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Factor Effects to Farm Household's Income in Nari District, Bac Kan Province

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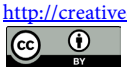

Abstract

Na Ri is the mountainous district in the Eastern of BacKan province, where agriculture sector remains the main contributor to the income of farmer. However, the income sources of farmers often depend on the instability prices of output agricultural products; which leads to near-poor farmers being vulnerable to falling back into poverty under the impact of this risk. By using survey data from 287 households, this study analyzed the factors affecting the income of farming households in Na Ri district. The research results showed that the number of income sources is the factor that has the greatest influence on the total income of the household with the coefficient of 22,329, followed by the loan size, land area, occupation, number of dependent members, and education level of household head. From the analysis results, the study also proposed some solutions to increase income for households in the research area: 1) Diversifying income sources, 2) Actively changing careers, 3) Enhancing access to credit capital, 4) Encouraging farmers to improve their own cultural level.

Subject Areas

Agricultural Engineering, General Business Research

Keywords

Factor, Effect, Farm Household, Income, Multiple Regressions

1. Introduction

In Vietnam, agricultural economics is currently playing an important role in the national economy; the majority of the Vietnam population having livelihood depend on agriculture. Moreover, the structure of agriculture, forestry, hunting and fishing annually accounts for about 14.85% of the total GDP of the country.

[1]. Thus, many authors have pointed out that the agricultural economics is making a great contribution to improving the livelihoods and households income in rural areas of Vietnam [2] [3] [4]. On the other hand, along with the development of economic sectors, the household economic is also constantly developing in size and form; households income in rural areas is increasingly improved [5].

Na Ri is a mountainous district in the eastern part of Bac Kan province; Na Ri district has a tropical climate, and suitable for agricultural activities similar to other provinces in the Northeast region of Vietnam. According to the forest resource survey results, the total land area of Na Ri district is 85,300 ha, accounting for 17.54% of the natural area of Bac Kan province, which, agricultural land has nearly 82,000 hectares, accounting for over 95% of the total land area [6].

At present, the agricultural sector is still the main contributor to the households income in Na Ri district. However, in reality in agricultural production, households still reveal many limitations such as: most of the households are still small-scale production, did not accord to the planning; unable to forecast market demand; prices fluctuate and depend on the market; low production efficiency. On the other hand, the source income generated by households is often unsustainable due to the instability of output prices; it leads to near-poor farmers being vulnerable to falling back into poverty under the impact of the risk. Low income also leads to limited access to essential needs and services of society.

Therefore, this study will deeply analyze the income status of farm households in Na Ri district, find out the factors affecting the households income. Hence, this study will propose the solutions to improve and stabilize income and livelihoods of farm households in rural areas in the district. The research results will be a scientific basis for policy makers in making policies related to social security for rural people in Na Ri district, Bac Kan province.

2. Households Income and Factors Affecting Income

2.1. Households Income

The income definition used in this paper is based on the income used in the CIFOR global PEN study [7]. The PEN study identifies income as the added value of labor and capital (including land). Total household income is total cash plus living income. Living income is determined by calculating the value of products used directly by the household or given to friends and relatives. Products for household consumption were reported and independently controlled by comparing them to retail prices in local markets during the time of consumption [7].

In addition, the mixed income of the household is calculated as the part obtained after taking the total revenue minus the material costs, minus the outsourced wages and deducting other costs (including taxes, depreciation of fixed assets, etc.). Applying these perspectives, the household income in the study area is determined as the remainder of the total revenue after deducting material and

service costs, depreciation and taxes to get that revenue for a certain period of time (usually a year).

2.2. Factors Affecting Household's Income

According to the studies of Shittu *et al.* (2005), Mohammad Samaun Safa (2005), Nem Nei Lhing, (2013), Klasen *et al.* (2013), Wanjiku (2017), Anzidur Rahman (2017), Karmini (2017) farm household income is influenced by many factors such as capital, land, education level, production experience, number of member, ability to diversify income, access opportunities market, etc. [8]-[15]. However, these factors can be divided into three main groups: 1) Characteristics of the household head such as gender, education level, age, occupation etc; 2) Characteristics of the household such as land area, the number of laborers, the number of activities generating income, loans etc; 3) Policy factors such as state subsidies, agricultural extension activities, land ownership characteristics, market access opportunities etc.

On the other hand, studies in Vietnam by Nguyen Quoc Nghi *et al.* (2011); Nguyen Tien Dung *et al* (2014); Do Huu Nghi *et al.* (2016) shown that factors such as education level, land area, duration of residence in the locality, distance from home to the center, amount of loan, interest rate and number of labor has an effect on the households income [16] [17] [18]; Studies result of Nguyen Khanh Doanh *et al.* (2014); Chu Thi Kim Loan and Nguyen Van Huong (2015); Le Dinh Hai (2017) also pointed out that the resources of household such as the land size, the number of labor, education level were directly proportional to the household's income; which land size and number of labor have the greatest influence. In addition, abillity access to loans, gender of the household head, geographical location and production costs also had impact on groups of farmers [4] [19] [20].

3. Material and Methods

3.1. Sampling Method

To select sample households for the survey, we used a three-stage procedure following the method. The first stage is selection of sampled district in the targeted province. This district ensures that there are socio-economic conditions representative of the province. This means that the household's income in the district is at the provincial average. Thus, we identified Nari district in BacKan province based on diversity of land use, other official data available for all districts, and the households in this district can be representative of other districts in terms of income and livelihood. In the second stage, we selected six communes with typical economic conditions in Nari district as: Kim Hi, Con Minh, Xuan Duong, QuangPhong, Lam Son, Kim Lu.

In the third stage, we obtained records of all house-holds in a commune from the commune leader and, based on the econimic condition average of households. We selected one village from each commune and randomly selected 55

households from each village, resulting in a total of sample of 330 households; after excluding the damaged and wrong samples, we selected 287 households (see Table 1). The power of the sample size is calculated at 5% accuracy using the Taro Yamane formula [21]: n = N/(1 + Ne2) in which n is sample size, N is the total number of households in the area, and e is reliability.

3.2. Data Collection

Primary data were collected covering the period from June to August in 2021, were conducted with household heads (or another senior household member in their absence), using the participatory approach, focus group discussions and through questionnaires in a face-to-face interview technique. The surveys and interviews were conducted by author and six local enumerators. Vietnamese or ethnic languages were used (as required) to conduct the surveys, with the data recorded in Vietnamese, and then later translated into English by an author (with crosschecking and random back-translations by author's colleague to ensure quality).

The questions asked with a fixed range of answers; some questions allowed for more choices answer by household. The questionnaire also covered general household socio-economic characteristics or household head characteristics (e.g., age, household size, gender, assets, income, expenditure, health aspects, economic activities, social cultural factors, market factors, institutional infrastructure facilities) and qualitative information about income, livelihoods, loans and risks. For village information, data were collected from the head of the village and members of the village committee.

Secondary data in this study include scientific research works, books, newspapers, magazines, statistical yearbooks of communes in Na Ri district; reports of departments, agencies and branches of Na Ri district.

3.3. Data Analysis

3.3.1. Analytical Model

Based on previous study result as well as specific economic conditions of the study area. The authors propose to use linear regression model to evaluate the

Table 1. Total number of samples selected.

District	Commune	Villages	Number of Households
Na Ri	Kim Hy	Na Mo	45
	Con Minh	Na Ngoan	51
	Xuan Duong	NaTuong	38
	QuangPhong	NaBuoc	53
	Lam Son	Pan Khe	49
	Kim Lu	Dong Tam	51
	Total		**287**

factors affecting on household income in Na Ri district. The factors affecting on household income are modeled as follows:

INCOME = β_0 + β_1 AGE + β_2 GENDER + β_3 EDUCATION + β_4 JOB + β_5 MEMBER + β_6 DMEMBER + β_7 LANDA + β_8 SINCOME + β_9 LOCATION + β_{10} EXTENSION + β_{11} LOAN + ε.

In addition, the explanation variables in the model are shown in Table 2.

3.3.2. Data Processing Methods

The study used statistical analysis software STATA 14 for descriptive statistical analysis, comparative statistics and for determining main factors affecting on households income. The results of the comparative statistical analysis and the multivariable linear regression model are the basis for propose some solutions to improve the total household income in study area.

Table 2. Explain the variables in the model.

	Explain	Unit	Expect
TOTAL INCOME	The dependent variable represents the total household income	Million VND/year/household	
AGE	Age of households head	Year	+
GENDER	Gender of household head	Dummy variable, taking 1 value if the head of the household is male, 0 if the head of the household is female	+
EDUCATION	Number of years schooling of the household head	Get value from 1 to 12 if head of household finished high school, from 13 to 16 if finished university degree	+
JOB	Occupation of household head	Dummy variable, taking 1 value if the household head working in the non-agricultural sector, 0 values if the household head working in the agricultural sector.	+
MEMBER	Total number members of the household	Person	+
DMEMBER	Total number of dependent members of the household	Person	-
LANDA	Land area of the household	Hectare	+
SINCOME	Total income sources of the household	Million VND	+
LOCATION	Distance from home to market	Km	-
EXTENSION	Number of days participating in agricultural extension training in a year	Day	+
LOAN	Size of household loan	Dummy variable, taking 1 value if household borrowing less than 30 million, 2 value if borrowing from 30 - 50 million,3 value if borrowing over 50 million	+

4. Results and Discussions

4.1. Characteristics Households

4.1.1. Age, Gender and Education Level

The data in Table 3, Table 4 show that the average age of the household head were quite high, more than 52 years old; while the youngest household head was 30 years old and the oldest was 87 years old. Regarding gender, from Table 3, Table 4 we can see that the male household head accounting the majority with 80.14 percent while the female household head accounting only 19.86 percent. In terms of educational attainment, the majority household heads have less than high school education level, household heads with above high school education level accounting low percentage, only about 2.44 percent. Meanwhile, the proportion of household heads with only primary education level accounting a large proportion, up to 21.25 percent.

Table 3. Characteristics of households survey according to variables.

No	Indicators	Minimum value	Maximum value	Average value
1	Age of households head	30	87	52.45
2	Member of households	2	7	3.69
3	Total number of dependent	1	5	2.35
4	Land area	0.1	19.67	2.53
5	Source income	3	7	4.29
6	Total income of households	16	682.7	89.18

Source: Data collection from 2021.

Table 4. Characteristics of household's survey.

No	Indicator	Number	Rate (%)
I	**Gender of household head**		
1	Male	230	80.14
2	Female	57	19.86
II	**Education level of household head**		
1	Primary	61	21.25
2	Secondary	110	38.33
3	High school	109	37.98
4	University degree	7	2.44
III	**Size of household loan**		
1	Do not lend	67	23.34
2	Less than 30 million	140	48.78
3	From 30 to 50 million	29	10.10
4	Above 50 million	51	17.77

Source: Data collection from 2021.

4.1.2. Labor Force

Table 3 shown that the household has minimum member that two members and maximum members about seven people; On average, each household has about 3.69 members; The number of dependent members of households surveyed ranges from one to five members. On the other hand, each household has approximately 2.35 dependent members, this shown that with a high percentage of dependent members will lead to greatly affect to the total households income.

4.1.3. Land Area

The average land area of households was also about 2.53 hectares. However, the land area of households have a large difference, while the household with the smallest land area has only about 0.1 hectares, the largest land area of household has 19.67 hectares. Based on previous studies, we find out that land area will have a great effect on the ability to generate income of households, especially those have income depends on agriculture activities.

4.1.4. Income of Households

The total number generating sources income of households were 4.29; in which households with the fewest sources of income were three and households with the most income sources were seven sources. The number of sources income is affected by many factors such as: The number of members, the number of dependent members, the land area, etc. In fact, the more sources of income mean that households have more opportunities to increase their income.

The average total income of the households is 89.18 million VND per year. There is a big difference in income between households, while the households with lowest total income is only about 16 million VND per year, that households with highest total income reaches 682.7 million VND per year. This is considered a lower income level than the average of district; however, it is relatively consistent with the number of main laborers of households in the socio-economic context of Na Ri district.

4.1.5. Loan Size

Nearly half of surveyed households only borrowed capital of less than 30 million (48.78 percent). Meanwhile, the number of households without loans also accounting high proportion approximately 23.34 percent; Loans from 30 million to 50 million were rarely chosen by households when accounting for only about 10.1 percent. The number of households borrowing more than 50 million was accounting lowest proportion, only about 17.77%.

4.2. The Factorseffect on the Total Households Income

4.2.1. Regression and Model Testing

When analyzing the factors effect on the total household's income in the sample, the authors used a multivariable linear regression model with the dependent variable being the total household income, and the others independent variables. The data and the calculating process of the regression results are

done by STATA 14 software and the initial regression results are shown in detail in Table 5.

Although Table 5 shown that the regression model is appropriate because of the large F value and R-squared value (F = 71.98, and R^2 = 0.7422), but when considering the level of statistical significance of the independent variables, there are four independent variables have no statistical significance. Besides, four factors including age, gender of the household head, distance to the market and the number of days participating in agricultural extension training had no effect on the total household's income.

In order to accurately determine the factors affecting total household income, the authors continue to perform multivariable regression with the remaining variables after removing four variables that were not statistically significant above; the results of the regression after removing non-significance statistical variables are shown in Table 6.

Table 6 shown that all independent variables were statistically significant, the F value and the R-squared coefficient were large (F = 110.71 and R^2 = 0.7353). Thus, the model was completely appropriate; the independent variables explain

Table 5. Regression model.

Independent variables	Unnormalized coefficients	Standard deviation	t-value	Significance (Sig.)
Constant	−111.994	25.171	−4.45	0.000
AGE	**0.377**	**0.238**	**1.58**	**0.114^{NS}**
GENDER	**−6.319**	**5.761**	**−1.1**	**0.274^{NS}**
EDUCATION	1.533	0.725	2.11	0.036*
JOB	14.96	6.092	2.46	0.015*
MEMBER	9.673	2.899	3.34	0.001**
DMEMBER	−11.501	4.246	−2.71	0.007**
LANDA	15.109	1.062	14.23	0.000**
SINCOME	24.237	3.827	0.633	0.000**
LOCATION	**−3.154**	**2.379**	**−1.33**	**0.186^{NS}**
EXTENSION	**0.755**	**0.656**	**1.15**	**0.251^{NS}**
LOAN	15.487	2.669	5.8	0.000**
Dependent: INCOME				
Number of samples: 287				
F-value: 71.98				
R^2 Coefficient: 0.7422				
R^2 Coefficient adjust: 0.7319				
Durbin Watson: **1.888173**				

Note: Asterisks **, * are significance levels at 1%, 5% and 10%, respectively; NS: Non-significance levels

Source: Calculate by authors.

Table 6. Regression model after removing non-significance.

Independent variables	Unnormalized coefficients	Standard deviation	t-value	Significance (Sig.)	Vif-value
Constant	−89.384	18.999	−4.45	0.000	
EDUCATION	1.677	0.727	2.31	0.022*	1.2
JOB	15.159	6.102	2.48	0.014*	1.71
MEMBER	9.015	2.877	3.13	0.002**	1.81
DMEMBER	−11.672	4.233	−2.76	0.006**	1.98
LANDA	15.257	1.046	14.58	0.000**	1.28
SINCOME	22.329	3.734	5.98	0.000**	1.65
LOAN	16.317	2.621	6.23	0.000**	1.38
Dependent: INCOME					
Number of samples: 287					
F value: 110,71					
R^2 Coefficient: 0,7353					
R^2 Coefficient adjust: 0,7286					
Durbin Watson: **1.888173**					

Note: Asterisks **, * are significance levels at 1%, 5% and 10%, respectively; NS: Non-significance levels

Source: Calculate by authors.

73.53 percent of the variation of the dependent variable.

When testing the defects of the model, we can see that the VIF value was relatively small (all less than 2), the Durbin Watson test value was 1.89 (approximately 2). Thus, the variables in the model do not have the phenomenon of multicollinearity and autocorrelation. But when conducting the error test of Heteroscedasticity by White's test, the authors found out that the model has phenomenon of Heteroscedasticity when it had a Chi squared value as 191.62 and small P value; This error has been handled by the authors when using STATA 14 software, the coefficients of the independent variables have been normalized and shown in Table 5.

4.2.2. The influence of Factors on Total Household Income

Regarding the direction of impact, Table 5 shown that except dependent member variable has the negative effect; all other variables have a positive relationship with the dependent variable; this is completely consistent with the research hypothesis presented in section 2.

Table 5 also shown that the number of sources income is the factor that has the greatest influence on the total household income, when the number of sources income increases 1 unit, it will help increase the total household income approximately 22.329 million VND. Size of the loan and the land area also have a great influence on the household's income with the coefficients of 16.317 and

15.257 respectively; Specifically, when the land area increases one hectare, the total household income will increase about 15.257 million VND.

Regression results also show that if the household head working in the non-agricultural sector; it will help to increase the total household income up to 15.159 million VND per year. In addition, the number of dependent members in the household will have a negative impact on the total household income; when the number of dependent members increases one person, the total household income will decrease approximately 11.672 million VND per year. Meanwhile, if the number member of household increases one member; but it was not dependent members, this will increase the household income by 9.015 million VND per year.

Education level also has an impact on total household income, but the coefficient was only 1.677. That means if the household head has one extra year of schooling, total income will be more generated about 1.677 million VND per year;This is a very significant finding, reinforcing the compelling evidence that higher levels of education lead to more employment opportunities for households; thereby helping household head to improve their income as well as encouraging them to enhance their education level.

4.3. Solutions to Increase Household Income

According to the study results, to help improve the household income in Na Ri district, BacKan province; the authors propose some solutions as follows:

Firstly, diversify income sources, avoid excessive dependence on one or two income sources; The main income of households in Na Ri district was still mainly depend on agriculture activities and through agricultural cultivation and afforestation. Therefore, farm households need to diversify their income sources or can intensively increase crops on their existing agricultural land; On the other hand, households should combine planting between short-term crops with long-term crops, increasing livestock and poultry raising activities, taking advantage of raw materials from agricultural cultivation and forests.

Secondly, promote vocational training for farmers in rural areas, and helping them to transition from farm jobs to off-farm jobs; Develop job opportunities and business models based on local strengths, thereby creating opportunities to change occupations of farm households and contributing to promoting sustainable local economic development.

Thirdly, enhance ability access to credit sources, increase credit scale for feasible projects, support loan procedures as well as loan interest rates and repayment time; Encourage farmers to borrow capital to change occupations, expand production and business, applying scientific and technical advances to production.

Fourthly, encourage farm households to improve their education level, adopt policies to support children of ethnic minorities and poor households to help them enhance their education level.

5. Conclusion

Poverty alleviation and income improvement for farm households are necessary and meaningful jobs. Understanding this important role, the authors selected 287 farm households in Na Ri district BacKan province to interview and study the factors effect on total household income. Using the multivariate linear regression model to analyze the survey data, the study has shown that the number of sources income is the most important factor that has influence on the total household income with the coefficient about 22.329. The next factors were the loan size and the land area of the household respectively; for example, when the land area increases one hectare, the total household income will increase about 15.257 million VND per year. The study also showed that if farm household head working in the non-agricultural sector and having a higher education level will generate higher income than others household. According to the above analysis results, the authors have proposed solutions to increase farm household income such as: 1) Diversifying income sources, 2) Actively changing occupations, 3) Enhance ability access to credit sources, 4) Encourage farmers to improve their education level. The authors believe that the solutions proposed above are probably not only policy suggestions in the study area but also used as policy suggestions for households who live in socio-economic conditions area similar to Na Ri district, BacKan province.

Conflicts of Interest

The authors declare no conflicts of interest.

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