

## SOME SOLUTIONS TO INCOME OF FARMING HOUSEHOLDS IN PHÚ THỌ PROVINCE

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*Phú Thọ is a mountainous province in North Vietnam, and its Phú Ninh is a typical district on low hills living on agriculture. The living standard here is still low: average personal income is VND7.6 million a year, 14% of families here are poor, and 20.5% of under-fives are undernourished [1]. The situation shows that working out scientific measures to increase the personal income is really a challenge to policy makers. To achieve this aim, it is necessary to identify factors that affect the farming household income. Therefore the paper tries to address two aspects: Scientific basis for income-affecting factors and suggested solution to farming household income.*

### 1. Scientific basis for income-affecting factors

#### a. Literature review:

According to Park S.S. (2002), labor productivity is a condition for changes in the income. What affects the productivity will have impacts on the income. Lewis (1955), Oshima (1995), Randy Barker (2002) [2], and Đinh Phi Hồ (2008) conclude that factors affecting the labor productivity in agriculture comprise: farming area per household, mechanization (rental of machines), loan capital, agricultural knowledge, and biological cost (expenses on seeds, fertilizer and chemicals). Đinh Phi Hồ (2010) [3] presents factors affecting the income of rice-growing peasants in Cambodia in the following model:

$$\ln Y = B_0 + B_1 \ln DT + B_2 \ln MC + B_3 CA + B_4 \ln KL + B_5 \ln LC + B_6 \ln BC$$

$$Y = F(DT, MC, CA, AK, LC, BC)$$

Dependent variable:

Y: Income (Total sales of rice per laborer in the family)

Independent variables:

DT: Farming area per family (ha)

MC: Mechanization cost (riell,000/ ha/year)

CA: Loan capital from formal sources (CA = 1, or with loan; CA = 0, or without loan)

KL: Agricultural knowledge

LC: Labor cost

BC: Biological cost

Independent variables have positive linear relations with dependent variable, except for Labor cost.

#### b. Facts from Vietnam:

Experience from success of Bắc Ninh in increasing farming household income by financing training courses and technology transfer; supplying soft loans from National Fund 120, Bank for Social Policy, international organizations, Fatherland Front, civic organizations, families and communities; and providing free legal advisory services to poor families [4].

In Vĩnh Phúc, there is a Board for Agricultural Knowledge that made plan to supply such knowledge to some 200,000 farming householders in 2007-2009 and in 2010 to all householders in the province. As a result, peasants started to change their way of doing business and pay more attention to information about market prices, technology and employment. Many of them have now expanded their production generating sources of commercial farm products and more income for fellow peasants [5].

In Quảng Trạch District, Quảng Bình Province, 75% of households conducted semi-intensive farming to produce grass for their cow herds. The av-

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average herd kept by a household increased from 1-2 head of cow to 3-4 one and their income rose VND3 -5 million a year. The same thing also happened to pig-keeping families. The average herd of pig a household keeps at a time rose from 2-3 to 6-7 head. Many of them can keep from 10 to 15 pigs at a time or keep two or three litters a year. The productivity also rises remarkably. After four months, they can sell the pigs when their average weight is some 80kg. Pig-keeping households can earn annually from VND3 to 6 million more.

Measures taken by these localities and proven successful can affect the household income by changing the factors concerning source of capital, technical knowledge and non-cropping jobs [6].

### *c. Selected model:*

Theories and realities show that the factors affecting the household income are farming area, labor force, loan capital, and technical knowledge.

Phù Ninh District, however, with a natural area of 15,651 hectares (63.32% of this area are on the hills, and the cultivable land occupies 8,981 hectares), lives mostly on agriculture and the labor surplus is inevitable without non-cropping occupations [7]. Moreover, from initial observations and remarks, the authors realize that the income of households living on crop growing is smaller than the ones earned by households doing non-cropping jobs or doing farming based on loan capital and economic knowledge [8]. Thus, income from non-cropping jobs in Phù Ninh, besides above-mentioned factors, is worth studying and added to the research to present diversity of household economic structure.

The model used for studying income-affecting factors in Phù Ninh District is as follows:

$$\text{LnTNHAP} = B_0 + B_1\text{LnDTDAT} + B_3\text{LnVVON} + B_4\text{LnKTHUC} + B_5\text{DADANG}$$

**Table 1: Variables in the model**

Variable	Expectation sign
Dependent variable: Income/ laborer/ year (TNHAP, VND1,000)	
Independent variables:	
Farming land area (DTDAT, hectare)	+
Loan capital from formal credit institutions (VVON, VND1,000)	+
Agricultural knowledge (KTHUC, point)	+
Diversity (DADANG, Diverse = 1; Otherwise = 0)	+

Estimates of parameters are conducted with OLS method based on SPSS and comprise the following steps:

Step 1: Running the linear regression with all variables selected for the model to produce initial results

Step 2: Assessing the fit of the model (through adjusted R<sup>2</sup> and ANOVA test) before taking the step 3

Step 3: Checking for violations of necessary assumptions:

- Multicollinearity (by VIF and correlation matrix): If multicollinearity exists, each variable will be tested until the multicollinearity is eliminated.

- Heteroskedasticity (using Spearman rank correlation test): If the heteroskedasticity is found in a variable, the variable will be removed from the model and the regression is run again. The step 2 is repeated until no heteroskedasticity is found in all remaining variables

### *d. Model test:*

The authors conducted the survey from February to April 2009 at five communes (Phù Ninh, Bình Bộ, Phú Lộc, Phú Nham, and Gia Thanh) and Phong Châu Town of Phù Ninh District. Four inland communes are Phù Ninh, Phú Lộc, Phú Nham and Gia Thanh while Bình Bộ is a riverside commune and Phong Châu is the center of Phù Ninh District that houses many public buildings, factories and company offices (the most remarkable are Bãi Bằng Paper Factory and Đồng Lạng Industrial Park). The survey covered 200 families as samples selected at convenience; and direct interviews with these families were conducted in this survey period.

- Initial model:

**Table 2: Regression results of the initial model**

	Unstandardized coefficient		Standardized coefficient	Sig.
	B	Standard error	β	
(Constant)	45.161	0.8521		0.0000
LnDTDAT	0.2096	0.0937	0.1885	0.0272
LnVVON	0.1950	0.0684	0.2281	0.0052
LnKIENT	0.9439	0.4076	0.1945	0.0224
DADANG	0.7338	0.1395	0.4286	0.0000

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Dependent variable: LnY

Table 2 shows that four variables (farming area, loan capital, householder's knowledge and diverse pattern of production) have a 95% significance (Sig. < 0.05). When carrying test for heteroskedasticity, however, the LnVVON violates the assumption (Spearman test, with significance of rank correlation smaller than 0.05). This variable is removed and the modified model is as follows:

$$\text{LnTNHAP} = B_0 + B_1\text{LnDTDAT} + B_2\text{LnKTHUC} + B_3\text{DADANG}$$

- Modified model:

**Table 5: Pearson correlation coefficient matrix**

	LnY	LnDTDAT	LnKTHUC	DADANG
LnY	1	0.134075	0.337329	0.485311
LnDTDAT	0.134075	1	0.2554	0.21905
LnKTHUC	0.337329	0.2554	1	0.092548
DADANG	0.485311	0.21905	0.092548	1

Table 5 shows that the independent variables have correlation coefficients smaller than 0.6. This result, along with VIF < 10 (shown in the Table 3) allows us to affirm that the regression model is free from collinearity.

**Table 3: Regression results of the modified model**

	Unstandardized coefficient		Standardized coefficient	Sig.	Collinearity statistics	
	B	Standard error	β		Tolerance	VIF
(Constant)	58.692	0.5277		0.0000		
LnDTDAT	0.2162	0.0734	0.1817	0.0036	0.8754	11.424
LnKTHUC	11.221	0.2775	0.2444	0.0001	0.9116	10.970
DADANG	0.8561	0.1020	0.5025	0.0000	0.9284	10.771

Table 3 shows that all independent variables have significance smaller than 0.05. Thus, variables DTDAT, KTHUC, and DADANG have statistical significance and positive relations with the income.

- Tests of modified model:

The Durbin-Watson value of 1.876 (greater than 1 and smaller than 3) implies that the initial model has no autocorrelation.

**Table 4: ANOVA**

	Sum of squares	Degree of freedom	Mean square	F-value	Sig.	Adjusted R <sup>2</sup>	Durbin Watson
Regression	386.095	30.000	128.698	351.047	0.0000	0.34069	1.876
Residual	714.895	1.950.000	0.3666				
Total	1.100.990	1.980.000					

Results show that the linear regression model after running ANOVA (with reliability of 99%) has enough conditions to allow a conclusion that the model is appropriate to the data. Independent variables explain 34% of changes in the dependent variable.

**Table 6: Spearman test**

		ABSRES
ABSRES	Correlation coefficient	1
Logarithm DTDAT	Correlation coefficient	0.105
	Significance (two-tail)	0.139
Logarithm KTHUC	Correlation coefficient	0.156
	Significance (two-tail)	0.028
DADANG	Correlation coefficient	0.113
	Significance (two-tail)	0.113

The Spearman test for heteroskedasticity shows that the independent variables after two-tailed test (area, agricultural knowledge, and diversity) have significance greater than 0.05. This means that there is no change in variance of error.

We conclude that the adjusted model has statistical significance with all tests conducted.

Thus, the model DPH2-2010:

$$\text{LnTNHAP} = 5.8692 + 0.2162\text{LnDTDAT} + 1.1221\text{LnKTHUC} + 0.8561\text{DADANG}$$

is the final model selected for our Phù Ninh case.

- Conclusions from the model :

+ The variables DTDAT, KTHUC, and DADANG can explain 34% of changes in the household income.

+ The variable DTDAT has a positive relation with the household income and a statistical significance. This means that when other factors in the model stay unchanged, the income increases by 0.22% when the rice-growing area increases by 1%.

+ The householder's knowledge is directly proportional to the income. It increases by 1.12% when the householder's knowledge gains one more point.

+ The diversity of production pattern also has the same effect on the income. The income increases by 0.85% when one more household diversifies its production pattern.

+ The standard regression coefficient reflects roles of factors affecting the income in order of importance: Diversity (0.5), Knowledge (0.24), and Farming Area (0.18).

Thus, to increase the household income in the Phù Ninh District, local authorities must (1) encourage diversification of production pattern; (2) improve the householders' knowledge; and (3) accelerate the land accumulation by farming households.

## 2. Policy-related suggestions

To increase the income of peasants in Phù Ninh, policies should deal with the following problems:

**Firstly**, changes in the agricultural production must be accelerated.

- Structure of farm products should be more reasonable:

In these districts, local residents do crop farm-

ing and animal husbandry according to their long-established habits. For example, they usually grow cassava – a crop of low market price – or keep pigs using leftover. Local authorities had better encourage and help peasants to grow crops appropriate to hillside fields such as tea or wax tree. Farming land of low yield can be used for mariculture. In animal husbandry, peasants can keep chickens or pigs in natural environment without using stimulant-added feed to supply to big cities where personal income is higher.

- Attracting local and foreign investment to create more jobs:

Realities show that peasants cannot increase their income based on their hillside fields. With labor surplus (farming area per household is very small and in many cases, requires only one laborer from the household), non-farming occupations are much needed. At present, there are 4,925 personal businesses and 11 foreign-invested projects in the district. To attract investors, local authorities should make procedures more simple and convenient and ensure transparency and equal treatment. As for projects that have come into operation, local authorities should ensure favorable conditions and cooperate with investors for long-lasting and sustainable benefits.

- Identifying and encouraging production of specialties:

The specialties of the district are products that remind users of hillside landscape, such as palm forests or hillside tea plantations. Some products that have a long tradition from the district, such as cakes made from yam or glutinous rice, could be attractive to tourists and therefore, local authorities should help producers build their brand names.

**Secondly**, householders' knowledge should be improved.

- Agricultural extension activities should be turned into on-the-job training courses: Agricultural extension activities should be linked with fieldwork instead of being limited to lectures on agricultural techniques. Demonstrations of farming techniques at the rice fields or places where animals are kept (hen coop or pigsty) are very necessary. Authorities had better offer bonuses or incentives to households that carry out successfully instructions from experts; and help them deal



with bad consequences when their efforts fail.

- Supplying vocational training courses to every household: Such courses should be held at communes instead of centers or towns that are far from target learners in order to encourage them to take the courses without worrying about travel cost or neglecting their farming work.

- Disseminating the will to get rich among peasants: Events celebrating or honoring successful peasants should be held regularly.

**Thirdly**, farming land accumulation should be allowed and encouraged. The land accumulation can create favorable preconditions for production of larger scale because farming land in the district is divided into very small pieces.

- Peasants should be allowed to exchange farming land and annex new pieces of land to their existing field: Although this practice does not really increase the farming area for the peasants (except for some small increases because borders between rice fields are removed), larger rice fields can allow mechanization and easier irrigation or drainage, thereby reducing the production cost.

- Accelerating the task of granting land use right certificates to newly reclaimed land and land zoned for afforestation: In this district, many peasants who have reclaimed waste land or contracted to grow forest had no land-use right certificates. Local authorities had better grant them such title-deed in order to make them feel sure about their investment and effort. Moreover, there must be a plan to use the public land because at present, the afforestation is done in an unruly manner while the Bãi Bằng Paper Factory and other concerns producing furniture in the district are badly in need of raw materials. Local authorities should establish good relations between peasants and these concerns, zone the land for afforestation and help peasants to grow forest reasonably and effectively, thereby ensuring the supply of raw materials for local concerns.

- Encouraging the development of farms: The Phú Thọ Statistical Yearbook 2008 says Phù Ninh District has 30 farms while the Phù Ninh socioeconomic report in 2008 mentions 120 farms. This difference may come from different criteria

adopted by district and provincial statistics offices, but the report says that all farms develop well and stably. Thus, local authorities can encourage farming households to develop large-scale farms by supplying soft loans, granting the land-use right certificates timely, providing technical assistance, introducing new strains of plants and animals, and building the infrastructure in communes where farms are developed■

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