CORRELATION BETWEEN LAND USE PLANNING AND SOCIO-ECONOMIC DEVELOPMENT IN MAICHAU DISTRICT, HOABINH PROVINCE

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Received date: 18.04.2013 Accepted date: 20.06.2013

ABSTRACT

Land Use Planning (LUP) is a potential solution for sustainable use of land in the long-run by optimizing the effective use of land resources. However, the vital role of Land Use Planning in socio-economic development needs to be analysed in a specific area. This is an important background task. In a transition country and emerging economy like Vietnam, it is a priori not clear, which force LUP actually exerts on actual development. Because of the high priority that the Vietnamese government places upon economic development, it is conceivable that economic forces exert a much stronger influence on plan. If there is strong indication that actual development is not correlated to plans, LUP will be a lost cause from an economic point of view. More complex LUP would only generate more costs without possibly resulting in any positive change. If, in contrast, a strong influence can be documented, confidence in the entire LUP process will be strengthened.

Keywords: Correlation, Land Use Planning (LUP), socio-economic development.

Tương quan giữa quy hoạch sử dụng đất và phát triển kinh tế xã hội tại huyện Mai Châu, tỉnh Hòa Bình

TÓM TẮT

Quy hoạch sử dụng đất là một trong những giải pháp quan trọng trong việc sử dụng tài nguyên đất hiệu quả và bền vững. Bên cạnh đó, vai trò của quy hoạch sử dụng đất đối với phát triển kinh tế xã hội cần được nghiên cứu, phân tích tại các vùng cụ thể. Việt Nam đang trong quá trình chuyển đổi nền kinh tế nên nhiều hoạt động phát triển có sự đan xen, trọng tâm của sự phát triển phụ thuộc vào nhiều yếu tố, do đó tính ổn định bị hạn chế. Những năm qua, việc ưu tiên cho phát triển kinh tế đã được cụ thể trong quy hoạch sử dụng đất và nó ảnh hưởng trực tiếp tới việc bố trí sử dụng đất trong các phương án quy hoạch. Vấn đề đặt ra là kết quả phát triển kinh tế xã hội đạt được của địa phương có tương quan với sự thay đổi sử dụng đất trong phương án quy hoạch đề ra không? Nếu không tương quan tức là quy hoạch sử dụng đất không có tác động hoặc ít tác động tới thực tiễn phát triển kinh tế xã hội của địa phương, dẫn đến sự lãng phí trong công tác quy hoạch sử dụng đất. Ngược lại, nếu mối tương quan đó được xác định, thì vai trò của quy hoạch sử dụng đất đối với phát triển của các địa phương được xác lập và việc nâng cao chất lượng quy hoạch sử dụng đất được quan tâm.

Từ khóa: Phát triển kinh tế xã hội, quy hoạch sử dụng đất, tương quan.

1. INTRODUCTION

Land Use Planning (LUP) is a systematic assessment of the potential of land and water resources subject to economic and social conditions in order to select suitable land use options. It should account for current land use needs, as well as safeguarding resources for future use (FAO, 1993). Therefore, LUP can be considered as one of the most important approaches for long-term sustainable development at both the regional and national levels. Based on different development scenarios, LUP shall help groups of stakeholders to organize the utilisation of land resources in a way that fosters socio-economic

development (Counsell & Haughton, 2006). LUP is understood as the planning for the allocation of activities to land areas to benefit human kind (Crowley et al., 1975). In this regard, LUP can contribute significantly to economic development in the future, by systematically shaping industrialization and urbanization, both of which are major driving forces contributing to land-use change (Long et al., 2007). In addition, a systematic LUP is able to contribute positively to sustainable development within agricultural landscapes, particularly in frontier landscapes. This is particularly important in the rural areas of developing countries where the population depends mostly on agricultural income (Counsell & Haughton, 2006). Moreover, LUP needs to form a "bridge" connecting to different scales from national to commune level to facilitate sustainable development in public administration hierarchies (Bristow, 1981; Kelly, 2004: p43).

In Vietnam, the economy has changed significantly from a bureaucratic and centralized planning economy to the market-oriented system after the opening of the country since 1986. The average annual GDP growth was very high (7.3% from 1995 to 2005) (WB, 2008). The economic transition has resulted in profound changes in the organization of different sectors of the Vietnamese economy. Associated with the changes of organization, LUP in Vietnam has become more helpful with the plans being less rigid and taking into account market factors (Nguyen Quang, 2003: p7-9). Land Use Planning and plans in Vietnam is one of the 13 contents of State management on land (Article 6, Land law 2003) (Anonymous, 2003). LUP divides and allocates land for specific purposes and development among different sectors. Not only is it the spatial plan in the country, but there are also urban development plans, agriculture development plans, forest planning, and many more. However, the Land Use Planning is, in theory, the overriding spatial plan that covers all land and is also the legal basis for any types of land use (Anonymous, 2003; SEMLA, 2009). During this period of strong economic growth, LUP was mainly used to facilitate economic development (Nguyen Hieu Trung et al., 2004). In addition, LUP affects negatively the actual socio-economic development as well, such as: actually divided land does not support for actual socio-economic development, for example: unsuitable planned area for resident, industry, annual crop...

Obviously, LUP is built to support for actual socio-economic development at specific period of development. In contrast, it is a concern whether or not the results of actual socio-development have correlation with intended change of land in LUP. Based on this concern, the research objectives are to prove the correlation between LUP and actual socio-economic development in Maichau District, Hoabinh Province, including: (1) Correlation between LUP and statistical data on socio-economic development; (2) Correlation between LUP and judgments of authorities and natural resources management officials at the different communes on economic, social and infrastructure development in the research area.

The results of research will prove the vital role of LUP in actual socio-economic development in research area if the correlation is determined positively. Additionally, the quality of LUP needs to be improved based on the results in the research area.

2. METHOD

2.1. Research area

Maichau District with its complicated terrain was conveniently selected to carry out the study. Located in the mountainous and attractive region of the province with many beautiful landscapes and traditional customs, the district is considered as one of the most beautiful districts of Hoabinh Province and northwest region of Vietnam. Moreover, the location of the district is also a crucial bridge between Hanoi and other provinces in the northwest region of Vietnam (Anonymous, 2001: p14).

2.2. Research contents

The contents include: (1) Correlation between LUP and food production; (2) Correlation between LUP and population growth; (3) Correlation between LUP and industrial development; (4) Opinion of resources managers and officials.

2.3. Method

The analysis is based on interview data of the importance of LUP on development in the case study district as well as on a statistical analysis of actual land use change in comparison to the directives in LUP 2000.

2.3.1. Statistical method

To determine and analyse correlation between LUP made in 2000 and actual socio-economic development from 2001 to 2010 in Maichau District, statistical method was used to collect and analyse the secondary data, including:

- The results of LUP made in the year of 2000 for the period of 10 years development from 2001 to 2010 were collected at the Department of Natural Resources Management at the district and provincial level.
- Based on the land use pattern in the year 2010, the implementation of LUP from 2001 to 2010 is judged. Also, it was investigated at the Department of Natural Resources Management in different scales.
- Economic development in such period from 2001 to 2010 including agriculture, non-agriculture, etc. especially agriculture was also collected at the different departments in the research area.
- Actual social and environmental conditions from 2001 to 2010 archived regularly at the Statistical Department were used to compare with the results of LUP.

2.3.2. Interview method

Interview method was used to gather information regarding contribution of LUP to socio-economic development in the selected area. The interviewees comprised 23 authorities and 23 natural resources management officials at the different communes who participated in making the LUP in 2000. This LUP was implemented from 2001 to 2010 in their locations. Basically, participants have to clarify the contribution of LUP to socio-economic development of their communes.

The aim of interviewing the authorities at different communes in the district was to collect their judgments of economic, social and infrastructure development in their location, as they have connection with LUP made in 2000. Consequently, their judgment of LUP contributions is one of the basic parameters to estimate the correlation.

Questionnaire focused on:

- Process to make LUP in the year 2000
- Contribution of LUP to socio-economic development.
- Effect of LUP on environmental development.

2.3.3. Correlation method

This method was used to determine the correlation between the planned land use change and actual land use change in the research area, the correlation between LUP and actual socio-economic development from 2001 – 2010, and the correlation between LUP and judgments of authorities and natural resources management officials at the different communes on economic, social and infrastructure development in Maichau District. SPSS software was used to determine the correlation.

The framework is shown in Fig. 1

Accordingly, the combination between secondary data and primary data plays the vital role in determining the correlation. SPSS was used to analyse the data and linear regression indicated the correlation between LUP and socio-economic development.

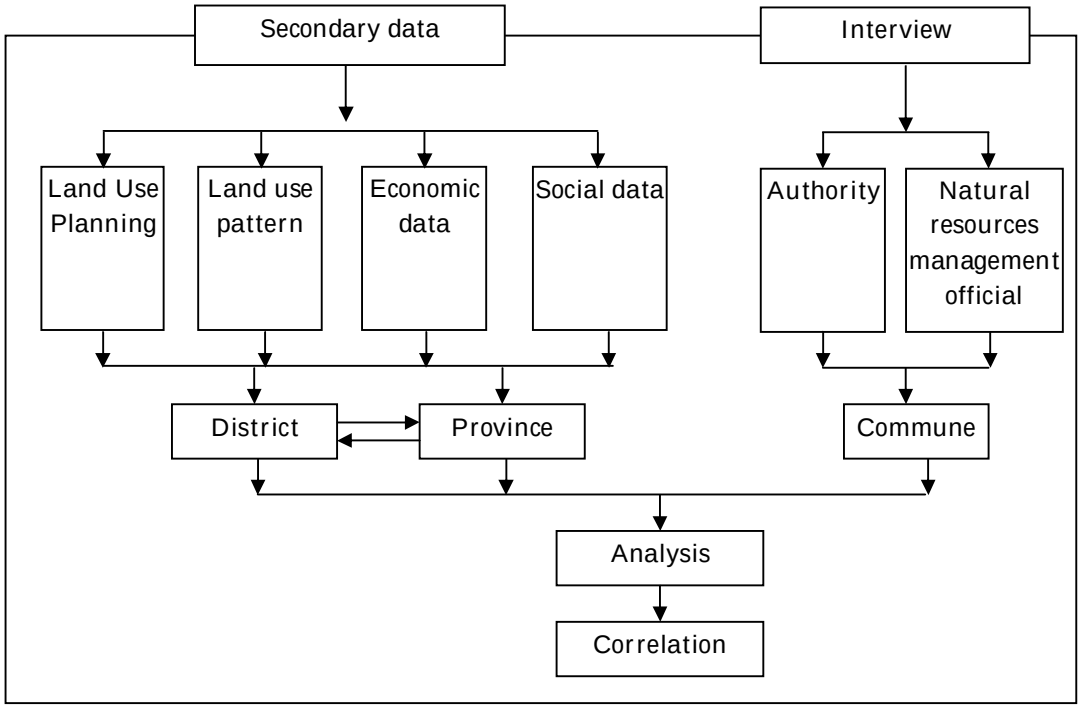

Fig. 1. Conceptual framework to determine the correlation

3. RESULTS AND DISCUSSIONS

3.1. Correlation between LUP and food production

The commercial and industrial development in Vietnam is subjected to certain limitations especially in mountainous regions. Securing food for the local people has been a significant concern of farmers and authorities (FAO, 2011: p2). Tram Huu Cuong (2005) demonstrated that developing agriculture and rural economy to large-scale production would form a basis for economic, political and social stability. Thus, land users should develop and exploit effectively the natural resources in their administrative areas (Jocelyn, 2002: p28). In the period from 2000 to 2010 in Maichau District, total food production increased remarkably due to some reasons, such as increased crop yields, and annual crop area or suitable change of the location of annual crop with higher yield. The correlation between annual crop area and self-produced food is shown in the fig.2.

The data indicates that total food product in Maichau increased steadily from roughly 13,200 tons in 2000 to 25,600 tons in 2010, while the area of annual crop also rose by nearly 53 ha in LUP and 2,080 ha in actual land use throughout the same period.

3.2. Correlation between LUP and population growth

To stabilise the development of the society is also one of the main goals of LUP. Trends of population growth and economic development are directly related to the political stability of the government during a particular time in history (Kelly, 2004: p30). The rate of population growth in developing countries is higher than in others, especially in Southeast Asian countries, such as Vietnam and Indonesia, so the need to extend the residential area has been estimated to be

higher for LUP at different levels from nation to commune. Additionally, population density control, one form existing in most LUP, can be expressed in different ways (Evans, 2004). The correlation between LUP and population growth in Maichau District is shown in fig.3.

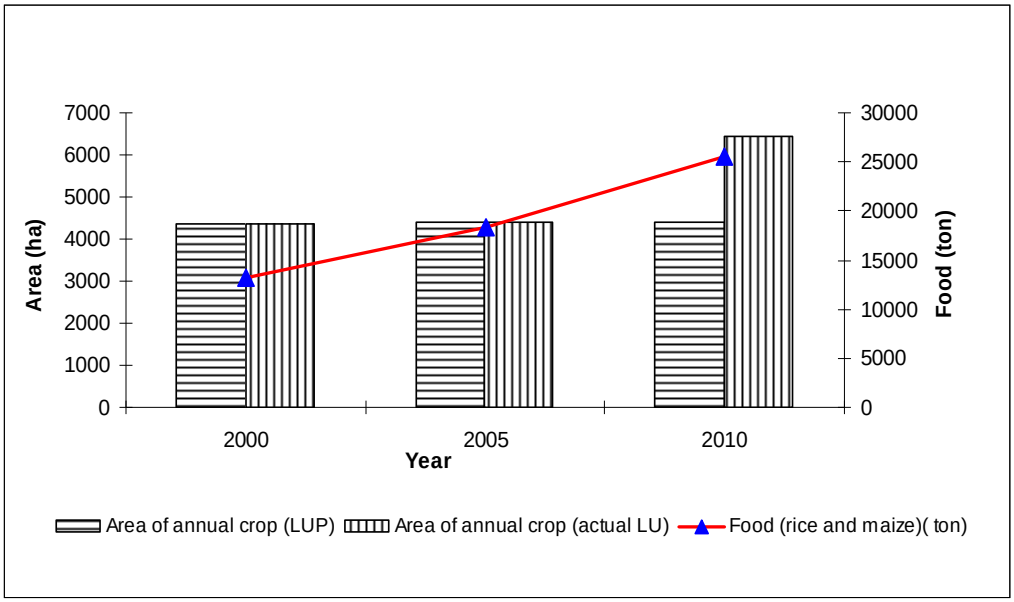

Fig.2. Annual crop land and food production (2000-2010)

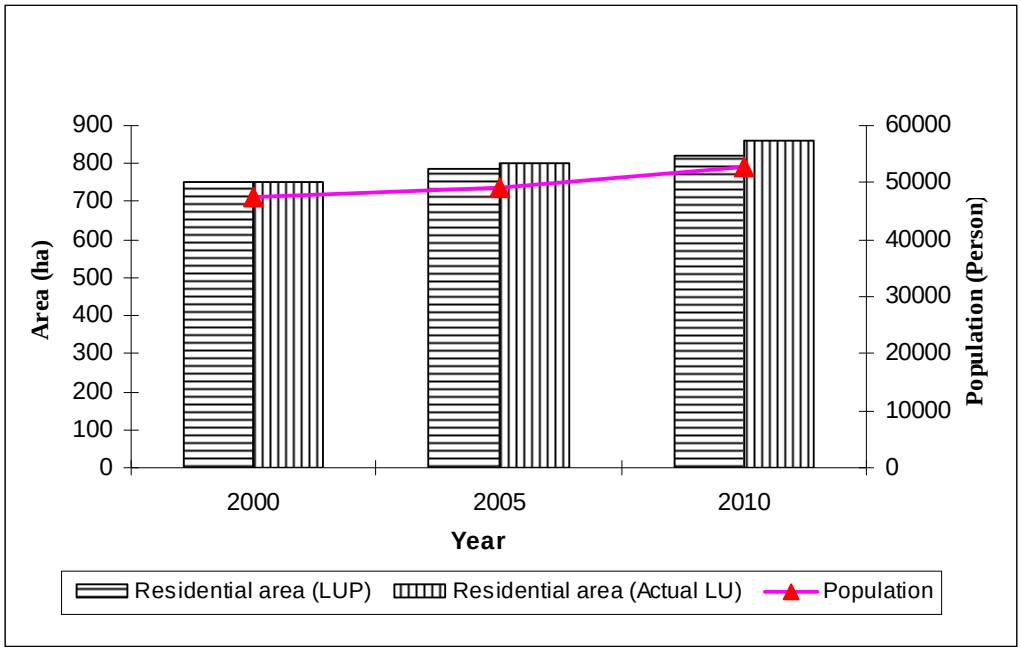

Fig.3. Correlation between residential land and population growth in Maichau

The figure indicates that the population of the district increased gradually from around 47,300 people in 2000 to 52,700 people in 2010, with an average population growth of 1.12% in 10 years (GSO, 2010). While residential land also rose significantly in both LUP and actual Land Use (LU). Indeed, the increase of roughly 70 ha and 110 ha were in LUP and actual LU, respectively. It is obvious that LUP was meant to provide land for population growth in such period.

3.3. Correlation between LUP and industrial development

Avans (2004) demonstrated that the use of land and the location of activities that operate in LUP process possibly control the economic activities towards economic efficiency. The increase or decrease of land for economic activities is merely solved by LUP. It is a unique tool to accommodate land for different purposes throughout the specific period of development. In the first period of industrialization, land is actually significant and appeals to investors. The realisation of rural industrialization and modernization demands that industrial land rise significantly to meet the need of land and contribute to the increase of income from industry for local people (Anonymous, 2001).

Fig.4 illustrates that land for non-agriculture and business was expanded gradually to support the demand of industrial development in Maichau District. Specifically, industrial land soared by around 21 ha both in LUP and actual LU from 2000 to 2010, an increase of more than 3 times throughout that period. The income from industry also rose dramatically from VND 5.43 billion in 2000 to VND 105.46 billion in 2010, nearly 20 times higher. It is assumed that the increase of industrial land affected positively the industrial income of the district.

The correlation between Land Use Planning and food production, population and industrial value is summarized in table 1. It shows that total output indicators correlate well with total assigned land use for a suitable land use category.

Table 2 shows the correlation between intended change and actual change of land use in 23 communes from 2000 to 2010.

The data in table 2 proves that intended change (between actual land use 2010 and LUP) and actual change (between actual land use 2010 and actual land use 2000) were significantly correlated for all land use types.

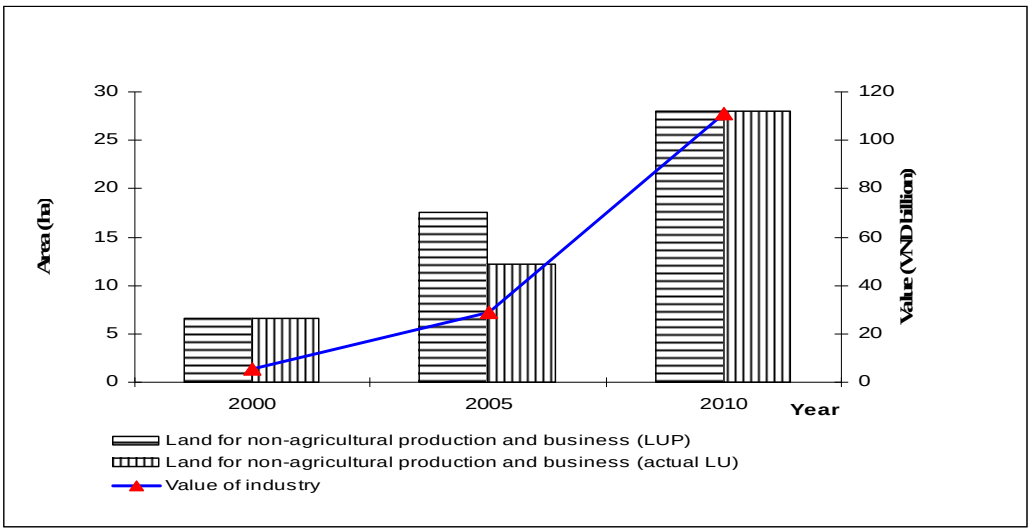

Fig.4. Correlation between industrial land and value of industry in Maichau

Table 1. Correlation between LUP and social economic development

Dependent variables		Independent variables (LUP) (n=23)		
		Annual crop land	Industrial and business land	Residential land
1. Actual annual crop land	R-Square	0.579	0.086	0.069
	P-value	0.000	0.499	0.226
	Slope	**1.112*** **	-14.140	-2.083
2. Actual industrial and business land	R-Square	0.043	1.000	0.064
	P-value	0.590	0.000	0.512
	Slope	-0.005	**1.007*** **	0.051
3. Actual residential land	R-Square	0.000	0.008	0.400
	P-value	0.976	0.825	0.001
	Slope	0.001	-0.280	**0.539*** **
4. Food	R-Square	0.579	0.068	0.069
	P-value	0.000	0.499	0.226
	Slope	**4.434*** **	-56.388	-8.305
5. Population	R-Square	0.000	0.292	0.672
	P-value	0.990	0.133	0.000
	Slope	0.024	88.503	**40.146*** **
6. Industrial value	R-Square	0.048	0.793	0.067
	P-value	0.573	0.001	0.502
	Slope	-0.022	**3.944*** **	0.231

, **, * significant at 0.05, 0.01, 0.001, respectively.*

Source: Own calculation

Table 2. Correlation between intended change and actual change of land use

Actual land use 2010 - LUP (Intended change)		Actual land use 2010 - Actual land use 2000 (Actual change) (n=23)				
		Agriculture	Residence	Industry	Forest	Unused
Agriculture	R-Square	0.776	0.068	0.012	0.086	0.019
	P-value	0.000	0.228	0.617	0.175	0.529
	Slope	**1.619*****	0.053	-0.012	-1.924	-0.882
Residence	R-Square	0.082	0.789	0.008	0.162	0.035
	P-value	0.185	0.000	0.685	0.057	0.392
	Slope	3.615	**1.244*****	-0.069	18.166	8.19
Industry	R-Square	0.002	0.000	0.832	0.031	0.028
	P-value	0.852	0.93	0	0.419	0.446
	Slope	-40.409	-2.091	**54.055*****	619	-567.136
Forest	R-Square	0.163	0.093	0.024	0.416	0.308
	P-value	0.056	0.157	0.478	0.001	0.006
	Slope	-0.089	0.007	0.002	**0.51****	0.426
Unused	R-Square	0.039	0.054	0.009	0.114	0.589
	P-value	0.366	0.287	0.663	0.116	0.000
	Slope	0.095	-0.012	-0.003	-0.58	-**1.279*****

, **, * significant at 0.05, 0.01, 0.001, respectively*

Specifically, for agriculture, 1 ha or 1% more in intended change was equivalent to 1.6 ha or 1.6% more in actual increase. For residence, 1 ha or 1% more in planned change, it increased 1.2 ha or 1.2% in actual change. In terms of industrial land, 1 ha or 1% more in intended change, the actual change increased 54 ha or 54%. For 1 ha or 1% more planned forest area, it increased 0.5 ha or 0.5% in actual change. For the unused land, the correlation was negative. In sum, a substantial impact of LUP2000 on actual development appears at the municipality level is visible, however, as correlation coefficients vary and rarely approach +1.0, the actual spatial influence is limited.

Nota bene, this analysis was conducted at the municipal level, not at the level of the single parcels of land to which a specific land use was assigned. I.e. the analysis indicates a high positive correlation even in potential cases where the intended changes had happened somewhere else as long as these deviations balance at the municipal level. Thus, the actual spatial importance of LUP2010 may be overestimated.

3.4. Opinion of resource managers and officials

To reinforce the correlation between LUP and socio-economic development from 2001 to

Table 4. Descriptive statistics of interview of communal officials

Variables	Mean (n=23)	Std. deviation	Min	Max
Dependent variables				
1 Participation of authority in making LUP (Yes=1; No=0)	1	0.0000	1	1
2 Participation of local people in making LUP (Yes=1; No=0)	0	0.0000	0	0
3 Contribution of LUP to economic growth (Low (<10%)=1, medium (10-15%) = 2; High (>15%) = 3)	2.0435	0.63806	1	3
4 Contribution of LUP to agricultural development (Low (<10%)=1, medium (10-15%) = 2; High (>15%) = 3)	2.2174	0.73587	1	3
5 Contribution of LUP to non-agricultural development (Low (<10%)=1, medium (10-15%) = 2; High (>15%) = 3)	1.4783	0.73048	1	3
6 Contribution of LUP to residential development (Low =1, medium = 2; High = 3)	1.6957	0.55880	1	3
7 Contribution of LUP to food security (Low = 1, medium = 2; High = 3)	2.0435	0.82453	1	3
8 Contribution of LUP to landslide prevention (Low = 1, medium = 2; High = 3)	1.7391	0.61919	1	3
9 Contribution of LUP to erosion prevention (Low =1, medium = 2; High = 3)	1.9130	0.59643	1	3
10 Contribution of LUP to reforestation (Low =1, medium = 2; High = 3)	1.6087	0.65638	1	3
11 Contribution of LUP to change of labour use (Low =1, medium = 2; High = 3)	1.4783	0.73048	1	3
Independent variables (LUP)				
1 Increase of annual crop land (ha)	2.2804	37.3315	-94.3100	76.2300
2 Increase of forest land (ha)	321.8461	397.9902	0.9100	1,966.7500
3 Increase of residential land (ha)	3.0596	2.8041	0.3900	15.1000
4 Increase of industrial land (ha)	0.9322	2.2712	0.0000	9.5500
5 Decrease of unused land (ha)	364.2343	395.3139	55.3300	2,029.8800

Source: Own investigation and calculation

2010, the interview of natural resources management officials and authorities of 22 communes and one town in Maichau District was carried out under concrete questions focused on three main aspects: (1) Participation in LUP; (2) Contribution of LUP to socio-economic development; (3) Effect of LUP on environment. Additionally, the area increases and decreases in different land use types in LUP were also extracted as independent variables.

LUP in the district was made in 2000 without local people's participation. Evans (2004) argues that the compromise with local people is very important in planning to achieve a balanced development. There was merely the participation of authorities and natural resources management officials in the making of LUP.

The contribution of LUP to economic development was claimed to be of great importance. Indeed, the contribution to socio-economic development was rated as between 1.5 and 2.2 at a three point scale (1: low, 2: medium, 3: high importance). The strongest influence was assumed for agricultural development.

Table 5. Correlation between LUP and contribution of LUP to socio-economic development

Variables		Independent variables				
		Increase of annual crop land	Increase of industrial and business land	Increase of forest land	Increase of residential land	Decrease of unused land
1. Contribution of LUP to economic growth	R-Square	0.299	0.304	0.018	0.002	0.006
	P-value	0.007	0.006	0.539	0.856	0.721
	Slope	**0.009****	**0.155****	0.000	0.009	0.000
2. Contribution of LUP to agricultural development	R-Square	0.753	0.010	0.058	0.001	0.025
	P-value	0.000	0.652	0.268	0.896	0.475
	Slope	**0.017*****	0.032	0.000	-0.008	0.000
3. Contribution of LUP to non-agricultural development	R-Square	0.031	0.653	0.026	0.005	0.021
	P-value	0.420	0.000	0.464	0.752	0.510
	Slope	0.003	**0.260*****	0.000	-0.018	0.000
4. Contribution of LUP to residential development	R-Square	0.07	0.011	0.120	0.524	0.165
	P-value	0.222	0.630	0.105	0.000	0.054
	Slope	0.004	0.026	0.000	**0.144*****	0.001
5. Contribution of LUP to reforestation	R-Square	0.176	0.002	0.595	0.156	0.544
	P-value	0.046	0.838	0.000	0.055	0.000
	Slope	-0.007*	0.013	**0.001*****	0.095	**0.001*****
6. Contribution of LUP to food security	R-Square	0.687	0.024	0.151	0.054	0.096
	P-value	0.000	0.481	0.067	0.285	0.150
	Slope	**0.018*****	0.056	0.000	-0.068	0.000
7. Contribution of LUP to landslide prevention	R-Square	0.134	0.000	0.528	0.208	0.506
	P-value	0.086	0.963	0.000	0.029	0.000
	Slope	-0.006	-0.003	**0.001*****	**0.101***	**0.001*****
8. Contribution of LUP to erosion prevention	R-Square	0.149	0.018	0.441	0.144	0.403
	P-value	0.069	0.537	0.001	0.074	0.001
	Slope	-0.006	-0.036	**0.001*****	0.081	**0.001*****
9. Contribution of LUP to change of labour use	R-Square	0.096	0.611	0.017	0.004	0.012
	P-value	0.150	0.000	0.549	0.769	0.622
	Slope	0.006	**0.251*****	0.000	-0.017	0.000

, **, * significant at 0.05, 0.01, 0.001, respectively.*

Source: Own calculation

Table 5 shows that there exists a significant correlation between the influences those municipal level interviewees *attribute* to LUP 2000 and actual socio-economic development from 2001 to 2010. For example, the increase of annual crops and industrial land affected largely the agricultural and non-agricultural development, respectively.

4. CONCLUSIONS

Local land managers regard Land Use Planning as a low-to-medium to medium effective tool to shape district development. Overall indicators of socio-economic development correlate well with the total areas assigned to the land use categories of the LUP 2000. Thus, it can be inferred that LUP contributes positively to sustainable development because it provides space for these developments, especially as land inputs for agricultural and forest production. However, at the level of the detailed changes proposed in LUP 2000 versus the actual changes at the municipal level, substantial deviations from the plan are commonly observed. Also, this result has to be put into perspective: The deviations in the residential and agricultural land use categories are among the lowest at the municipal level. For both categories, actual change is highly correlated with planned changes ($p<0.001$), and the proportionality factors are roughly 1.2 and 1.6. So the null-hypothesis that there is no relationship between plan and actual development is clearly rejected.

The correlation between the changes of land use in LUP and socio-economic statistical data in Maichau District is an evidence to prove partly the contribution of LUP to socio-economic development throughout the period of development. Particularly, in the undeveloped area with deficient financial support, land resource and land allocation become the vital key to change the economy structure towards non-agriculture and increase the income of local people. Besides, the correlation also demonstrates the effect of LUP implementation on actual development which is one of the backgrounds used to propose different land use scenarios in LUP for the next period of development.

The changes of land use in LUP (independent variables) and actual socio-economic development judgments (dependent variables) of local authorities and natural resources management officials in the district, who made and realized LUP, demonstrate the correlation as well. Indeed, LUP correlated with food production, contributed to socio-economic development through: Economic growth, residential development, change of the labour force, and environmental protection like landslide and erosion prevention.

Certainly, additional high resolution analyses would be desirable as well as qualitative insights into the “real” interaction of plan and actual development. Nevertheless, the results of this research can be regarded as supporting the notion that LUP does influence local development. Thus, scientific endeavors to improve the capacity of Vietnamese Land Use Planning by the incorporation of environmental factors cannot and should not be disregarded because of the low effectiveness of Land Use Planning itself.

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