

Impact Assessment of Factors to Agricultural Land Use Management in North Central of Vietnam

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Abstract

Management of sustainable agricultural land use in North Central, Vietnam is a particularly important issue in the process of industrialization and modernization. In order to manage the use of agricultural land efficiently and sustainably, it is required to identify and evaluate the factors affecting results affect agricultural land use management. This article aims to evaluate the factors affecting the agricultural land use management in the North Central provinces, Vietnam. Thence, the recommendation of a number of issues is to strengthen sustainable agricultural land use management..

Keywords: land use management; agricultural land; management and use of agricultural land; North Central; Vietnam

1. Introduction

Sustainable land use management relates to the fields of economy, society, culture and environment, present and future, limits land and water degradation to the minimum extent, reduces production costs by smart use of internal resources and applies appropriate management systems to maintain and improve incomes, while preserving natural resources to meet the requirements of sustainable development in the present and future (Luthuli, 2007). In the current period, Vietnam is aiming to the goal of sustainable land use management with the deployment of the implementation of the Land Law in association with the Law on Environmental Protection and the Agenda 21 in Vietnam.

The North Central provinces, Vietnam have favorable conditions to develop the inherent strengths on land, labor, cultural and historical monuments, landscapes, trade villages, strategic positions on defense and security. However, the North Central also has to face the challenges of industrialization and urbanization in the process of expanding the centrally-run cities with the increasing pressure on land demand for industrial and urban development; the organization of resettlement and career change for a large proportion of farmers without agricultural land. Until now, studies on land use management in North Central provinces are implemented only in the separate studies. The separate studies led to the issuance of their own policies of each sector in order to improve the land use management by sector. The issuance of separate policies results in the overlapping. On the other hand, during the policy development, people are not engaged properly, resulting in many difficulties policy faced during implementation process. All of these challenges require the North Central provinces, Vietnam to have strategies of reasonable land use management to ensure sustainable development. The implementation of the studies is to identify the necessity of a number of factors affecting land use management.

2. Theoretical Basis and Research Methodology

2.1. Theoretical basis

Land management is the process of storing and updating information on the ownership, value and use of land and other information related to land (United Nations, 1996). It is a process guaranteed under the law for the use and development of land bank, exploitation of profits earned from the land (through taxes, rent, sell) and settlement of disputes relating to land. Land management objects related to both objects of public land and private land include the work: land surveying, land registration, land valuation, supervision of use and storage and updating of land information, provision of land information and land dispute resolution (Engelke and Vancutsem, 2012; Georgia, 2001).

Land use management focuses on land and how the land to be used for purposes of production, conservation and aesthetics (Verheye, 2010). Land use management requires to make decisions and is determined by the purpose of using it such as food production, housing, entertainment, mining... and is determined by the nature and value of land.

Land use management is a combination of all the tools and techniques used by the government to manage the way that land is used and developed (Peter, 2008; World Bank, 2010), including: planning, land use plans, law, land use rights, land valuation and real estate information.

According to Dang Kim Son and Nguyen Do Anh Tuan (2011): land policy is action and activity, thereby the Government determines the rights of individuals and social groups to land, specifies circumstances in which land rights are transferred, develops mechanisms to protect those rights and orient processing related disputes. Land policy of Vietnam is reflected official through the Law on Land, the Decrees, Directives, Decisions, Circulars guiding the implementation of the Law on Land.

Land - territorial ground. Territorial ground is shared space for all industries, there are places that can not be used for trees but for non-living industries. Therefore, the use of land should be comprehensive and ensure the development of national economy effectively towards the market economy, with the overall vision of the whole country, each area or river basin; in planning, the first thing to be noted: to keep the specific vegetation, localize the special forests, precious birds and animals; protect marine resources to not be exhausted; reserve land for the key projects of the country, each region and each province. However there must be limit to keep the priority land for agriculture and forestry: paddy land, types of short-day crops and precious perennial industrial plants and precious pets; there must be a shared vision on handling the entire basin against erosion and pollution. In addition to arrange land use by administrative unit, it is required to arrange to land use by basin and environmental protection of each sector (Ministry of Agriculture and Rural Development, 2009).

2.2. Research methodology

2.2.1. Analytical framework

Research assumption is that: Over the years, the North Central provinces in Vietnam have had many changes and positive contribution to the development of the social economy. Changes in the management of land use are necessary to adapt to the trend of economic development in the period of industrialization and modernization. Assume that there is a relationship between the natural factors and techniques, social and economic factors, mechanisms and policies and the role of communities to the management of land use and that process has the relationship with the awareness of community on the impact of land use management to land use efficiency.

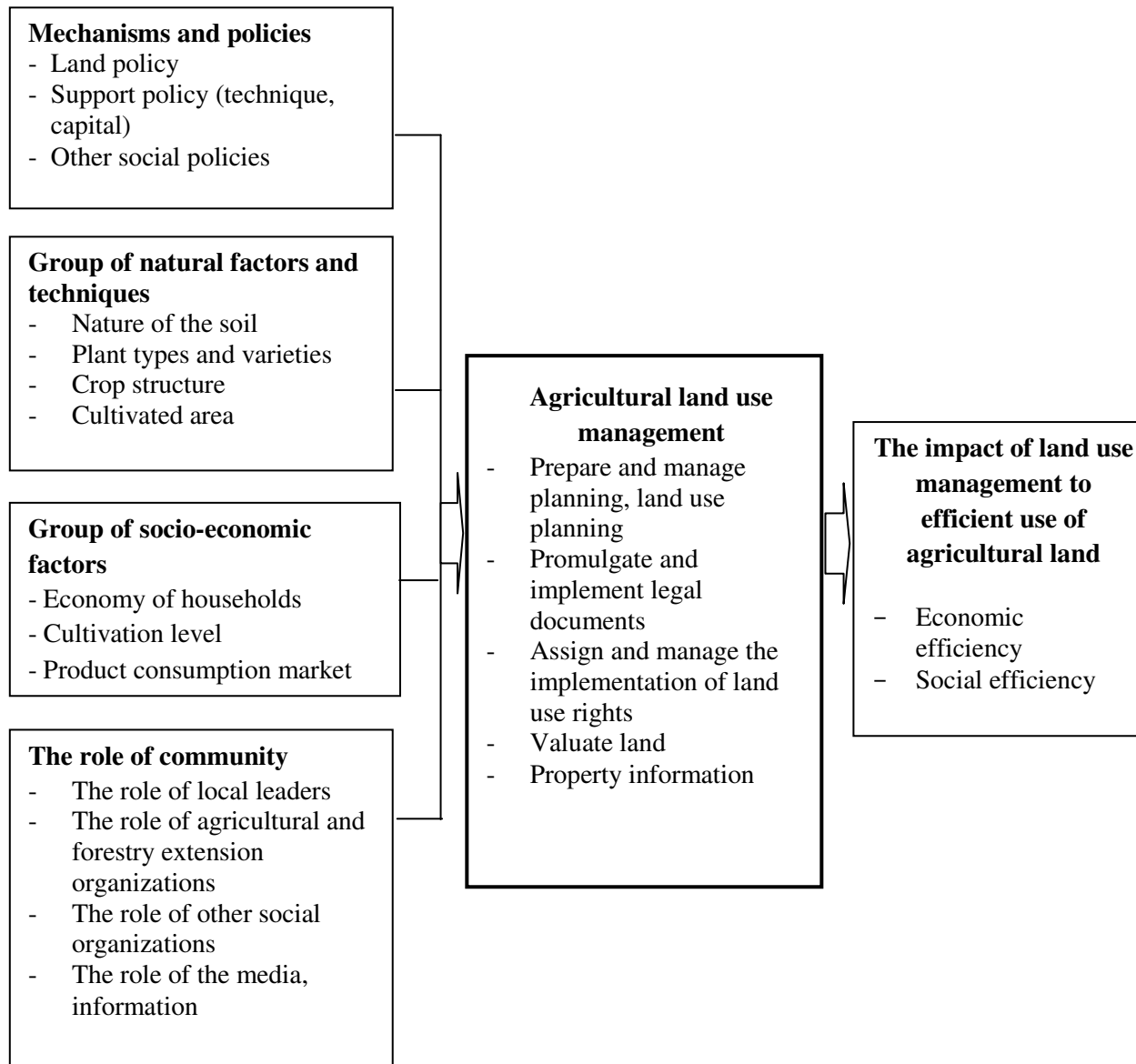


Figure 1. Analytical framework

2.2.2. Research methodology

** Select the study sites:*

Based on the topographic features North Central, Vietnam was divided into two regions:

Plains: these are areas with flat terrain, including the main soils as alluvium raised annually, alluvium not raised, infertile soils on old alluvium. The main crops are rice, corn, vegetable plants, ornamental plants.

Half-mountain half-plain area: Half-mountain half-plain terrain but with the low hills interspersed with valleys, soils are mainly infertile soils on old alluvium, yellow-red soil on clay, yellow-brown soil on old alluvium. Crops are: rice, peanuts, vegetable plants, fruit trees, cassava and aquaculture.

Each research province of Thanh Hoa, Nghe An, Ha Tinh, Quang Binh selected 40 agricultural households under random sampling method. Total households surveyed was 160 households.

The survey criteria include: general information on households (land, labor, income), Agricultural production of households in 2016, households' opinion about the management of agricultural land and the factors affecting the management of agricultural land use. Selected households for surveys are households that use agricultural land and participate directly in agricultural production.

** Data analysis methods*

The data were processed through 3 steps:

Step 1: Qualitative research by developing the concept/ scale system.

Step 2: Quantitative research by using T-test analysis method to test the different levels between the regions by group of observation factor.

Step 3: Determination of the correlation between the observed variables together to determine the factors affecting land use management.

** Methods of assessing the impact of factors on land use management*

Analysis of the impact of factors of land resources, socioeconomic development pressures, legal policies, management mechanisms, and public awareness to the land use management by Spearman Rank Coefficient SPSS Correlation 20.0 with a significance level of 0.05 and reliability of research results as 95%. The magnitude of the impact is evaluated through the Table on decentralization of influence level (Table 1).

Table 1: Decentralization of influence level of relationship

Relationship level	Correlation coefficient r
- Completely inverse relationship	-1,00
- Very high inverse relationship	- 0,75 to -0,99
- High inverse relationship	-0,50 to -0,74
- Medium inverse relationship	-0,25 to -0,49
- Very low inverse relationship	-0,01 to -0,24
- No relationship	0
- Very low direct relationship	0,01 to 0,24
- Medium direct relationship	0,25 to 0,49
- High direct relationship	0,5 to 0,74
- Very high direct relationship	0,75 to 0,99
- Completely direct relationship	1,00

Source: Zulueta and Costales (2003); Hoang Trong and Chu Nguyen Mong Ngoc (2008).

3. Research Results

3.1. Factors of mechanisms and policies

Group of policy factors includes: land policy, support policy (technique, capital), and other social policies. Survey and assessment results of people on the role of mechanisms and policies and the impact of mechanism and policy factors to the agricultural land use management are summarized in Table 2, Table 3.

Table 2. Assessment on the role of mechanism and policy factors in agricultural land use

Assessment criteria	Plain n=80		Half-mountain half-plain n=80		Total N=160	
	Value	%	Value	%	Value	%
Land policy	80	100.00	80	100.00	160	100.00
- Very good	17	21.25	14	17.50	31	19.38
- Good	46	57.50	43	53.75	89	55.62
- Average	12	15.00	16	20.00	28	17.50
- Poor	5	6.25	7	8.75	12	7.50
- Very poor	0	0.00	0	0.00	0	0.00
General assessment		3.94		3.80		3.87
p-value					0.284	
Support policy (technique, capital)	80	100.00	80	100.00	160	100.00
- Very good	6	7.50	6	7.50	12	7.50
- Good	5	6.25	8	10.00	13	8.13
- Average	50	62.50	47	58.75	97	60.63
- Poor	10	12.50	15	18.75	25	15.62
- Very poor	9	11.25	4	5.00	13	8.12
General assessment		2.89		2.98		2.93
p-value					0.571	
Other social policies	80	100.00	80	100.00	160	100.00
- Very good	3	3.75	4	5.00	7	4.38
- Good	15	18.75	17	21.25	32	20.00
- Average	40	50.00	50	62.50	90	56.25
- Poor	8	10.00	9	11.25	17	10.62
- Very poor	14	17.50	0	0.00	14	8.75
General assessment		2.81		3.20		3.01
p-value					0.007	

(Source: Compiled from survey form, 2016)

The North Central provinces has plans for regional land use planning. The inspection and supervision of the implementation of the planning has been carried out regularly. The survey results showed that people were aware of the establishment land use planning, but did not know specifically about the detailed projects, especially the time and plans of project implementation. There are projects already in planning for a long time, but have not implemented. That will affect land use decisions of households.

Land policy is highly appreciated with an average of 3.87 (Table 1). There is no difference between the two regions (3.94 in plain area and 3.80 in half-mountain half-plain area in average). There is a direct relationship at high level between on land policy and establishment of agricultural land use management in 3 contents: management, planning, land use plan ($r_s = 0.558$; $P = 0.01$); promulgation and implementation of legal documents ($r_s = 0.748$; $P = 0.01$) and land valuation ($r_s = 0.510$; $P = 0.01$); There is a direct relationship at medium level between the land policy and agricultural land use management in 2 contents: allocation and management of the implementation of land use rights ($r_s = 0.288$; $P = 0.01$) and Property information ($r_s = 0.427$; $P = 0.01$).

support policy on technique and capital is only medium level to the value of 2.93. There is no difference between the plain area and half-mountain half-plain area (2.89 and 2.98). There is a direct relationship at high level between support policy and agricultural land use management in the promulgation and implementation of legal documents ($r_s = 0.552$; $P = 0.01$). There is a direct relationship at low level for allocation and management of the implementation of land use rights ($r_s = 0.217$; $P = 0.01$) and there a direct relationship at medium level for establishment and management of the planning, land use plan ($r_s = 0.321$; $P = 0.01$); land valuation ($r_s = 0.373$; $P = 0.01$) and Property information ($r_s = 0.383$; $P = 0.01$). Looking at the relationship above, we see that the support policy (technique, capital) has multiple levels affecting the agricultural land use management in the study area. There is a great influence on the promulgation and implementation of legal documents and less affect the management and implementation of land use rights.

People also evaluate other social policies at medium level (3.01). There is clear difference between the plains and half-mountain half-plain areas (2.81 in plain area compared to 3.20 in half-mountain half-plain area in average and $p_{\text{value}} < 0.05$). There is a direct relationship at low level for establishment and management of the planning, land use plan ($r_s = 0.214$; $P = 0.01$) and land valuation ($r_s = 0.221$; $P = 0.01$). There is no relationship between other social policies and promulgation and implementation of legal documents; allocation and management of the implementation of land use rights and Property information. Thus, in general, other social policies have little impact on the agricultural land use management in the provinces of North Central, Vietnam.

Table 3: The impact of mechanisms and policies to agricultural land use management

Independent variables	Agricultural land use management				
	Promulgation and implementation of legal documents	Establishment and management of the planning, land use plan	Allocation and management of the implementation of land use rights	Land valuation	Property information
Mechanisms and policies					
- Land policy	0.748 **	0.558**	0.288**	0.510**	0.427**
- Support policy (technique, capital)	0.552**	0.321 **	0.217**	0.373**	0.383**
- Other social policies	0.129	0.214**	-0.027	0.221**	0.009

** Significance level of 0.01, * Significance level of 0.05. $N = 160$

(Source: Compiled from survey form, 2016)

3.2. Group of natural and technical factors

Group of natural and technical factors includes: the nature of the soil, plant types and varieties, crop structure, scale of cultivation area. Assessment results of land use efficiency of the town showed that the selection of plant structure, plant types affects efficiency of agricultural land.

Research results in Table 4 and Table 5 show that:

Up to 76.88% of the households surveyed are interested in the nature of the soil, the interest is at high level of 4.18. There is no difference between the two regions (4.06 in plain area compared to 4.29 in half-mountain half-plain area in average). There is a direct relationship at very high level between the nature of soil and establishment and management of the planning, land use plan ($r_s = 0.758$; $P = 0.01$). There is a relationship at medium level ($0.322 < r_s < 0.250$; $P = 0.01$) between the nature of soil and promulgation and implementation of legal documents and land valuation. The relationship between the nature of soil and the allocation and management of the implementation of land use rights is at low level ($r_s = 0.161$; $P = 0.05$) (table 7). No relationship is found between the nature of the soil and Property information. The relationship above showed that the factor of the nature of the soil affects at many levels from low, medium to high for the agricultural land use management in the study area. This factor influences on the establishment and management of planning, land use plan at very high level, but influences on the allocation and management of the implementation of land use rights at low level.

Up to 55% of surveyed households said that they are interested in the selection of plants; 19.38% of surveyed households said that they are particularly interested in the selection of plants. The level of interest is assessed at a high level (average value of 3.87). There is no differences between the plains and the half-mountain half-plain areas (the average value of 3.94 and 3.80, respectively). Plant types and varieties are in direct relationship at high level for the agricultural land use management in the establishment and management of planning, land use plan ($r_s = 0.614$; $P = 0.01$). There is a direct relationship at medium level between the plant types and varieties and the agricultural land use management in the promulgation and implementation of legal documents ($r_s = 0.364$; $P = 0.01$); allocation and management of the implementation of land use rights ($r_s = 0.323$; $P = 0.01$); and Property information ($r_s = 0.318$; $P = 0.01$). And there is a direct relationship at low level between the plant types and varieties with land valuation ($r_s = 0.206$. $P = 0.01$).

Table 4: Assessment on the role of the group of natural and technical factors in agricultural land use

Assessment criteria	Plain		Half-mountain half-plain		Total	
	n=80		n=80		N=160	
	Value	%	Value	%	Value	%
Interest in the nature of the soil	80	100	80	100	160	100
- Very interested	27	33.75	45	56.25	72	45.00
- Interested	36	45.00	15	18.75	51	31.88
- Normal	12	15.00	18	22.50	30	18.75
- Less interested	5	6.25	2	2.50	7	4.37
- Very less interested	0	0.00	0	0.00	0	0.00
General average		4.06		4.29		4.18
p-value					0.109	
Interest in selection of plant types and varieties	80	100.00	80	100.00	160	100.00
- Very interested	17	21.25	14	17.50	31	19.38
- Interested	46	57.50	43	53.75	89	55.62
- Normal	12	15.00	16	20.00	28	17.50
- Less interested	5	6.25	7	8.75	12	7.50
- Very less interested	0	0.00	0	0.00	0	0.00
General average		3.94		3.80		3.87
p-value					0.284	
Interest in crop structure	80	100.00	80	100.00	160	100.00
- Very interested	16	20.00	19	23.75	35	21.88
- Interested	54	67.50	47	58.75	101	63.13
- Normal	8	10.00	7	8.75	15	9.37
- Less interested	2	2.50	1	1.25	3	1.87
- Very less interested	0	0.00	6	7.50	6	3.75
General average		4.03		3.90		3.96
p-value					0.352	
Cultivated area	80	100.00	80	100.00	160	100.00
- Very large (> 2000 m ²)	3	3.75	4	5.00	7	4.38
- Large (1700 - 2000m ²)	48	60.00	52	65.00	100	62.50
- Medium (1400-1699 m ²)	21	26.25	14	17.50	35	21.88
- Small (1100 – 1399 m ²)	8	10.00	9	11.25	17	10.62
- Very small (<1100 m ²)	0	0.00	1	1.25	1	0.62
General average		3.58		3.61		3.59
p-value					0.757	

(Source: Compiled from survey form, 2016)

Table 5: The impact of natural and technical factors on agricultural land use management

Independent variables	Agricultural land use management				
	Promulgation and implementation of legal documents	Establishment and management of the planning, land use plan	Allocation and management of the implementation of land use rights	Land valuation	Property information
Group of natural and technical factors					
- The nature of the soil	0.322**	0.758**	0.161*	0.325**	0.110
- Plant types and varieties	0.364**	0.614**	0.323**	0.206**	0.318**
- Crop structure	0.267**	0.417**	0.269**	0.260**	0.312**
- Cultivated area	0.321**	0.515**	0.209**	0.376**	0.236**

** Significance level of 0.01, * Significance level of 0.05. N = 160

(Source: Compiled from survey form, 2016)

Up to 85.01% of surveyed households interested in and very interested in crop structure. The interest is at high level (average value of 3.96) and there is no difference between the plains and half-mountain half-plain areas. There is a direct relationship at medium level between the selection of crop structure and land use management in the establishment and management of planning, land use plan ($r_s = 0.417$; $P = 0.01$); promulgation and implementation of legal documents ($r_s = 0.267$; $P = 0.01$); allocation and management of the implementation of land use rights ($r_s = 0.269$; $P = 0.01$); land valuation ($r_s = 0.260$; $P = 0.01$); and Property information ($r_s = 0.312$; $P = 0.01$) (table 7). In general, the crop structure is the factor affecting at medium level the and use management in the territory of North Central, Vietnam.

The average cultivated land area is at a high level, up to 84% of surveyed households have cultivated land from 1400 to 2200 m². There is no difference between the plains and the half-mountain half-plain areas (average value of 3.58 and 3.61). The area of cultivated land has a direct relationship at a high level for the establishment and management of planning and land use plan ($r_s = 0.515$; $P = 0.01$). There is a direct relationship at medium level for the promulgation and implementation of legal documents as well as land valuation ($0.321 < r_s < 0.376$; $P = 0.01$). There is a direct relationship at low level ($0.209 < r_s < 0.236$; $P = 0.01$) for the allocation and management of the implementation of land use rights and Property information. Thus, according to the perception of the households, the large area of agricultural land has a direct effect with a major impact on the agricultural land use management.

3.3. Group of socioeconomic factors

Group of socioeconomic factors includes: household economy, cultivation level and product markets. Research results in Table 6, Table 7 show that the economy of most households surveyed is at medium and above-medium level (accounting for 96.25%), only about 3% of poor households. This economic level is at medium level (average value of 3.31) and there is no difference between the plains and half-mountain half-plain areas. The qualification of the people is at a high level (average value of 3.60). No relationship is found between the economic level of rural households and the agricultural land use management. That is consistent with the North Central region, Vietnam, since this is the region with relatively well economic and social conditions. The difference in economy of rural households is not much, and this difference has little impact on agricultural land use management. Cultivation level has a direct relationship at low level for Property information ($r_s = 0.174$; $P = 0.05$) and there is no relationship found between the cultivation level of agricultural land use management in the establishment and management of planning and land use plan; promulgation and implementation of legal documents; allocation and management of the implementation of land use rights and land valuation. Up to 90.63% of respondents with high school educational level and there is no difference between the two regions of plains and half-mountain half-plain areas.

Table 6: Assessment on the role of the group of socio-economic factors in agricultural land use management

Assessment criteria	Plain n=80		Half-mountain half-plain n=80		Total N=160	
	Value	%	Value	%	Value	%
Economic level of households	80	100.00	80	100.00	160	100.00
- Rich	0	0.00	0	0.00	0	0.00
- Above medium	28	35.00	28	35.00	56	35.00
- Medium	46	57.50	52	65.00	98	61.25
- Poor	6	7.50	-	-	6	3.75
- Very poor	0	0.00	0	0.00	0	0.00
General average		3.28		3.35		3.31
p-value					0.381	
Qualification of people	80	100.00	80	100.00	160	100.00
- Very high (higher than grade 12)	2	2.50	5	6.25	7	4.38
- High (from grade 9- grade 12)	54	67.50	47	58.75	101	63.13
- Average (from grade 6- grade 9)	18	22.50	19	23.75	37	23.12
- Low (from grade 3- grade 5)	4	5.00	7	8.75	11	6.87
- Very low (<grade 3)	2	2.50	2	2.50	4	2.50
General average		3.63		3.58		3.60
p-value					0.689	
Product consumption market	80	100.00	80	100.00	160	100.00
- Very good ($\geq 80\%$)	3	3.75	4	5.00	7	4.38
- Good (60-79%)	17	21.25	9	11.25	26	16.25
- Average (40-60%)	45	56.25	44	55.00	89	55.62
- Poor (20-39%)	8	10.00	14	17.50	22	13.75
- Very poor (<20%)	7	8.75	9	11.25	16	10.00
General average		3.03		2.81		2.92
p-value					0.156	

(Source: Compiled from survey form, 2016)

Product consumption market has a direct relationship at medium level with Property information ($r_s = 0.315$; $P= 0.01$) and a direct relationship at low level with the agricultural land use management in establishment and management of the planning, land use plan ($r_s = 0.221$; $P= 0.01$); promulgation and implementation of legal documents ($r_s = 0.208$; $P= 0.01$); allocation and management of the implementation of land use rights ($r_s = 0.203$; $P= 0.05$); land valuation ($r_s = 0.168$; $P= 0.05$). Thus we see that the product consumption market has a direct relationship at low level for agricultural land use management in the province. This shows that because the location is very close to the city and convenient for the production area, product consumption market is not heavily affected by market factors. According to people's perception, the product consumption market is at medium level (55.62% of households) even up to 23.75% of households said that product consumption market is poor and very poor. Assessment of people in this criterion is only at medium level (average value of 2.92) and there is no difference between the plains and half-mountain half-plain areas.

Table 7: The impact of socio-economic factors on agricultural land use management

Independent variables	Agricultural land use management				
	Promulgation and implementation of legal documents	Establishment and management of the planning, land use plan	Allocation and management of the implementation of land use rights	Land valuation	Property information
Socio-economic factors					
- Kinh tế hộ	0.116	0.045	0.052	0.113	-0.072
- Trình độ canh tác	0.123	0.034	-0.021	0.102	0.174*
- Thị trường tiêu thụ sản phẩm	0.208**	0.221**	0.203*	0.168*	0.315**

** Significance level of 0.01, * Significance level of 0.05. N = 160

(Source: Compiled from survey form, 2016)

3.4. Group of factors related to the role of community

The role of the community: the role of local leaders, the role of agricultural and forestry extension organizations, and the role of other social organizations, the role of communication and information. Research results summarized in Table 8, Table 9 show that:

Table 8: Assessment on the role of the community in the agricultural land use management

Assessment criteria	Plains n=80		Half-mountain half-plain n=80		Total N=160	
	Value	%	Value	%	Value	%
Role of local leaders	80	100.00	80	100.00	160	100.00
- Very good	1	1.25	0	0.00	1	0.63
- Good	20	25.00	27	33.75	47	29.38
- Average	44	55.00	45	56.25	89	55.62
- Poor	9	11.25	5	6.25	14	8.75
- Very poor	6	7.50	3	3.75	9	5.62
General average		3.01		3.20		3.11
p-value					0.134	
Role of agricultural and forestry extension organizations	80	100.00	80	100.00	160	100.00
- Very high	3	3.75	4	5.00	7	4.38
- High	19	23.75	16	20.00	35	21.87
- Average	33	41.25	41	51.25	74	46.25
- Low	18	22.50	10	12.50	28	17.50
- Very low	7	8.75	9	11.25	16	10.00
General average		2.91		2.95		2.93
p-value					0.811	
Role of other social organizations	80	100.00	80	100.00	160	100.00
- Very good	15	18.75	14	17.50	29	18.13
- Good	39	48.75	41	51.25	80	50.00
- Average	15	18.75	15	18.75	30	18.75
- Poor	5	6.25	6	7.50	11	6.87
- Very poor	6	7.50	4	5.00	10	6.25
General average		3.61		3.69		3.65
p-value					0.656	
Role of communication and information	80	100.00	80	100.00	160	100.00
- Very good	3	3.75	2	2.50	5	3.13
- Good	45	56.25	37	46.25	82	51.25
- Average	17	21.25	23	28.75	40	25.00
- Poor	9	11.25	10	12.50	19	11.87
- Very poor	6	7.50	8	10.00	14	8.75
General average		3.38		3.19		3.28
p-value					0.245	

(Source: Compiled from survey form, 2016)

Table 9: The impact of the role of the community on agricultural land use management

Independent variables	Agricultural land use management				
	Promulgation and implementation of legal documents	Establishment and management of the planning, land use plan	Allocation and management of the implementation of land use rights	Land valuation	Property information
The role of the community					
- Role of local leaders	0.243**	0.250**	0.204**	0.193*	0.268**
- Role of agricultural and forestry extension organizations	0.260**	0.411**	0.205**	0.283**	0.201*
- Role of other social organizations	0.171*	0.163*	0.209**	0.267**	0.211**
- Role of communication and information	0.384**	0.813**	0.338**	0.416**	0.291**

** Significance level of 0.01, * Significance level of 0.05. N = 160

(Source: Compiled from survey form, 2016)

The role of local leaders is assessed at medium level (average value of 3.11) and there is no difference between the plains and half-mountain half-plain areas. The role of local leaders has a direct relationship at medium level with agricultural land use management in establishment and management of the planning, land use plan ($r_s = 0,250$; $P= 0,01$) and Property information ($r_s = 0,268$; $P= 0,01$). The role of local leaders has a direct relationship at low level with agricultural land use management in promulgation and implementation of legal documents ($r_s = 0,243$; $P= 0,01$); allocation and management of the implementation of land use rights ($r_s = 0,204$; $P= 0,01$); land valuation ($r_s = 0,193$; $P= 0,05$). Thus we see that the role of local leaders influences at not high level for the agricultural land use management in the provinces of North Central, Vietnam.

The role of agricultural and forestry extension organizations is assessed at medium level (2.93) with 21.87% of surveyed households assessed as very good and 46.25% of the households surveyed assessed as medium. There is no difference between the plains and half-mountain half-plain areas (average value of 2.91 and 2.95 respectively). The role of agricultural and forestry extension organizations has a direct relationship at medium level with the agricultural land use management in establishment and management of the planning, land use plan ($r_s = 0,411$; $P= 0,01$); promulgation and implementation of legal documents ($r_s = 0,260$; $P= 0,01$); land valuation ($r_s = 0,283$; $P= 0,01$). There is a direct relationship at low level between the role of agricultural and forestry extension organizations and agricultural land use management in the allocation and management of the implementation of land use rights ($r_s = 0,205$; $P= 0,01$) and Property information ($r_s = 0,201$; $P= 0,05$). There is no relationship found of agricultural and forestry extension organizations with agricultural land use management in the study area.

The role of other social organizations is assessed at high level with average value of 3.65. 18.13% of surveyed households assessed as very good and 50% of surveyed households assessed as good. There is no difference between the plains and half-mountain half-plain areas (average value of 3.61 and 3.69). The role of other social organizations has a direct relationship at medium level with the agricultural land use management in land valuation ($r_s = 0,267$; $P= 0,01$) and a direct relationship at low level with the agricultural land use management in establishment and management of the planning, land use plan ($r_s = 0,163$; $P= 0,05$); promulgation and implementation of legal documents ($r_s = 0,171$; $P= 0,05$); allocation and management of the implementation of land use rights ($r_s = 0,209$; $P= 0,01$) and Property information ($r_s = 0,211$; $P= 0,01$).

The results above show that the role of other social organizations affects at low level for the agricultural land use management in the the study area. The role of communication and information is assessed at medium level (average value of 3.28) that 51.25% of surveyed households assessed as good and 25% of surveyed households assessed as medium. There is no difference between the two regions (3.38 in plains; 3.19 in half-mountain half-plain areas). The role of communication and information a direct relationship at very high level with the agricultural land use management in in the establishment and management of the planning, land use plan ($r_s = 0,813$; $P= 0,01$) and a direct relationship at medium level with the agricultural land use management in the promulgation and implementation of legal documents ($r_s = 0,384$; $P= 0,01$); allocation and management of implementation of land use rights ($r_s = 0,338$; $P= 0,01$); land valuation ($r_s = 0,416$; $P= 0,01$); and Property information ($r_s = 0,291$; $P= 0,01$). It was found that the role of communication and information in the provinces of North Central, Vietnam has great influence on the agricultural land use management in general, and particularly affects at very high level in the establishment and management of the planning, land use plan in particular.

3.5. General assessment of the influence level of factors to the agricultural land use management

The impact level of the factors to the agricultural land use management in the provinces of North Central, Vietnam is presented in Table 10. Research results show that the promulgation and implementation of legal documents were affected at high level by the land policies and financial and technical support policies. This demonstrates that people are very interested in the promulgation of legal documents by the state. Six factors of the role of the media, information; plant types and varieties; nature of the soil; cultivated area; crop structure; role of agricultural and forestry expansion organizations have a direct impact at medium level for the promulgation and implementation of legal documents.

Table 10: Some factors affecting the agricultural land use management in North Central, Vietnam

Content of agricultural land use management	Impact level		
	Very high (rs > 0.75)	High (0.5 < rs < 0.75)	Medium (0.25 < rs < 0.5)
Promulgation and implementation of legal documents		Land policy Support policy (technique, capital)	- The role of communication and information - Plant types and varieties - The nature of the soil - Cultivated area - Crop structure - The role of agricultural and forestry extension organizations
Establishment and management of the planning, land use plan	- The role of communication and information; - The nature of the soil	- Plant types and varieties - Land policy - Cultivated area	- Crop structure - The role of agricultural and forestry extension organizations - Support policy (technique, capital) - The role of local leaders
Allocation and management of the implementation of land use rights			- The role of communication and information - Plant types and varieties - Land policy - Crop structure
Land valuation		- Land policy	- The role of communication and information - Cultivated area - Support policy (technique, capital) - The nature of the soil - The role of agricultural and forestry extension organizations - The role of other social organizations - Crop structure
Property information			- Land policy - Support policy (technique, capital) - Plant types and varieties - Product consumption market - Crop structure - The role of communication and information - The role of local leaders - Cultivated area

(Source: Compiled from survey form, 2016)

The planning, agricultural land use plan is affected directly at very high level by 2 factors of communication, information and soil nature; is affected directly at medium level by 4 factors of plant types and varieties; land policy and cultivated area. The group of factors on crop structure; role of agricultural, forestry expansion organizations; support policy and role of local leaders has a direct effect at low level to planning, agricultural land use plan.

For the allocation and implementation of land use rights: there are 4 factors that influence at medium level to the allocation and implementation of land use rights. They are the role of communication and information; plant types and varieties; land policy; crop structure.

The land valuation is affected at high level by the land policy. Compared with other factors, level of influence to this content is at medium level, except for the factors of household economy and qualification of people has the relationship at very low level.

The content of Property information is affected at medium level by 8 factors of: land policy; support policy; plant types and varieties; product consumption market; crop structure; role of communication and information; role of local leaders; cultivated area.

Thus in the group of factors, the role of the community impacts directly upon all the contents of land use management. The group of socioeconomic factor has little impact on land use management in the provinces of North Central, Vietnam.

4. Conclusion and Recommendations

Factors that impact at a high level to the agricultural land use management are communication, information ($0.291 \leq r_s \leq 0.813$; $P=0.01$); nature of the soil ($0.322 \leq r_s \leq 0.758$; $P=0.01$); land policy ($0.288 \leq r_s \leq 0.748$; $P=0.01$), support policies ($0.217 \leq r_s \leq 0.552$; $P=0.01$); plant types and varieties ($0.206 \leq r_s \leq 0.614$; $P=0.01$); cultivated area ($0.209 \leq r_s \leq 0.510$; $P=0.01$). On the other hand, land use management has a direct effect at medium level on efficiency of agricultural land use ($0.264 \leq r_s \leq 0.423$; $P=0.01$). Particularly property information has inverse effects at medium level on the efficiency of agricultural land use ($-0.459 \leq r_s \leq -0.456$; $P=0.01$).

For the content of promulgation and implementation of legal documents: need to enhance the propagation and popularization of laws; check document system in land use management in order to have a plan for timely adjustments in line with the actual situation of each locality.

For the content of establishment and management of the planning, land use plan: planning alternatives must reflect the land-use demand of projects, industries, sectors, and should be unified and public; strengthen inspection and supervision of the government and the community in the formulation and implementation of planning and land use plan; resolutely dealt with the projects and works not included in the approved plan.

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