and poverty alleviation (Andersen and Lorch 1995; UNDP 1997; Irz et al. 2001; World Bank 2008). The negative relationship between agricultural growth and poverty is found and quantitatively measured in a large number of studies (Rangarajan 1982; Coxhead and Warr 1991; Datt and Ravallion 1996; Thorbecke and Jung 1996; Irz et al.

* Nguyen Viet Cuong, Development Economics Group, Mansholt Graduate School, Wageningen University, Hollandseweg 1, 6706 KN Wageningen, The Netherlands
Email: c_nguyenviet@yahoo.com, Tel: (84) 904159258, Fax: (844) 693369

2001).

However, agriculture is not always a panacea for poverty reduction. Agriculture is always associated with economic and natural risks. The poor farmers, especially in developing countries are most vulnerable to these risks. For example, a country which relies on agricultural export can be adversely affected by global economic shocks (Winters et al. 2004; Easterly and Kraay 2000). A sudden decrease in prices of agricultural outputs can quickly push the poor households who are in tradable agriculture into losses and poverty. Natural risks such as calamity and diseases can result in heavy loss for agricultural households. In addition, the industrial and service sectors tend to grow more quickly than the agricultural sector in the long run. The shrinking of agriculture relative to industry and service has been observed in both developed and developing countries. The non-farm employment and business have been proved to be an effective way to increase household income and reduce poverty (e.g., Lanjouw and Lanjouw 1995; Lanjouw 1997, Van de Walle 1994, Ruben and Van den Berg 2001, etc.)

Vietnam has been an agricultural country, with around 60 percent of the population involved in agricultural activities in 2006. Vietnam has achieved both high agricultural growth and fast poverty reduction. The export value of agricultural products increased from 40380 billion VND to 153985 billion VND during the period 1995-2006[2]. The incidence of poverty was reduced from 58 percent in 1993 to 15 percent in 2006. However, there is an evidence of the agricultural shrink. The proportion of households involved in agricultural activities was reduced from 80 percent to 60 percent during the period 1995-2006. The share of agriculture in GDP decreased from 26 percent to 19 percent during the same period. The share of agricultural products in total export revenue also decreased from 32 to 14 percent. It is not clear whether agriculture still makes great contribution to household income and poverty reduction.

The main objective of this paper is to examine to which extent households' agricultural production affects household welfare, poverty and inequality in rural Vietnam. Information on this impact evaluation can be of interest to policymakers and researchers for at least two reasons. Firstly, it informs how well the agricultural sector can increase household welfare, reduce poverty and inequality compared to the non-agricultural sector. Economic transformation is a major development policy of the government. In the government's socioeconomic plan of the period 2006-2010, agriculture, industry and services are expected to achieve annual growth rates of 3, 10 and 8 percent. If agriculture is still very important in income increase and poverty reduction, the government should have measures to promote not only non-agricultural but also agricultural activities. Secondly, information on impacts of different agricultural products can be helpful for design of policies of agricultural development and poverty reduction.

In this paper, fixed-effects regression is applied to measure the impact of agricultural production. Then, a simple method is used to measure the impact of agricultural production on poverty and inequality. Data used in this paper are from Vietnam Household Living Standard Surveys (VHLSS) in 2002 and 2004.

There are five sections in this paper. The second section describes data sources used in this paper. The third section gives brief overview of poverty and the agricultural sector in Vietnam. Next, the fourth section presents findings on impact estimation. Finally, the fifth section concludes.

Data Sources

The study relies on data from the two VHLSSs conducted by General Statistics Office of Vietnam (GSO) with technical supports from the World Bank (WB) in the years 2002 and 2004. The 2002 and 2004 VHLSSs cover 30000 and 9000 households, respectively[3]. The selection of the samples follows a method of stratified random cluster sampling so that the samples are representative for the national, rural and urban, and regional levels. It is very interesting that the 2002 and 2004 VHLSSs set up a panel of 4000 households, which are representative for the whole country, and regions of large population.

The surveys collect detailed information through household and community level questionnaires. Information on households includes basic demography, employment, education, health, income, expenditure, housing, fixed assets and durable goods, participation of households in poverty alleviation programs.

Information on commune characteristics is collected from 2960 and 2181 communes in the 2002 and 2004 surveys, respectively. Data on commune characteristics consist of demography and general situation of communes, economic conditions and aid programs, non-farm employment, agricultural production, local infrastructure and transportation, education, health, and social affairs. Commune data can be linked with household data. However, the commune data in the 2004 VHLSS are only available for rural areas.

This study focuses on the rural population. The main reason is that commune variables are used in regression analysis, and there are only data on commune variables for rural areas in the 2004 VHLSS. In Vietnam, around 75 percent of the total population and 90 percent of the agricultural population are living in rural areas. The number of households in the rural panel for 2002-2004 is 3099.

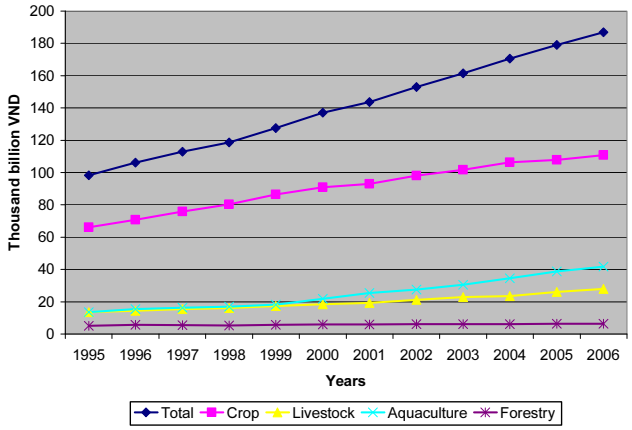
Poverty and Agricultural Production in Vietnam

In this study, a household is classified as poor if their per capita expenditure is below the poverty line which is calculated by WB and GSO. The poverty line is equivalent to the expenditure level that allows for nutritional needs and some essential non-food consumption such as clothing and housing. The poverty lines in 2002 and 2004 are equal to 1917 and 2077 thousands VND, respectively. Between 1993 and 2004, the proportion of people with per capita expenditure under the poverty line dropped dramatically from 58 to 20 percent. However, the poverty rate remained rather high in rural areas, at 25 percent in 2004. Together with reduction in poverty, inequality was increasing overtime, albeit at a moderate pace. The Gini index increased from 0.33 in 1993 to 0.37 in 2004.

The agricultural production is defined broadly in this paper. It includes production, processing and marketing of crop, livestock, forestry and aquaculture. Agriculture has been contributing substantially to economic growth in Vietnam. The annual growth rate of agriculture was around 6 percent during the period 1995-2006. Figure 1 shows that the crop production accounted for a very large proportion of the total agricultural production. Crops and aquaculture also had higher growth rates than livestock and forestry.

However, there was an evidence of shrink of the agricultural sector in the economy. The ratio of households involved in agricultural activities was decreased from 80 percent to 60 percent during the period 1995-2006. The share of agriculture in GDP was

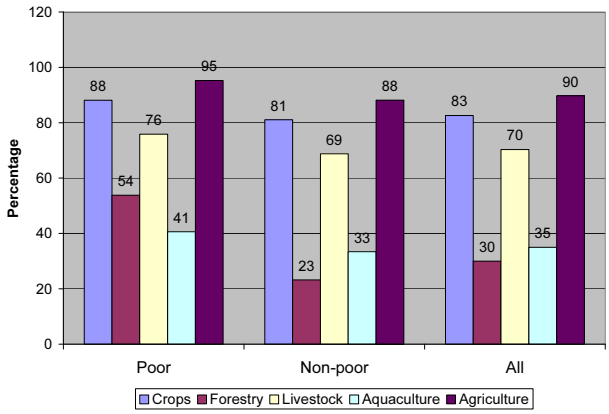
also reduced over time. Its share was decreased from 26 percent to 19 percent during the period 1995-2006. In addition, the share of agricultural products in total export revenue was reduced more quickly, from 46 percent in 1995 to 23 percent in 2006.



Source: Statistical Year Books of GSO of Vietnam

Figure 1. Agricultural value during 1995-2006

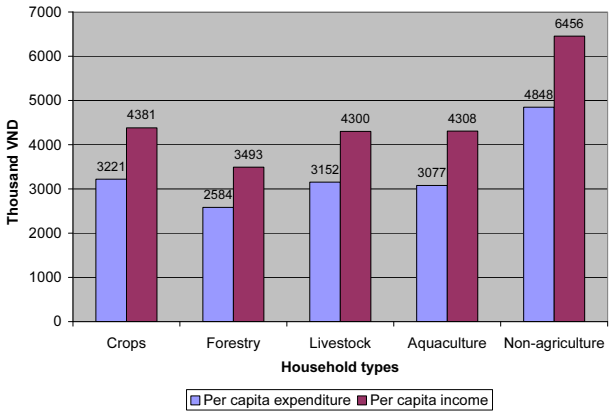
Figure 2 presents the proportion of rural households producing different agricultural products and compares this proportion between the poor and non-poor. In the rural areas, up to 90 percent of households were involved in agriculture. The poor were more likely to produce agricultural products than the non-poor.



Source: Estimates from VHLSS 2004

Figure 2. Percentage of households producing agriculture products in 2004

However, the non-agricultural households tended to have higher consumption expenditure and income than the agricultural households (Figure 3). For example, per capita income of the non-agricultural households was 6456 thousand VND, while per capita income of the agricultural households was 4300 thousand VND in 2004.



Source: Estimates from VHLSS 2004

Figure 3. Expenditure and income of agricultural and non-agricultural households in 2004

To short, although a large proportion of population is involved in agriculture, the agricultural sector is decreasing compared to other sectors. In addition, the non-agricultural households tend to be richer than the agricultural ones. Thus, an important question is whether the agricultural production still makes contribution to income and consumption growth and poverty reduction. This question will be discussed in the following section.

Impact of Agricultural Production

Impact Evaluation Method

This section presents a method to measure impacts of agricultural production on per capita income and consumption. Assume the following function of households' outcome at time *t*:

$$\ln(Y_i) = \alpha + X_{it}\beta + D_{it}\gamma + u_i + v_{it}, \quad t = 1,2, \tag{1}$$

where Y_i is per capita income or expenditure of household i, X_{it} are household characteristics at time t, and D_{it} are the binary variables indicating the productions of the agricultural products, i.e. crops, forestry, livestock and aquaculture. The effect of D is measured by γ. The unobservable component is decomposed into two elements: u_i which is time-invariant and allowed to be correlated with D_{it}, and v_{it} which is time-variant but uncorrelated with $D_{it.}$

The difficulty in estimating effect of the agricultural production is their endogeneity in the outcome equation. Unobserved variables such working conditions, production skills and information can be different between agricultural and non-agricultural households. A standard method to deal with endogeneity is instrumental-variables regression. However, finding valid instruments for all the four agricultural products is not a simple task. In this paper, we apply the fixed-effect regression, which can solve the problem of correlation between the agricultural production and error terms under assumption that the correlation goes only through time-invariant error terms. This assumption would be reasonable during a short time period of 2002-2004. Using the panel data, we can run fixed-effects regression of equation (1). Once the parameters in (1) are estimated, we can estimate the impact of D on poverty and inequality.

In this paper, poverty is measured by three Foster-Greer-Thorbecke poverty indexes which can all be calculated using the following formula (Foster et al. 1984):

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - Y_i}{z}\right]^\alpha, \tag{2}$$

where Y_i is consumption expenditure per capita for person i, z is the 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 which measures the proportion of people below the poverty line. When $\alpha = 1$ and $\alpha = 2$, we have the poverty gap index which measures the depth of poverty, and the squared poverty gap index which measures the severity of poverty, respectively.

To measure the 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 as follows:

$$G = \frac{1}{n(n-1)\bar{Y}}\sum_{i>j}\sum_{j}\left|Y_i - Y_j\right|, \tag{3}$$

where $\bar{Y}$ is the average per capita expenditure. The value of the Gini coefficient varies from 0 to 1, and the closer a Gini coefficient is to one, the more unequal is the expenditure distribution.

The Theil L index of inequality is calculated as follows:

$$Theil\_L = \frac{1}{n}\sum_{i=1}^{n}\ln\left(\frac{\bar{Y}}{Y_i}\right), \tag{4}$$

The Theil L index ranges from 0 to infinity, and the higher the value of Theil L, the higher the inequality is.

The Theil T index of inequality is calculated as:

$$Theil\_T = \frac{1}{n}\sum_{i=1}^{n}\frac{Y_i}{\bar{Y}}\ln\left(\frac{Y_i}{\bar{Y}}\right) \tag{5}$$

The Theil T index ranges from 0 (lowest inequality) to ln(N) (highest inequality).

The impact of the agricultural production on a poverty index of the producing households is expressed as follows:

$$\Delta P = P(D=1, Y_1) - P(D=1, Y_0), \tag{6}$$

where Y_1 and Y_0 are potential outcomes with and without the agricultural production. The first term in the left-hand side of (6) is the poverty measure of the agriculture-producing households in the presence of the agricultural production. This term is observed and can be estimated directly from the sample data. However, the second term in the left-hand side of (6) is the counterfactual measure of poverty, *i.e.*, poverty index of the agriculture-producing households if they had not produced the agricultural products. This term is not observed directly, and it is estimated using predicted expenditure from the fixed-effect regression. For an agricultural household i (with D=1), their expenditure without the agricultural production is simply as follows:

$$\hat{Y}_{0(D=1)} = e^{\left(\hat{\alpha}+X_i\hat{\beta}+\hat{u}_i+\hat{v}_{it}\right)} = e^{\left[\ln(y_i)-\hat{\gamma}\right]}. \tag{7}$$

Regarding to inequality, we measure the impact of the agricultural production on inequality of the whole rural population. The impact on an inequality index is expressed:

$$\Delta I = I(Y) - I(Y_0), \tag{8}$$

where $I(Y)$ is an observed inequality which is calculated using the observed expenditure data. $I(Y_0)$ is the inequality index in the absence of agriculture, which is calculated using predicted expenditure from equation (7). The standard errors of estimates can be calculated using the bootstrap technique.

Estimation *Results*

Table 1 presents the impact estimation of the production of the agricultural products on per capita expenditure and income using the fixed-effects regressions. Widely-used explanatory variables in income and expenditure models include household composition, characteristics of household head, education of household head and members, household assets, and characteristics of communes and villages. Table 1 shows that impact estimates of production of crops and forestry are not statistically significant in both the expenditure and income equations. Impact estimates of livestock are statistically significant for per capita income but not for per capita expenditure. The livestock production increases per capita income of households by around 6.3 percent. Impact estimates of aquaculture are statistically significant in both the expenditure and income regressions. The production of aquaculture helps households increase per capita expenditure and per capita income by around 4.7 percent and 7.3 percent, respectively. The point estimates of the impact on per capita income are higher than on per capita expenditure, which implies that the aquacultural production might also increase saving or investment of households.

Table 1. Fixed-effect Regression of Expenditure and Income

Explanatory variables	Logarithm of per capita expenditure		Logarithm of per capita income	
	Coef.	Std. Err.	Coef.	Std. Err.
Production of crop	-0.02728	0.02946	-0.00285	0.04309
Production of forestry	-0.00812	0.01748	0.00285	0.02407
Production of livestock	0.01527	0.01749	0.06346***	0.02262
Production of aquaculture	0.04733***	0.01650	0.07270***	0.02186
Ratio of members younger than 16	-0.14900**	0.06556	-0.26238***	0.08018
Ratio of members who older than 60	-0.21520***	0.06672	-0.36041***	0.08159
Head age	0.01286	0.00823	0.00739	0.00910
Head age squared	-0.00011	0.00008	-0.00007	0.00009
Household size	-0.13288***	0.02209	-0.14088***	0.02468
Household size squared	0.00437**	0.00179	0.00432**	0.00190
Head less than primary school	Omitted			
Head primary school	0.01372	0.02447	0.00541	0.02594
Head lower secondary school	-0.00357	0.03539	-0.00958	0.04051
Head upper secondary school	-0.04100	0.04801	0.02525	0.05760
Head technical degree	-0.00566	0.04977	0.02071	0.06063
Head post secondary school	-0.04633	0.08959	0.04985	0.10509
Ratio of members with lower secondary school	0.19328***	0.05192	0.15369**	0.06332
Ratio of members with upper secondary	0.50927***	0.08343	0.24328**	0.09581
Ratio of members with technical degree	0.46007***	0.10449	0.32767***	0.11866
Ratio of members with post secondary	0.72508***	0.18634	0.42007**	0.20074
Ratio of members working in agriculture	-0.12470***	0.02745	-0.29964***	0.03094
Log of living areas	0.05115***	0.01728	0.06513***	0.02053
Living in permanent house	0.08654***	0.02840	0.12996***	0.03720
Living in semi-permanent house	0.04971***	0.01780	0.06882***	0.02141
Living in temporary house	Omitted			
Area of annual crop land (1000 m^2)	0.00578***	0.00128	0.01227***	0.00170
Area of perennial crop land (1000 m^2)	0.00249*	0.00136	0.00513	0.00313
Area of aquaculture water surface (1000 m^2)	0.00632**	0.00309	0.01783**	0.00850
Foreign remittances (billion VND)	0.00158**	0.00070	0.01131***	0.00160
Domestic remittances (billion VND)	0.02243***	0.00150	0.02722***	0.00194
Commune having non-farm activities	0.03209	0.02072	0.05058**	0.02458
Distance to nearest town (km)	0.00012	0.00102	-0.00123	0.00112
Distance to nearest road (km)	0.00410	0.00577	0.00078	0.00856
Distance to nearest daily market (km)	-0.00141	0.00112	0.00118	0.00150
Distance to nearest periodic market (km)	0.00136	0.00113	0.00073	0.00132
Distance to nearest post (km)	-0.00211*	0.00127	-0.00160	0.00174
Distance to nearest primary school (km)	0.00338	0.00471	0.01601**	0.00703
Distance to nearest lower secondary school	-0.00177	0.00206	-0.00541*	0.00325
Distance to nearest upper secondary school	0.00423***	0.00113	0.00273	0.00174
Dummy variable of year 2004	0.10976***	0.00950	0.13457***	0.01288
Constant	7.76637***	0.22306	8.16294***	0.25061
Observations		6198		6198
Number of households in panel data		3099		3099
R-squared		0.485		0.455

* significant at 10%; ** significant at 5%; *** significant at 1%, Figures in parentheses are robust standard errors.

Source: Estimation from VHLSSs 2002 and 2004

Table 2. Impact of Agricultural Production on Poverty

Poverty index	With production	Without production	Impact
Impact of crop production			
Poverty incidence (P0)	0.2681***	0.2510***	0.0171
	(0.0098)	(0.0223)	(0.0208)
Poverty gap index (P1)	0.0664***	0.0611***	0.0053
	(0.0033)	(0.0067)	(0.0058)
Poverty severity index (P2)	0.0242***	0.0220***	0.0022
	(0.0016)	(0.0029)	(0.0024)
Impact of forestry production			
Poverty incidence (P0)	0.4339***	0.4228***	0.0111
	(0.0182)	(0.0228)	(0.0143)
Poverty gap index (P1)	0.1186***	0.1161***	0.0025
	(0.0067)	(0.0086)	(0.0050)
Poverty severity index (P2)	0.0455***	0.0443***	0.0012
	(0.0034)	(0.0043)	(0.0024)
Impact of livestock production			
Poverty incidence (P0)	0.2695***	0.2790***	-0.0095
	(0.0100)	(0.0161)	(0.0134)
Poverty gap index (P1)	0.0660***	0.0692***	-0.0032
	(0.0034)	(0.0050)	(0.0036)
Poverty severity index (P2)	0.0237***	0.0250***	-0.0013
	(0.0017)	(0.0023)	(0.0015)
Impact of aquaculture production			
Poverty incidence (P0)	0.2820***	0.3254***	-0.0433**
	(0.0143)	(0.0231)	(0.0186)
Poverty gap index (P1)	0.0700***	0.0806***	-0.0106***
	(0.0045)	(0.0062)	(0.0039)
Poverty severity index (P2)	0.0254***	0.0299***	-0.0045***
	(0.0022)	(0.0029)	(0.0017)

* significant at 10%; ** significant at 5%; *** significant at 1%
Figures in parentheses are standard errors. Standard errors are corrected for sampling weights and estimated using bootstrap (non-parametric) with 200 replications.
Source: Estimation from VHLSSs 2002 and 2004

Table 3. Impact of Agricultural Production on Inequality

Poverty index	With production	Without production	Impact
Impact of crop production			
Gini index	0.2902***	0.2893***	0.0009
	(0.0047)	(0.0048)	(0.0010)
Theil L index	0.1385***	0.1377***	0.0009
	(0.0046)	(0.0047)	(0.0010)
Theil T index	0.1447***	0.1437***	0.0009
	(0.0059)	(0.0060)	(0.0011)
Impact of forestry production			
Gini index	0.2902***	0.2896***	0.0006
	(0.0049)	(0.0051)	(0.0012)
Theil L index	0.1385***	0.1379***	0.0006
	(0.0048)	(0.0051)	(0.0012)
Theil T index	0.1447***	0.1441***	0.0006
	(0.0061)	(0.0063)	(0.0011)
Impact of livestock production			
Gini index	0.2902***	0.2909***	-0.0007
	(0.0046)	(0.0046)	(0.0008)
Theil L index	0.1385***	0.1392***	-0.0007
	(0.0046)	(0.0046)	(0.0008)
Theil T index	0.1447***	0.1455***	-0.0008
	(0.0058)	(0.0058)	(0.0010)
Impact of aquaculture production			
Gini index	0.2902***	0.2920***	-0.0018**
	(0.0046)	(0.0048)	(0.0007)
Theil L index	0.1385***	0.1402***	-0.0017**
	(0.0046)	(0.0047)	(0.0007)
Theil T index	0.1447***	0.1466***	-0.0019**
	(0.0058)	(0.0060)	(0.0008)

* significant at 10%; ** significant at 5%; *** significant at 1%
Figures in parentheses are standard errors. Standard errors are corrected for sampling weights and estimated using bootstrap (non-parametric) with 200 replications.
Source: Estimation from VHLSSs 2002 and 2004

Table 2 presents impact estimates of the agricultural production on poverty. It shows that only aquaculture has negative and statistically significant estimates of impact on poverty. This is because the poverty indexes are estimated using per capita expenditure, and only aquaculture helps households increase expenditure. The production of aquaculture reduces poverty incidence (P0) of the producing households by 4.3 percentage points. It also decreases the poverty gap index (P1) and the poverty severity index (P2) by around 13 percent and 15 percent, respectively.

Table 3 presents impact estimates of the agricultural production on inequality. Similar to the impacts on poverty, only aquaculture has statistically significant impacts on inequality. However, the impacts are extremely small. The production of aquaculture decreases the Gini index by around 0.6 percent, and reduces the Theil indexes by around 1.2 percent.

Conclusions

This paper aims to measure the impact of agricultural production on household welfare, poverty and inequality in rural Vietnam. The data used in this paper are from Vietnam Household Living Standard Surveys in 2002 and 2004. It is found that the production of crops and forestry does not have statistically significant impacts on both per capita expenditure and per capita income. The production of livestock helps household increase per capita income but not per capita expenditure. More specifically, the livestock production increases per capita income of households by around 6.3 percent. On the other hand, impact estimates of aquaculture on both expenditure and income are positive and statistically significant. The aquacultural production increases per capita expenditure and per capita income by around 4.7 percent and 7.3 percent, respectively. The point estimate of the impact on per capita income is higher than on per capita expenditure. It implies that the aquacultural production might also increase saving or investment of households.

Regarding the impact on poverty, only the production of aquaculture helps the producing households reduce poverty. The production of aquaculture reduces poverty incidence (P0) of the producing households by 4.3 percentage points. It also decreases the poverty gap index (P1) and the poverty severity index (P2) by around 13 percent and 15 percent, respectively. In addition, the aquacultural production reduces the rural expenditure inequality, albeit at an extremely small magnitude. The findings suggest that for the time being the agricultural sector in general is not a very effective way for poverty and inequality reduction compared to the non-agricultural sector. Among the sub-sectors of agriculture, aquaculture is the most effective activity for income and expenditure increase as well as poverty and inequality reduction in Vietnam.

Notes

[1]The role of trade liberalization is discussed in numerous studies e.g., Harrison, 2005; Winters et. al., 2004; and McCulloch et al., 2001.

[2] 1 USD is approximately 16000 VND in January 2006.

[3]In 2002, GSO increased the sample size to 30000 households so that the data could be

representative for some large provinces. However, this large sample survey was very costly, and the sample size of VHLSS 2004 was reduced to 9000 households.

References

APF Canada. (2005). Asia Pacific Bulletin. No. 216, July 8, 2005, Asian Pacific Foundation of Canada.

Coxhead, I. A. and Warr, P. G. (1991). Technical Change, Land Quality and Income Distribution: A General Equilibrium Analysis. *American Journal of Agricultural Economic*s 73: 345-60.

Datt, G. and Ravallion, M. (1996). How Important to India's Poor is the Sectoral Composition of Economic Growth. *World Bank Economic Review* 10 (1): 1-25.

Easterly, W. and A. Kraay. (2000). Small States, Small Problems? Income, Growth, and Volatility in Small States. *World Development* 28(11): 2013-27.

Goldberg, P. and N. Pavcnik (2004), "Trade, Inequality and Poverty: What Do We Know?", *Brookings Trade Forum* 2004*,* 223-269. Brookings: Washington, DC.

Harrison, Anne (2005), "Globalization and Poverty", National Bureau of Economic Research Conference Report, edited by Harrison Anne, Chicago University Press.

Irz, X, Lin Lin, Thirtle, C and Wiggins, S. (2001). Agricultural Productivity Growth and Poverty Alleviation." *Development Policy Review*. 19(4):449-466.

Johnston, B.F. & Mellor, J.W. (1961). The Role of Agriculture in Economic Development.', *American Economic Review* 51: 566-93.

Lanjouw, J. O. and Lanjouw, P. (1995). Rural Nonfarm Employment: A Survey. Policy Research Working Paper, 1463. The World Bank: May.

Lanjouw, P. (1998). Ecuador's Rural Nonfarm Sector as a Route Out of Poverty. Policy Research Working Paper, 1094. The World Bank: March.

Lewis, W. A. (1954). Economic Development with Unlimited Supplies of Labor. *The Manchester School* 22: pp. 3-42.

McCulloch, N., Winters, L.A. and Cirera, X. (2001). *Trade Liberalization and Poverty: A Handbook.,* London, Centre for Economic Policy Research.

Milner, C. and Wright, P. (1998). Modeling Labor Market Adjustment to Trade Liberalization in an Industrializing Economy. *Economic Journal* 108: 509-28.

Rangarajan, C. (1982). Agricultural Growth and Industrial Performance in India. Research Report 33. Washington DC, IFPRI.

Ranis, G., Stewart, F. and Angeles-Reyes, E. (1990). *Linkages in Developing Countries: A Philippine Study, ICS Press for International Center for Economic Growth*, San Francisco, CA.

Revenga, A. (1997). Employment and Wage Effects of Trade Liberalization: The Case of Mexican Manufacturing, *Journal of Labor Economics* 15(3, pt2): S20-S43.

Ruben R and M. van den Berg. (2001). Nonfarm employment and poverty alleviation of rural farm households in Honduras. *World Development* 29(3): 549-560.

Seshan, G. (2005). The Impact of Trade Liberalization on Household Welfare in Vietnam." World Bank, Washington DC.

Thorbecke, E. and Jung, H. S. (1996). A Multiplier Decomposition Method to Analyse Poverty Alleviation. *Journal of Development Economics* 48(2): 279-300.

Timmer, C.P. (2002). Agriculture and Economic Development, in B. Gardner and G. Rausser eds., *Handbook of Agricultural Economics, Vol* 2: Elsevier Science B.V.

Van de Walle, D. (1994). Rural Poverty in an Emerging Market Economy: Is Diversification into Nonfarm Activities in Rural Viet Nam the Solution? Policy Research Department. The World Bank, Unpublished Manuscript.

Winters Alan, McCulloch, and Andrew McKay. (2004). Trade Liberalization and Poverty: The Evidence So Far. *Journal of Economic Literature* Vol. XLII (March 2004).

World Bank. (2008). World Development Report 2008: Agricultural for Development. World Bank, Washington DC.