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The linkage between land reform and land use changes: A case of Vietnam

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Recently, land reform and land tenure have been once again considered as the important issue of development agenda. Land reform via land allocation and titling has been widely undertaken in transition and developing countries across continents. As a result, a massive transfer of land rights from state and collective bodies to private entities have been adopted. Such land reforms have significantly influenced land tenure, agricultural production, land use, rural livelihoods and environment. Like many other transitional countries, Vietnam has recently shifted away from its economy from plan to market-oriented system. Land reform by land allocation and land titling to individual land users is the breaking point of the reform policies. Land reform has been considered as one of the key factors that defines patterns and changes in the land use system. This paper examines the influence of land reform on household decisions regarding land use, agricultural intensification, and environment protection from three buffer zone villages of Cat Tien National Park in the southern upland of Vietnam. The empirical findings show that farm households have increasingly diversified their land use as well as increased agricultural intensification and commercialization. Moreover, shifts from subsistence land use practices to more intensified patterns have produced both positive and negative impacts on the rural environment and natural resources. Recommendations drawn from the findings are necessary to redefine land policies in particular and development policies in general for achieving sustainability of rural livelihoods and environment.

Key words: Vietnam, land reform, market liberalization, land use change, livelihood, agricultural intensification.

INTRODUCTION

Since 1986, Vietnam has undertaken the radical reform of its economy towards market-based system and land reform was the fundamental component of the economic reform policy. A nation-wide program of de-collectivization was implemented. The essence of this effort was to allocate land that had been farmed collectively by administrative means to individual households for the long-term use. In the context of following-up market liberalization in the early of 1990s, the reform land laws in 1993 and its later revisions were enacted to introduce official land titles to land users in order to extend and secure their land tenure. Farmers became the manager of land resources and decisions of production investment and product uses. At the same

time, the government has also adopted the reform of pricing and financial systems, agricultural input and output market, and improvement of infrastructure and agriculture-related services. As a result, farmers have increasingly used land more market-oriented and intensified. The production of commercial and industrial crops has significantly increased towards the increasing demand of domestic and export market. Land use patterns have experienced conspicuous changes. However, defined land tenure might be not the only factor to guarantee agricultural intensification and resource conservation. Several factors working at different scales would affect land-use change.

Therefore, this study aimed to explore land reform and

land tenure systems, land use change patterns and identify effects of land reform and other related factors which resulted in land use change as well as figure out some feasible suggestion for improving well-being and environment. The paper starts with a review of land reform and its influence on land tenure systems, agriculture production, land use changes and environment at macro level and then comes to household level by three case study villages in the buffer zone of Cat Tien National Park. In addition, other related factors influencing land use, land use changes and agriculture and local environment target to explore.

LAND REFORM AND LAND RIGHTS IN VIETNAM

Land reform and shifts in land rights

Over the last five decades, several land tenure systems prevailed due to shifts of the political and economic system. In the North, the agrarian reforms that began with independence in 1954 established the land as state property and were followed by the agriculture collectivization to pave a way for building the socialist economy. The same policy was adopted in the South after the country's unification in 1975. In the beginning of the 80s, there was some initial shift in tenure systems undertaken in 1981 due to the introduction of a "Product Contract" system known as "Contract 100" (Marsh and MacAulay, 2002). Land once owned by cooperatives could be subcontracted to farmers (Neef et al., 2000) and households undertook the planting, care, and harvesting of crops, but the harvested product largely still held by the cooperative (Marsh and MacAulay, 2002). However, the initial enthusiasm of the "Contract 10" to some extent, its original dynamic began to wane since mechanisms in macroeconomic management had not been fully revised and changed in practice (Nam et al., 2000:15). Consequently, inadequate reform, together with other mistakes accumulated for many years, gradually drove the whole socioeconomic system into crisis and food shortages.

Further pressures on land and agriculture reform for economic development as a whole and agriculture development in particular were extremely necessary. As a result, the first Land Law was introduced in 1987 and went into effect in 1988. According to this law and its implementary regulations, agricultural land once owned by the cooperatives was subjected to allocate individual farm households for more stable use while landownership rights belonged to the State. Also, the introduction of the household responsibility system induced a shift in control over assets from collective to individual ownership and allowed households to exercise limited control over land and labour, and investment decisions. Farm households could keep their entire output after fulfilling their tax and other obligations (Haque and Montesi, 1996). The 1988 Land Law laid down the fundamental guidelines for

today's land administration processes and along with other renovation policies and decisions, have encouraged more productive land use (Christ and Kloss, 1998). The 1988 Land Law perceived as the major land reform undertaken since 1975, has significantly contributed to land use intensification and agricultural growth.

However, after few years, the 1988 Land Law was considered outdated (Christ and Kloss, 1998). This land law did not provide farmers with full and secured land use rights, e.g. land rights were not allowed to trade or used as collateral (Haque and Montesi, 1996). It did not sufficiently motivated farmers to utilize their land effectively and their investment decisions were still primarily driven by immediate output concerns rather than by partially privatizing land use rights (UNDP, 1996). The 1988 Land Law was insufficient in swiftly changing the economic environment and prevented the process of economic reform and therefore further revisions to this law were especially needed to make up for its defects.

The radical land right reform, say, was undertaken under the 1993 Land Law. It stipulated the land administration and the land use system, as well as the rights and obligations of land users. The spirit of this Law was a continuation of the reform undertaken by the government since 1988 and finalized the process of land rights privatization (Castella et al., 2002). Land ownership¹ was though not changed as compared to the previous land laws; long-term land use rights for farm households have been legally endorsed. This law brought about deepened and broadened land rights reform compared to its precedents (UNDP, 1996), that is: (1) Land is allocated to individual entities for stable and long-term use; (2) Specifying rights and obligations of land users to ensure that the land is used genuinely, economically, and suitably. Land users are granted a bundle of rights to transfer, mortgage, exchange, lease, and inherit² their allocated land, and (3) Assigning land tenure certificates (LTC) to land users.

Land reform by land allocation and titling was though unified, nationally, it has not been evenly implemented and varied largely across regions (Castella et al., 2002). The land titling program was initiated since 1994, but has yet completed. According to World Bank (2008), household survey data in 2006 indicates that only 76% of agricultural land, 68% of urban land and 34% of forest land were granted the land-use right certificate. This also means that approximate one thirds of land plots have not been granted the land use consultants (LUC) to their owners. In order to strengthen

¹ According to Vietnam's constitution, land defined as all people's ownership and uniquely managed by the State.

² The revisions to the 1993 Land Law in 1998, 2001, and 2003 granted more rights to land users by enabling land to be sub-leased and allowing Vietnamese entrepreneurs to exercise their rights by contributing to joint ventures with a foreign company.

³ "Having more rights" means land granted with the LTC.

Table 1. Land use change between 1993 and 2007.

Year	Total	Distribution					
		Annual crops			Perennial crops		
		Total	Cereal grains	Other annual crops	Total	Industrial crops	Fruit trees
1993 (ha)	10,028.3	8,893.0	7,058.3	598.9	1,135.3	758.5	296.0
2007 (ha)	13,495.2	10,862.7	8,270.2	845.8	2,632.5	1,796.6	775.5
Comparison (ha)	3,466.9	1,969.7	1,211.9	246.9	1,497.2	1,038.1	479.5
Comparison (%)	34.57	22.15	17.17	41.23	131.88	136.86	161.99

Unit: 1,000 ha. Source: Calculated from National statistical data, 2009.

the weaknesses of land administration system and foster development of land market, the 2003 Land Law was launched. Under this law, improvements of weaknesses in land administration, expansion of land use rights to land users as well as creation of favorable conditions for development of land and real estate markets have been essentially made.

Effects of land reform on land use and agriculture production

Land use has been undergoing rapid transformation since Vietnam government launched economic and land reform policies in 1986. The total cultivated area had considerably increased from 10,028,300 ha in 1993 to 13,485,200 ha in 2007. Together with the increased total cultivated area, land use patterns have also been revised. A rise in commercial agricultural production of cash crops was at the expense of subsistence agricultural production. The crop pattern changes were favorable towards certain tradable crops, such as paddy rice, coffee, rubber, cashew nut, pepper and aquaculture. The area of annual crops had increased from 8,893,000 ha in 1993 to 10,867,200 ha in 2007 as well as significantly increasing in a portion of total cultivated area devoted to multi-year crops. The area for planting industrial/commercial crops (including coffee, rubber, cashew nut, pepper, fruits, etc.) had significantly soared from 1,135,300 ha in 1993 to 2,632,500 ha in 2007 (Table 1). Although, crop patterns were generally determined by agroclimatic factors such as soil conditions, topography, rainfall, changes in response to a favorable market and tenurial environment were taken place (Haque and Montesi, 1996). Thus, the new exposure to more secured land rights and better access to input and output market, infrastructure has brought about expansion of cultivated area and changes in land use patterns.

Together with expansion of cultivated area and changes in land use patterns, the output from most of important crops such as paddy rice, maize, coffee, tea, pepper, rubber and cashew nut have significantly improved between 1993 and 2007; some of which

increased 606.75% (e.g. coffee) (Table 2). The impressive growth of agricultural outputs has transformed Viet Nam from a food-deficit into a food-surplus country (Haque and Montesi, 1996). Much of the development of intensive agriculture and agriculture growth, say, has been driven by policy interventions (e.g. land, finance, pricing reforms and market liberalization), integration in global economy, and external market forces. Such factors have released productive forces, improved households' access to input and output market which provided farmers both motivation and opportunities in agriculture production. However, Quy and Lakshmi (2005) also assert that long-term investment could be perhaps driven by direct government incentives for investing in such crops rather than by the land reform itself.

It is useful to note that land use changes in response to land and other sectoral reforms have importantly influenced utilization of natural resources and environment. Such driving forces have led land users to intensify their farm and switch from subsistence to high value crops with higher application of chemical fertilizers and pesticides, high yield varieties, deep ploughing technique (Neef et al., 2000). While short-term benefits of a more intensified utilization of land resources have been clearly perceived, negative effects on natural resources (e.g. soil and water contamination and soil degradation and depletion) have still not been taken into account by farmers. Few long-term investments can be observed (Neef et al., 2000). This has caused gradual, even rapid in some place, degradation of land, land – based resources and environment.

In addition, opening land market due to land reform has induced the intensification of land accumulation and large farm development process. A number of large farms increased from 57,069 farms in 2000 to 116,222 farms in 2007 or 103.65%. The total area under the large farm also extended almost double, from 373,200 ha in 2000 to 663,500 ha in 2007. At the same time, a number of landless farmers have also raised over double, from 8% in 1993 to 19% in 2002. A number of households owning less than 0.2 ha of agricultural land accounted for 23.8% of a total number of farm households (or 2,382,000 households/9,740,000 households in total). At the same time, land fragmentation has been growing, seriously. It is

Table 2. Trends in the output of major crops.

Major crops	Output of crops		Comparison between 1993 - 2007	
	1993	2007	±	±%
Paddy rice	21.9	35.87	13.97	63.78
Maize	0.8	4.11	3.31	413.44
Total cereals	22.7	39.98	17.28	76.10
Tea	0.17	0.70	0.53	314.65
Coffee	0.14	0.96	0.83	606.76
Pepper	0.0075	0.009	0.0015	20.27
Cashew nut	0.046	0.30	0.26	556.3
Rubber	0.097	0.60	0.50	519.59

Unit: Million tones. Source: Calculated from National statistical data, 2009.

estimated that there were 75 millions of agriculture land plots and each household has about 7 to 8 land plots. Around 10% of land plots were equal or smaller than 100 m² (Marsh and MacAulay, 2002).

CASE STUDY VILLAGES

This case study aimed at examining whether effects of land reform and other related policies on local land use were in line with the trends of the macro level. The study was undertaken in three buffer zone villages of Cat Tien National Park (CTNP) in the southern upland of Vietnam. To what extent, this study also examined impacts that development programs, market liberalization and conservation regulations have had on agents to adapt their land use decision and agriculture production decisions and environment.

Three villages, Ma, Tay, and Kinh, were selected for the field survey. First, Ma village is located on the edge of the buffer zone and CTNP and is far from the communal and district market center. The village is the residence of seven ethnic groups, in which the Ma and Stieng are two indigenous populations and also dominant groups. Second, Tay village is inhabited by mainly Tay people. Tay village is also situated in the buffer zone of CTNP, but far from the CTNP's boundary (4 km) and 15 km to the district market center. Third, Kinh village is located adjacent to Tay village and is about 10 km to the district market center. Kinh village is the homeland of Kinh majority (Vietnamese). The two latter villages were established by the Tay and Kinh in the 80s when families immigrated from low-land and northern mountainous provinces in search of productive agricultural land and alternative livelihoods. Historically, these two villages were upgraded from the production groups lasting from 1984 to 1992. During this period, the production groups controlled residents and collected taxes only, whereas farm households possessed land and production, individually. Landholding among households was never adjusted by either collectivization or later land rights

privatization.

Economically, a majority of Ma village's households were fallen under the poverty threshold. Their livelihoods were predominantly drawn on agricultural production and collection of non-timber forest products (NTFPs). Villagers' access to alternative livelihoods seemed to be limited. Tay villagers' livelihoods were derived from agricultural production and supplemented by off- and non-farm activities, such as small enterprises, wages from other farms, factories, and public sectors. In Kinh village, the agricultural sector remained the single most important source of income for villagers, but their income was considerably added to by off- and non-farm economic activities. The Tay and Kinh villages were better than Ma village in terms of economy and infrastructure. However, three villages were all identified as the very poor in various aspects as compared with other villages in the region.

The implementation of land allocation and land titling according to the 1993 Land Law and its later revisions was an uneven and difficult process due to various compressive factors. It included ambiguous and inconsistent land legislation, inconsistent local decisions and guidelines, complicated implementation procedures, a top-down approach, and shortcomings in governance. While the constraint level of each factor having on the implementation process might vary across localities and even households, it is not easy to separately evaluate their adverse impacts.

METHODS

The study was drawn on diverse sources of data collected in 2004 and 2005 (PhD fieldwork) and supplemented by the fieldwork in 2009. First-hand information, including quantitative and qualitative data, was the basic source of data for empirical analysis. Such data was mainly gathered through the structured questionnaire interviews of 119 selected households which focused on households' background, ownership of and access to productive resources, economic activities, agriculture production and land use. Additionally, qualitative data related to changes in households' land use and crop choices, living standard improvement, access to

alternative livelihoods. At the same time, data for the empirical analysis on the impacts of land reform and other related programs on villagers' land use and agriculture production was enriched by focus-group discussions and key informant interviews.

Secondary data was a complementary source of empirical analysis in this work; it provided a basis background relevant to land rights privatization, procedure of land allocation implementation, and factors determining the outcome of land rights privatization. The secondary information came from multiple sources, mainly collected and synthesized from published literature and monography, official statistics, legal and policy documents.

RESULTS

Changes in households' land use patterns

There were 118 of 119 interviewed households owning some land and just one having absolutely no land. On average, each household owned 2.29 ha of land and almost households in the surveyed sample (99%) possessed some agricultural land including, in mean, 1.06 ha of wet rice land, 0.06 ha of other annual crop land, 0.64 ha of industrial crop land, and 0.04 ha of fish pond. Since rice production was a main source of providing households' food, 97% of households possessed wet rice land; in contrast, only 20, 65 and 23% of households had other annual crop lands, industrial crop land and fish pond, respectively. Few households had forest land and accounted for 0.49 ha per household. Still, a large area of forest land was controlled by governmental agencies and state forestry enterprises.

Farmers in the buffer villages have substantially adjusted their land use practice in response to changing political and economic circumstances, especially reforming economic, land, natural conservation and upland development policies since 1986. A trend towards the expansion of landholding became common among households. A mean size of households' landholding had been rising from 1.97 ha in 1997 to 2.29 ha in 2004 (increasing 0.32 ha or 16%). Although, land in the region was no longer "open access" due to the process of villagization, land demarcation for land allocation and land titling, the establishment of CTNP, and forest agencies' strict control over forests, landholding enlargement by new land invasions in the state-owned forest and Cat Tien National Park, informal land rental, and informal land transferring was taken place among a large number of households. Some households illegally seized forests nearby their residence for cultivation, especially those in Ma village, since the potential supply of new land for cultivation in the village has increasingly become scarcer, while the local demand for agricultural land has been particularly high due to population growth and commercial farm expansion. Other households, especially those in Kinh and Tay village, enlarged their landholding by informally buying or renting in land. It should be particularly noted that landholding has been increasing discrepant among households. Some others had only 0.1 ha. There were at least four households

(3.36%) lost land and became landless. Landholding differentiation was closely tied with households' settlement time, resident location and land access capacity, government's interventions in land distribution and opening land transfer market.

Adding to changes in households' landholding, their land use patterns and crop choices had obviously transformed in response to economic and land reform as well as population growth, market development, economic integration, technical innovation and other related factors. Farmers have gradually shifted their annual crop land (e.g. upland rice, cassava, and sweet potato) towards commercial perennial crops (e.g. fruit trees, cashew nut, coffee, and pepper), inland aquaculture and commercial livestock development. Data in Table 3 shows clearly that household's annual crop land slightly diminished (-0.17 ha) while the area of land devoted for perennial plantations, fish pond and livestock development considerably expanded (+0.49 ha). Land use diversification and intensification with switching from subsistence, traditional to high value cash crops with adoption of new technologies such as intensified uses of fertilizers, pesticides, high yield varieties, deep ploughing with tractors have become increasingly a common practice among farmers, even indigenous people who traditionally practiced extensive agriculture and shifting cultivation.

It is worthy to take into account that while favoring in changing crop patterns to commercialized land use systems, farm households also increased adopting non-cropping and non-farm activities (Ha, 2007). A portion of households involved in commercial livestock grazing, inland aquaculture, rural small enterprises, waged has risen 23, 22, 12 and 39%, respectively. Such economic activities were also diversified in terms of types of activities. At the same time, collection of non-timber forest products from CTNP and contacted forest has become commercialized in recent years with sales to outside traders which considered as a way to increase households' income and generate financial sources for agricultural and other investments.

Effects on local land tenure security

Most of populations (92%) in the study villages were satisfied with land tenure security due to land allocation and granting land title (Table 4). Statistically, a correlation between the LTC and the perception of landholders' satisfaction with land tenure security is typically high ($R^2 = 0.97$, and significant at a 1% level). It can be best explained that the land title thus embodied the state's guarantee to protect land users' legally backed rights and farmers holding the LTC could fully realize their rights as legally-defined in the Land Law. Only few households (2%) were unsatisfied with their land rights. Those who belonged to this group claimed that the duration of granted rights was not long enough for them to reap their

Table 3. Households' landholding.

Landholding	Changes in households' landholding		
	1997 (ha)	2004 (ha)	± (ha)
Agricultural land	1.48	1.80	0.32
Wet rice land	1.09	1.06	-0.03
Other annual crop land	0.2	0.06	-0.14
Industrial crop land	0.17	0.64	0.47
Fish pond	0.02	0.04	0.02
Forest land	0.49	0.49	0
Total land	1.97	2.29	0.32

Source: Household survey in 2004 to 2005.

Table 4. Households' perception on land titling and security of land rights.

Perception	Land titling and right security perception			
	HHs with LTC		HHs without LCT	
	Number (71)	%	Number (48)	%
Satisfied	65	92	0	0
Unsatisfied	6	8	48	100
Having more rights ¹	65	92	unobservable	unobservable

¹"Having more rights" means land granted with the LTC. Source: Household survey 2004 to 2005.

investment in land.

Effects on households' access to formal credit

Together with reforming the rural financial system, land titling has improved both supply and demand sides of institutional credits. Statistical test shows that holding the LTC is positively and significantly related household's access to formal credit provided by the State Bank (mainly Bank for Agriculture and Rural Development) since the LTC could be used as the collateral for borrowing loans. Thus, a number of households gained access to formal credit increased quickly at expense of dropping access to private credits after the implementation of land titling program in 1997 (Table 5). Nevertheless, we also observed that although formal credit market has been increasingly accessible to farmers, they continued confronting with difficulties including a complicated borrowing procedure and over paperwork, a short term of credit ration, a small amount of loan, discrimination towards the poor, and households' land foreclosure worry due to loan default.

Effects on households' production investment and land use

Crop patterns and land use are generally affected by

agro-climatic factors such as soil conditions, topography, rainfall and temperature. However, more importantly, human action is considered a predominant factor. Technical innovation, institutional environment, market development, economic integration as well as households' socio-economic conditions significantly influence farmers' behavior towards how to use their land and the level of intensified production. Land ownership is also identified as a determinant affecting households' decision on the pattern of land use intensification and diversification, the level of intensive resource utilization, and natural conservation.

Land allocation and land titling following land reform led farmers to change their land use patterns and crop choices by providing them with incentives to invest in their agriculture production and related activities. Statistically, the holding of the LTC is positively and significantly correlated with households' investment in crops. And as observed well-enhanced security of tenure not only stimulated farmers to undertake more investment into farm production, but also into other economic activities were comparatively ameliorated. Holding the LTC also affected households' investment by underpinning households' access to formal credit. This finding is in line with a result of most studies on land titling and credit access. Moreover, it is more reasonable that a large number of farmers in the study villages and other villages in CTNP had extreme liquidity constraints, and the formal credit with favorable interests that they gained

Table 5. Households' access to credit.

Forms of credit	A total amount (million VND)	A portion of households (%)
Private credit in 1997	2.86	76
Total credit in 2004	5.71	86
Land collateral-based credit	3.47	45
Private credit	2.24	53

Source: Household survey 2004 to 2005.

by using their LTC as collateral was the major source of capital for carrying out production investment.

Among other households' economic activities, their agricultural investment and land use were strongest influenced by land reform. A result of statistical shows holding the LTC and access to formal credit have significantly positive correlation with investment intensification in crops. Thus, the investment volume per land unit had increased three times between 1997 and 2004. Additionally, farmers have increased their crop diversification and shifted towards high-value and commercial crops for cash income while kept practices of traditional crops to ensure their food needs. Farmers adopted intensification of paddy rice, high-value annual crops (e.g. corn, vegetables), and perennial crops including pepper, cashew nut, and fruit trees. Adopting input intensification has become as a principle farming method among agrarian societies, for instance in the study villages. This fact reflects the trend in local economic transformation as exposing to reform policies and external market forces. Farmers have struggled to seek opportunities in order to increase their income, minimize risks and ensure their food security. Practicing inland aquaculture has also become common among farmers in the study villages, but was not associated with shifts in land reform. Rather, development of inland aquaculture was farmers' response to their own food needs.

Changes in land use patterns and land use intensification were, in addition, determined by combined factors, such as households' ownership of and access to productive resources, extension services, technical innovation and population growth. Obviously, those farmers who belonged to the high income group and also possessed more and better access productive resources, and infrastructure tended to pursue more intensive input-required and high-commercial value crops. Moreover, those households were densely populated and owned less cultivable land per capita seemed also to practice more agricultural intensification as a strategy reducing their land scarcity. In contrast, poor farmers, that is, those who had less production resources and limited access to other production facilities favored in subsistence and semi-subsistence cropping patterns with requiring less input intensification and technical knowledge.

Land reform had also positively influenced households'

investment in commercial livestock production. Commercially raising pig and cattle was a common practice among farmers, even among ethnic minorities who used to raise cattle for their tradition spiritual ceremonies. Together the increasing of market demand for livestock products, better access to formal credit enabled farmers to invest more capital in commercial livestock production. Livestock production has increasingly become the important source of income among farmers. Moreover, government's development programs and agricultural extension favoring to promote livestock production were also the influential factors.

Land reform, land use intensification and environment

Empirical observations show useful facts that short-term benefits from intensification of land resource uses in response to land and other sectoral reforms have increasingly driven degradation of natural resources and environment. Local biodiversity has also gradually been degraded, even rapidly for some species. The loss of local varieties of reptile, wild fish, crustaceans, and amphibians were most observable. As asserted by local people, it has become very difficult to find wild fish and crustaceans in streams and in paddy fields for their protein needs in comparing with the past. Over application of agro-chemistries, less use of manure, organic fertilizers, and deep ploughing with the tractor resulted in soils being gradually depleted. Experienced farmers recognized that "their inputs have continuously increased, but crop yields improved slowly due to the lessening fertility of fields, continuing pollution of surface water, and increase of crop diseases." Long-term investments into land conservation were undertaken by few households. Thus, only several farmers in Kinh and Tay villages built up plant hedgerows or rock-hedgerows around their terrace fields in order to prevent soil erosion. However, such forms of investment were not really associated with land tenure security being enhanced by land reform, but were rather connected to farmers' awareness of the impact of soil erosion on productivity and long-term benefits.

It is, further, worthily considered that growing input-intensified industrial crops in the uplands was good for

preventing soil erosion due to increasing tree cover. However, local experiences also suggest that over uses of chemical inputs for industrial crops have caused soil degradation. Furthermore, in some extreme situations, crop failures due to bad weather and price uncertainties of agricultural products have caused farmers bearing default on their bank loans and losing their land due to foreclosure; this led them to rely more heavily on natural resources in the CTNP for their subsistence and income generation. At least 10% of households in the survey fell into this situation.

Conservation, national park, and land use changes

The establishment of Cat Tien National Park was also a driving force of land use intensification and land use changes. The area now became the national park was "free access land" to indigenous people for extensive agriculture – shifting cultivation. Since establishing the national park, local people were totally excluded from access to land and forest resources in the area. Together with the establishment of CTNP, other external forces such as market development, regional economic integration, technological innovation and population growth, have forced indigenous farmers to adopt sedentary agriculture and intensified uses of available land resources within their village boundary to meet their needs. Moreover, defining the area within the national park, once common property of indigenous people as state property, also caused local people to act indifferently towards resources.

Conclusion

Although, it is not the only decisive factor, land reform following economic renovation policy launched in 1986 is considered as a cornerstone of economic development in general and agricultural growth in particular. More specifically, land reform by land allocation and land titling, together with other sectoral reforms and market development have significantly influenced land use and shifted land use patterns from subsistence –based agriculture towards commercial and high-value agriculture. Farmers have increasingly adopted intensification and diversification of agriculture in response to changing institutional environment and market forces. Land reform has also resulted in the increasing of land accumulation, commercial farm development, land fragmentation and landless. In addition, more intensified land use for short-term benefits becomes widely practiced while investment in land and resource conservation for long-term benefits is not popularly considered by farmers. Consequently, this has caused negative impacts on natural resources and environment.

The findings from the empirical study conducted in

three buffer zone communities of Cat Tien National Park in the southern uplands of Vietnam reveals that land tenure security and better access to formal credit enhanced by land reform, together with market development and technology innovation have strongly motivated farmers to undertake more investment in their agriculture and move towards practicing high-value and intensified crops as well as increasing crop diversification as income improvement and risk – against strategies. In addition, shifts in land use patterns and intensification of land use are determined by other factors including households' initial circumstances and access to productive resources, extension services and infrastructure, and population growth.

Land reform has the potential to stimulate farm households practicing short-term investment for immediate benefits by intensifying utilization of land resources with over application of chemical fertilizers and pesticides and using high yield varieties. This land use behavior among farmers has caused degradation of natural resource and environment problems (e.g. soil erosion and degradation, and loss of biodiversity). Moreover, no evidence suggests land tenure security enhanced by land reform has encouraged farmers' investments in land conservation. In some cases, adopting market-oriented land use has resulted in the loss of households' livelihoods due to crop failures and price uncertainties which force farmers relying more on natural resources to secure their livelihoods. Therefore, redefining development and environment protection policies towards sustainability is particularly required.

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