



AGRICULTURAL LAND DISTRIBUTION OF HOUSEHOLDS BETWEEN REGIONS IN BAC GIANG PROVINCE, VIET NAM

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Abstract

The study used a data set of 399 households representing three regions in Bac Giang province (mountainous area, low mountain area, midland) to analyze distribution of household agricultural land. Besides, the simpson index is used to determine the degree of fragmentation of household agricultural land between regions. The analysis results show that household agricultural land size in the regions is small. The degree of fragmentation of agricultural land differs greatly between regions (mountainous areas - Luc Ngan district has the fragmentation index of 0.35, low mountainous areas - Lang Giang district has the fragmentation index of 0.83. Midland region - Viet Yen district has the fragmentation index of 0.63). The main reason is that Vietnam implemented a fair policy in land allocation. Although the policy of accumulation and concentration of agricultural land has been implemented, small scale and fragmentation of agricultural land is still a common phenomenon in Bac Giang province.

Keywords: Agricultural land distribution, household, fragmentation, degree of fragmentation

INTRODUCTION

Agricultural land distribution of households plays an important role in socio- economic development and livelihood security. Viet Nam' government carried out “revolutions” or “reforms” in land policies such as Land Law 1987, Resolution No. 10 – NQ/TW, Decree No. 64, Land Law 1993. Land use rights were allocated to households on the principle that land had been distributed “fairly”. In which agricultural land was equally divided on average per person or average per farmer of households according to the area and the location of land in regions of the North. Land use rights were adjusted to ensure the minimum amount of agricultural land which required for landless people in the South.

In general, Vietnam's agricultural production after reform of land polices has been based mainly on household economy with small and fragmented scale. Average agricultural land per household in 2016 (including three categories: agricultural land, forestry land and aquaculture land) was approximately 0.8 ha/household (General Statistics Office, 2016). It was lower than the region with the lowest average area of household in the world such as South Asia (the average household area in South Asia was 1.0 ha), and this area was less than half of the average household agricultural land area in Southeast Asia (the average household area in Southeast Asia was 1.8 ha) (Eastwood et al., 2006). Although the agricultural land area of households in Vietnam was small and fragmented but this scale contributed to improving the economic efficiency of agricultural production, poverty reduction and rural cultural development in the period was named “Doimoi” in Viet Nam. However, the small scale and fragmentation of agricultural land in the current period is being limited, even this is considered to be the main barrier to the development of commodity agriculture, or to improve the efficiency of land use.

Therefore, this study selected Bac Giang province in the Northern Midlands and Mountains. This province' agricultural sector was the 23rd of nationwide and topped the Northern Midlands and Mountains region. 81.25% of the total area of agricultural land was used by households (Bac Giang Department of Natural Resources and Environment, 2017). The objective of the study is to assess the extent of agricultural land fragmentation between regions in the province?

REVIEW OF THE LITERATURE

Agricultural land distribution

Agricultural land is suitable land for agricultural production, including crops and livestock (FAO, 2013 and OECD, 2007). It is the main resource in agricultural production. According to the 2013 Land Law in Vietnam, agricultural land is classified by type of use including: land for

annual crops (including: land for rice and other annual crops), land for perennial crops, land forests (including: production forest land, protective forest land, special-use forest land), aquaculture land, salt-making land, and other agricultural land (Parliament, 2013).

There are many different concepts about agricultural land distribution. According to Harriet (2015) and Huaizhou (2014), agricultural land distribution is the change of agricultural land structure over time in a system including: The allocation and redistribution of agricultural land, owners of use land the rights, land use capacity, agricultural land scale, agricultural land management, distribution range of agricultural land in each region or locality.

According to UlleEndriss (2006) agricultural land distribution is the result of steps in a sequence such as: Division, redistribution, adjustment ... these steps form the structure of agricultural land for each economic region.

Thus, the agricultural land distribution is understood as the division of agricultural land between regions, between land use types and between land users in space and time. A reasonable distribution is the one that ensures fairness for land users and brings land use economic efficiency.

Agricultural land distribution is understood in two aspects: Firstly, agricultural land distribution is a process, under the influence of factors such as policies, institutions; Economic, technical and psychological, social. The adjustment and redistribution of agricultural land takes place. They change the current state of agricultural land structure among regions, the subjects and the types of land use. Second, the distribution of agricultural land is a state, or status Which is agricultural land fragmentation or accumulation, concentration.

Household agricultural land distribution

According to Parliament (2013), land users are households that directly do agricultural production and they are allocated, leased, recognized agricultural land use rights, and received the transfer of agricultural land use rights by The state and they have a stable source of income from agricultural production on the land they are using.

Household agricultural land distribution is understood as the division of agricultural land among land-users who are households. This distribution is measured by the area and proportion of agricultural land of households, household groups across regions, land use types and occupations in the total agricultural land area of the region, locality and country.

Over a long period of time, each region, country, and locality has been affected by a group of factors: policies, institutions; economic, technical and psychological, social. The current status of agricultural land distribution forms two forms. They are small-scale and fragmented agricultural land or the accumulation and concentration of agricultural land.

In Vietnam in 1988, Resolution 10 of the Politburo (term VI) was born. The goal of the resolution is to divide agricultural land among households according to the principle of uniformity on different land types to ensure fairness to help households that have land for production. Accordingly, agricultural land is equally divided towards an average of demographics and types of land in each region.

This will lead to the fragmentation of agricultural land. The small scale and fragmentation of agricultural land can be limited in improving the economic efficiency of land use. Therefore, a "reasonable" choice to harmoniously combine equity and efficiency in household agricultural land distribution is always a target of concern by countries, as well as Vietnam.

The role of household agricultural land distribution

Household agricultural land distribution plays a very important role in agricultural development in particular and social development in general.

For households, the distribution of household agricultural land is the factor affecting land use economic efficiency and livelihood security of the household. During 2006 and 2016, the area of land allocated to households increased from 88.8% to 89.4%, the structure of agricultural land according to the type of land used changed in accordance with the crop structure. The above transformation positively contributes to improving land use economic efficiency, stabilizing people's lives in rural (Nguyen Thi Ngoc Lan, 2019).

For communities, distribution of agricultural land to households contributes to community development. It can be said that the rational distribution of agricultural land will contribute to stabilizing livelihoods for users, ensuring food security, increasing crop yields and improving nutrition for the rural poor. In addition, the distribution of agricultural land to households contributes to the development of infrastructure, housing and protection of natural resources (Rodney, 2007).

For the society, distribution of agricultural land to households ensures social justice. Land is not only a means of production for farmers, but it is also a meaningful asset in terms of psychology and society. Therefore, a fair distribution of agricultural land will help households feel secure in the production process (Lamont & Favor, 2017).

Reasonable household agricultural land distribution will increase the supply of agricultural products, ensuring input materials in the implementation of other economic development goals (Nguyen Huu Tuan, 2019).

In Viet Nam, land is owned by the State, agricultural land is used appropriately, bringing high efficiency, ensuring fairness and sustainability for the common benefit of the community. That is the goal throughout. Therefore, an even and equal distribution with a

small-scale foundation under Resolution 10 ensures that people have productive land is one of the government's options. However, according to FAO (2003), the distribution of agricultural land in many cases creates the accumulation and concentration of agricultural land, which solves the problem of production organization, labor, and income for households that produce agriculture.

METHODOLOGY

Research design

The study adopted a descriptive research design.

Method of selecting research points

It is based on the characteristics of research sites on land, topography and socio-economic, we analyze and select samples based on topographical criteria divided into two sub-regions: mountainous and midland. In which, the mountainous area is divided into mountainous areas with low mountains and mountainous areas with high mountains. Out of a total of 9 districts and 1 city in Bac Giang province, the Study selected 3 districts. Viet Yen district represents the midlands with the largest area of aquaculture land in the districts of the region and the district is undergoing a process of agricultural restructuring as well as strong industrialization and urbanization, Luc Ngan is a district representing mountainous areas including high mountains. The district has the largest area of perennial crop land in the region, as well as the whole province. Lang Giang district represents mountainous areas, including low mountains. The district has the largest area of land for annual crops in the region.

Through consultation with district officials, we selected 3 communes in each district according to high, low, average positions in the district and each commune chose 3 villages. Therefore, the total number of selected villages is 27 villages belonging to 9 communes representing the topography of the sub-regions of the province according to the criteria of highland, midland and lowland.

Sample selection and sample size

The sampling process is divided into phases, at each stage, stratified and clustering sampling methods are combined (Taherdoost, 2016).The whole study (all households use agricultural land in Bac Giang province) are divided into three strata (midland, low mountainous and highland), this stratification ensures the difference between strata and uniformity in each strata and that will improve the reliability of the sample. We choose 01 district to represent each

region, each district chooses three communes, each commune selects three villages (sampling in the study is intentional, communes and villages are selected according to topography: high, medium, and low). Finally, in each village, households were randomly selected to sample according to the required quantity of sample size. The sample size formula used was

$$n = (Z_{(\alpha/2)} p(1-p)) / e^2 \quad (\text{Cochran, 1963}):$$

Where,

n is the sample size; $Z(.)$ is the limit value of the z-statistic, $(1-\alpha)$ is the confidence in the estimate; p is the estimate of the proportion of individuals with the same characteristic in the population (measurement of population homogeneity: $p = 0.5$ corresponds to the overall highest degree of difference), e permissible error (it corresponds to the expected accuracy) of the measurements of the variables in the study.

The statistical parameters in the formula are chosen at the common rate of the socio-economic studies: $\alpha = 5\%$, $Z(\alpha/2) = 1.96$; $p = 0.5$ and $e = 0.05$. The sample size, therefore, is calculated as: $n = (1,96 \times 0,5 \times (1-0,5)) / (0,05)^2 = 384$. In order to increase the representativeness of the sample, the author investigated an additional 10% of the total sample volume. Therefore, the total number of questionnaires distributed is 422. The number of surveyed households in each district (strata) is calculated by the proportion of households in each district out of the total number of households of the three districts. Luc Ngan district has 44,884 households, accounting for 51.29% of total households in three districts, 26,231 households in Lang Giang district accounting for 29.97% of total households of three districts and Viet Yen district has 16,400 households, accounting for 18.74% of total households of three districts (Bac Giang Statistical Office, 2017). After filtering the observed samples, the sample size selected is 399 households.

Data analysis

The study uses descriptive statistical methods to analyze the distribution of agricultural land in the regions in Bac Giang. In addition, to assess research fragmentation using the Simpson index. Agricultural land fragmentation index (Simpson): $1 - \sum a_i^2 / A^2$. Where a is the area of the i th parcel and A is the agricultural land size of household $A = \sum a_i$. The index ranges from 0 to 1. The value 0 indicates complete land consolidation, it is that household has only one plot of land. Values closer to 1 are more fragmented. This is a sensitive indicator of the number of plots as well as the size of the plots, meaning that fragmentation will decrease as large plots increase.

RESULTS AND DISCUSSION

Current status of households' agricultural land distribution by region

The agricultural land area of Bac Giang households accounted for 1.54% of the total agricultural land of households in the country, corresponding to 245,274.33 ha (General Department of Land Management, 2018). The area of agricultural land of households is not evenly distributed among regions in Bac Giang province.

The topographic of Bac Giang province is divided into two main regions. Whers are Midlands and Mountains. Mountainous areas include low mountains and high mountains. In terms of total household agricultural land (including cropland and aquaculture land). The area of household agricultural land in the mountainous area from 2005 to 2015 was much larger than that in the Midlands region. Over 80% of the household's agricultural land was concentrated in the mountainous areas, while only nearly 20% of the remaining area was distributed in the midlands. The mountainous districts with high mountains include: Son Dong district, Luc Ngan district, Luc Nam district, Yen The district. The household agricultural land of these districts accounted for 70% of the mountainous area.

Average agricultural land area per household in Bac Giang province was 0.33 ha / household (table 2). This area was lower than the average area of the Northeast (0.48 ha) and the whole country (0.46 ha) (General Statistics Office, 2016; Ministry of Natural Resources and Environment, 2018).

Table 1. Current status and changes of agricultural land area of households
by region from 2005 to 2015

Targets	2005		2010		2015		Increase/Decrease 2010/2005		Increase/Decrease 2015/2010	
	Area (ha)	Ratio of area (%)	Area (ha)	Ratio of area (%)	Area (ha)	Ratio of area (%)	Area (ha)	Ratio of area (%)	Area (ha)	Ratio of area (%)
I. Midlands	21,734.08	18.54	21,254.52	17.44	28,443.28	18.75	-479.56	-2.21	7,188.76	33.82
- Bac Giang city	1,226.19	5.64	1,195.53	5.62	3,392.65	11.93	-30.66	-2.50	2,197.12	183.78
- Viet Yen district	9,046.31	41.62	8,662.20	40.75	10,532.65	37.03	-384.11	-4.25	1,870.45	21.59
- HiepHoa district	11,461.58	52.74	11,396.79	53.62	14,517.98	51.04	-64.79	-0.57	3,121.19	27.39
II. Moutainous region	95,512.43	81.46	100,612.07	82.56	123,228.77	81.25	5,099.64	5.34	22,616.70	22.48
1. Low mountains	32,880.24	28.04	34,456.06	34.25	40,743.11	33.06	1,575.82	4.79	6,287.05	18.25
- Tan Yen district	10,979.92	33.39	11,194.21	32.49	14,384.21	35.30	214.29	1.95	3,190.00	28.50
- Yen Dung district	10,057.61	30.59	10,675.50	30.98	10,857.46	26.65	617.89	6.14	181.96	1.70
- Lang Giang district	11,842.71	36.02	12,586.35	36.53	15,501.44	38.05	743.64	6.28	2,915.09	23.16
2. High moutains	62,632.19	53.42	66,156.01	65.75	82,485.66	66.94	3,523.82	5.63	16,329.65	24.68
- Son Dong district	9,823.95	15.69	10,253.93	15.50	12,120.46	14.69	429.98	4.38	1,866.53	18.20
- Luc Ngan district	26,476.03	42.27	27,354.07	41.35	31,929.67	38.71	878.04	3.32	4,575.60	16.73
- Luc Nam district	18,170.60	29.01	18,365.89	27.76	26,195.84	31.76	195.29	1.07	7,829.95	42.63
- Yen The district	8,161.61	13.03	10,182.12	15.39	12,239.69	14.84	2,020.51	24.76	2,057.57	20.21
Bac Giang province	117,246.51	100.00	121,866.59	100.00	151,672.05	100.00	4,620.08	3.94	29,805.46	24.46

Source: Bac Giang Department of Natural Resource and Environment (2005-2015)

Table 2. Current status of agricultural land in surveyed households in 2018

Source: survey data (2018)

Area group (m ²)	Total		Luc Ngan district		Viet Yen district		Lang Giang district	
	Quantity (household)	Rate (%)	Quantity (household)	Rate (%)	Quantity (household)	Rate (%)	Quantity (household)	Rate (%)
Below 1.000 m ²	32	8.02	16	7.84	11	14.67	5	4.17
From 1.000 m ² to 2.000 m ²	82	20.55	40	19.61	16	21.33	26	21.67
From 2000 m ² to 3.000 m ²	141	35.34	50	24.51	23	30.67	68	56.67
From 3.000m ² to 4.000 m ²	60	15.04	27	13.24	12	16.00	21	17.50
From 4.000 m ² to 5.000 m ²	29	7.27	21	10.29	8	10.67	0	0.00
From 5.000 m ² to 6.000 m ²	15	3.76	14	6.86	1	1.33	0	0.00
From 6.000 m ² to 7.000 m ²	7	1.75	6	2.94	1	1.33	0	0.00
Over 7.000 m ²	33	8.27	30	14.71	3	4.00	0	0.00
Total	399	100.00	204	10000	75	100.00	120	100.00
<i>Average area of household</i>	<i>3,269.87</i>		<i>3,986.96</i>		<i>2,775.57</i>		<i>2,359.75</i>	
<i>Sd</i>	<i>3,116.70</i>		<i>4,017.63</i>		<i>1,999.59</i>		<i>709.81</i>	
<i>CV</i>	<i>0.95</i>		<i>1.01</i>		<i>0.72</i>		<i>0.30</i>	

The analysis results show that the current agricultural land of the surveyed households in the three districts (Luc Ngan district, Viet Yen district and Lang Giang district) have diversity and differences in the distribution of agricultural land of households. Survey data shows that two-thirds of households have agricultural land less than the average for the whole Bac Giang province and there are large disparities between the studied districts. Average household agricultural land per household in Lang Giang and Viet Yen districts is relatively low. The proportion of households using an area of 2,000m² - 3,000m² is high. Meanwhile, on average, household agricultural land in Luc Ngan district is 1.7 times larger than Lang Giang (a district located in low mountainous areas) and 1.4 times larger than Viet Yen (midland district). The main reason is because Luc Ngan district is a mountainous district with high mountains. This is a typical district for the development of specialized agriculture and fruit tree cultivation (Table 2).

Fluctuations in agricultural land distribution of households by region

Fluctuations in household agricultural land distribution in Bac Giang province had changed over time. Over a period of 10 years (from 2005 to 2015), the total area of agricultural land of households in Bac Giang province tended to increase, an average of around 13.74%. Average agricultural land per household and household member in the whole province increased by 0.24 times and 0.37 times from 2006 to 2016 period (table 1). A year later, the total area of household agricultural land tended to decrease, in the year 2018 it decreased by 0.2% (in 2018, the area of household land was 151,371.84 ha) (Department of Natural Resources and Environment Bac Giang, 2018).

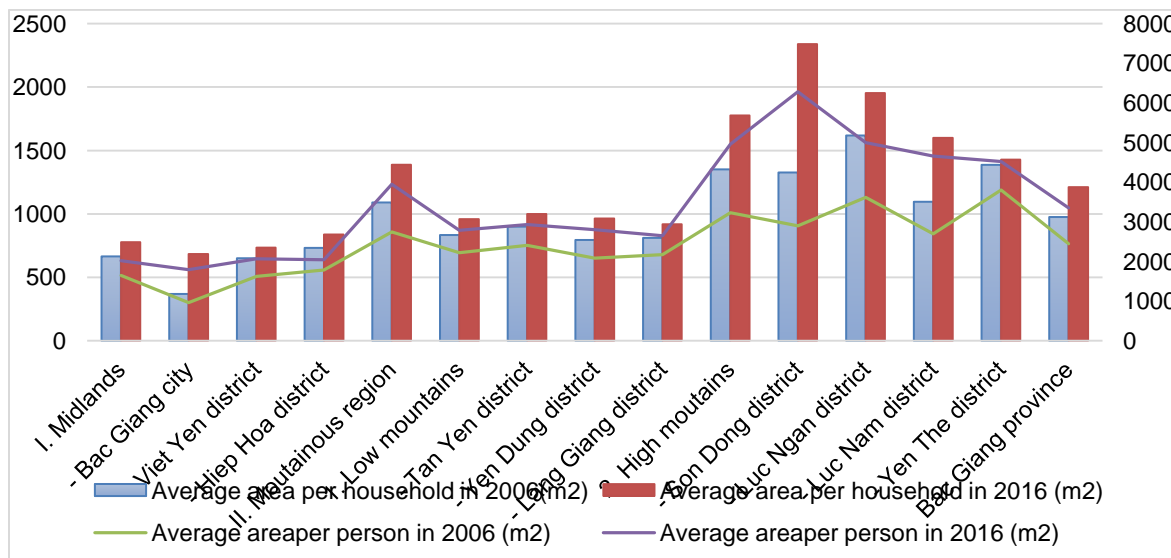


Figure 1. Changes in household agricultural land areas by region

Source: Bac Giang Statistical Office (2006 - 2016)

The average agricultural land area of households in Bac Giang province tended to increase around 14% (table 1). In which, the average agricultural land area of a household in Bac Giang city tended to increase significantly by 66.34% and increases by 1.77 times between 2005 and 2005. In general, the trend of a household’s average agricultural land changes per person in Bac Giang province is consistent with the national trend. Current status of the average area of Bac Giang in the year 2016 was 1,047.87 m² per person (approximately 0.1 ha) which was lower than the national average (0.12 ha / person) and equaled to one sixth the average agricultural land area of household in the world (OECD, 2016).

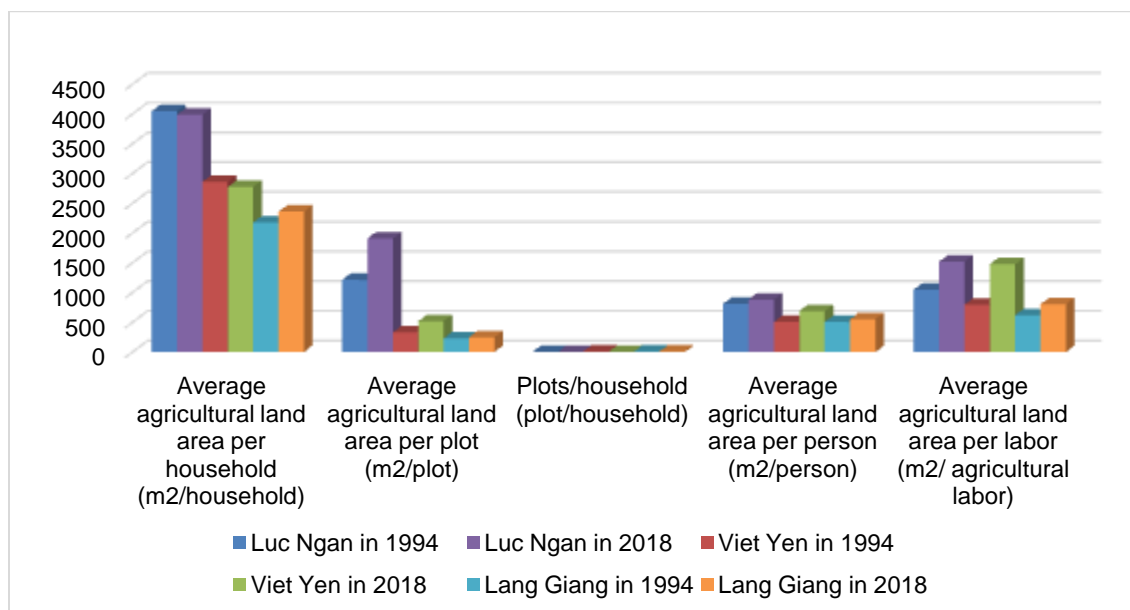


Figure 2. Changes in agricultural land area in the surveyed households by region between 1994 and 2018
 Source: Survey data (2018)

Although within the same province, the distribution variation of household agricultural land also differs between regions in the same period. On average ousehold agricultural land per household and person in mountainous areas increased more than in the midlands in between 2006 and 2016. Survey data (Chart 2, Chart 3) in the year 2018 shows that the average agricultural land area of household decreased in Luc Ngan district - mountainous areas with high mountains and Viet Yen district - in the midlands, and the average agricultural land area of household did not increase significantly in Lang Giang district - mountainous areas with low mountains from 1994 to 2018.

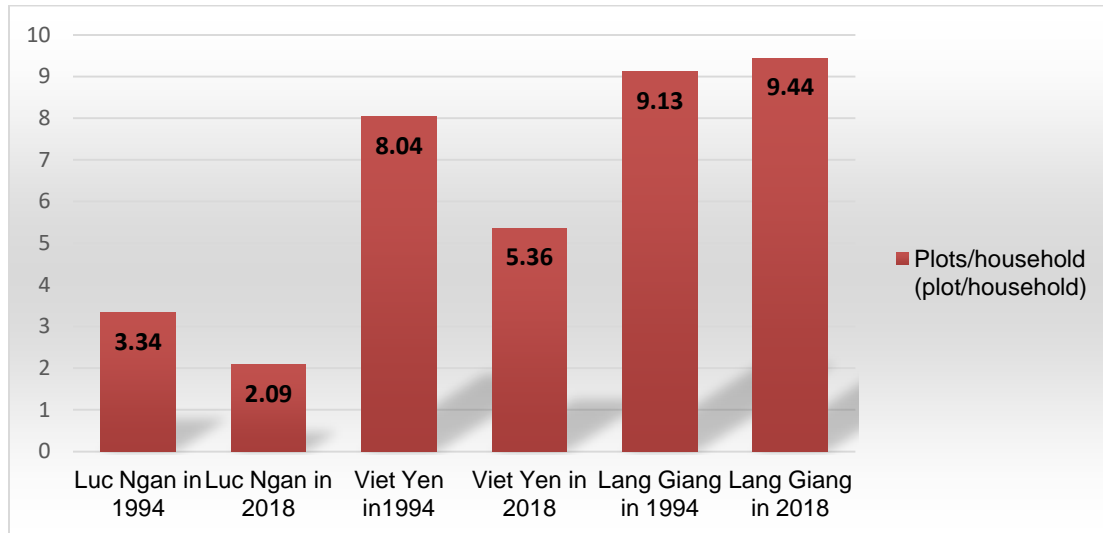


Figure 3. Changes in number of plots per household between regions in the Bac Giang province from 1994 to 2018

Source: Survey data (2018)

During the same period, average area per farmer tended to increase, but this area was only half of average area per farmer in Viet Nam (0.34 ha) and a quarter of the countries in the Southeast Asia such as: Cambodia, Myanmar or the Philippines (WB, 2016).

Land consolidation policy in the year 2013 helps households in Luc Nga district, Viet Yendistrict use less land plots (households' plots in Luc Ngan district reduced from 3 to 2 plots, households' plots in Viet Yendistrict reduced from 8 to 5 plots) and households use 1.5 times more agricultural land. The average area shows that the fragmentation between regions are different.

In conclusion, the distribution of agricultural land of households in Bac Giang province shows that the agricultural land scale of households is small (compared to other regions and Viet Nam) and this scale uneven across regions. The agricultural land area of households is concentrated mainly in mountainous areas, especially in the high mountains. Because of the impact of the land consolidation and exchange policy, the average agricultural land area of households per person or labor and plot area increased, and the number of plots decreased.

The fragmentation in the distribution of household agricultural land in Bac Giang province also has clear differences between the districts representing the regions within the province. The distribution of household agricultural land in Lang Giang district (lowland mountainous area) is more fragmented than in Luc Ngan district (mountainous area) and Viet Yen district (midland). The index of agricultural land fragmentation (simpson) in Lang Giang

district was 0.83, Viet Yen district was 0.63, Luc Ngan district was 0.35 (Chart 3). The area of agricultural land per farmer in the lowland mountains (Lang Giang district) is at least 796.71 m². The largest average area of agricultural land in mountainous areas (Luc Ngan district) is 1,351.06 m².

The diversity in the distribution of household agricultural land shows that even within a province, the difference in land distribution is very large.

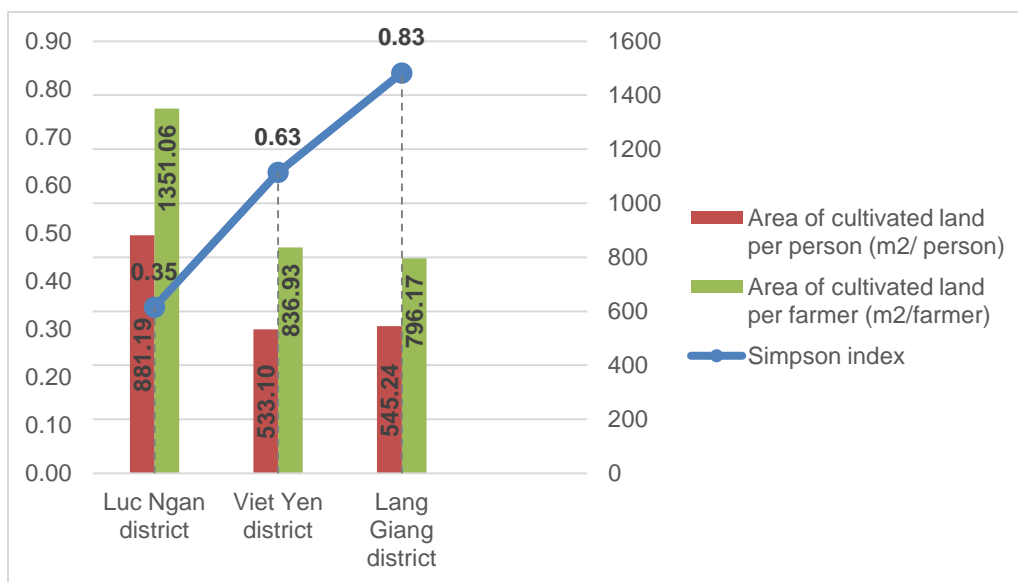


Figure 3. Fragmentation of household agricultural land between regions

Source: Survey data (2018)

Agricultural land fragmentation is a common phenomenon in Bac Giang province as well as in the country. The fragmentation level of household agricultural land in Bac Giang province is 0.55, equivalent to some northern provinces such as Yen Bai province (0.51), Ha Tay province (0.69) (Sally et al., 2007). With the current agricultural land distribution, the fragmentation of agricultural land will be an irreversible trend.

CONCLUSION

The distribution of agricultural land of households in Bac Giang province shows that the agricultural land scale of households is small and fragmented. Between regions in Bac Giang province the size of agricultural land and the degree of fragmentation vary. Research shows that fragmentation of agricultural land in upland area is lowest (Simpson index of Lang Giang district is 0.35), and fragmentation of agricultural land in lowland area is highest (Simpson index of Lang Giang district is 0.83). The small size and fragmentation of agricultural land is influenced

by the government's equity policy. However, in the current period in the policy of accumulation and concentration of agricultural land has been implemented, but small scale and fragmentation is still a common phenomenon. This study can be expand it further by researching specific soil types and doing extensive research in the northern of Viet Nam.

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