



Assessing the current land use management and crop systems on the sloping land in central Vietnam



A representative case study of Thuy Bang commune, Thua Thien Hue Province

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Introduction

Vietnam is an agricultural country with population of approximately 84 million (2005). The greatest potential for expansion of cropland is in the sloping areas of central Vietnam. But much of the central Vietnam is still underdeveloped. This region is characterized by widely variable soil types, many of which are of low fertility, severe climate. Additionally, the cleaning of vegetation from slopes greatly increases soil erosion, and the environmental problems associated with land and soil degradation. In some area soils on slopes exceeding 50% were cleared and all soil-protecting residue burned prior to hoeing and planting. The use of inappropriate tillage methods and the lack of suitable methods to improve soil fertility will further increase erosion rates. The main objective is to assess the existing land use management issues and to delineate the crop systems those are influencing to sustainable agricultural production and food security.

Study Area and extend

The study area chosen is a hill village Thuy Bang, Hue, central Vietnam at approximately 16°25'N and 107°27'E and at an altitude of 100 m, and covers an area of 2298 hectares with 5 major soil groups, Acrisols, Cambisols, Fluvisols, Gleysols, Leptosols and divided into 16 soil units. Climate data has been recorded between 1934-1998 at Hue climate and meteorological station showed that monthly mean temperature is about 25.100C, mean annual rainfall is about 2600 mm, but with erratic rainfall distribution, mainly in rainy season from September to January. There are 5 major soil groups with 13 soil units and 14 sub-soil units, 50cm to more 100 topsoil depth, light to light heavy soil texture, 3-20 degree soil slope, low soil reaction (pH), low to medium fertility soil. In 2005 and 2006 land clearing and the burning of vegetation was observed on soils on slopes exceeding 60%. The clearing of the vegetation from these slopes resulted in spectacular scenes of erosional devastation that included deep gullies, plugged roadside ditches, and exhumed bedrock. There is a need to change these tillage and crop residue management practices to reduce soil erosion rates. Without these changes in land use management practices, soil erosion rates will increase as more nutrients are lost and crop yields decrease.

Methodology

In order to carry out this study, methodologies were used as follows:

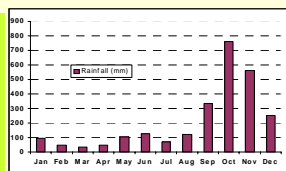
Participatory rural appraisal (PRA): to identify the land use systems, land law knowledges of local people and accessibility to the agricultural land policies.

Collecting the secondary data: To gather the existing census of social-economic, infrastructural, physical data, land policy, and crop production.

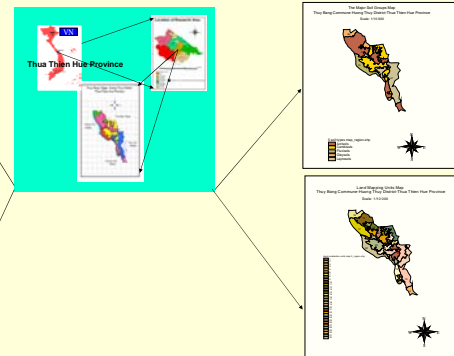
Field investigation: To observe the land cover, land use, map editing.

Farmer interviewing and farmer seminar: interviews of 40 households to obtain the household economy, agricultural production, ideas of farmers for land use policies. Discussion with farmers on land use management practices and crop systems.

SWOT analysis: includes SWOT of physical condition, SWOT of social-economic conditions, SWOT of crop cultivation.



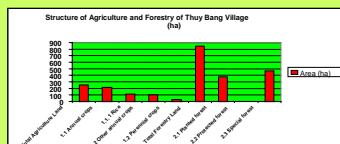
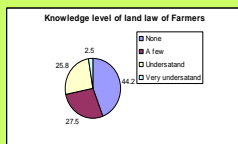
Paddy in the valley area and mixed crops in the garden



Results and Discussions

Assessing the current management and the use of land on the sloping land of Thuy Bang commune, Thua Thien Hue province was divided into two ways: Land use management and crop systems.

Land use management: Until 1999, the administrative map was established, so the land management found much difficulties. The current land use and fluctuation of land were showed in Table 1 and Figure below. The land area of commune is not large but land use was inappropriate, unused land area still occupied more 40% of total. The accessibility to the land policies and land law of local people was limited and equivocal. Household investigation of land law knowledge and accessibility in 2005 showed in Figure below. About of 44% of farmers was not knowledge on land law and land policies, certificate allocation of land use rights for agricultural land was slowly conducted.



Main reasons lead the limitations of land use management of the study area were: (1) Low technological supported conditions as map systems, documents; (2) poor professional competence of the local land administration staff; (3) Low education and knowledge level of land law and land policies of local people.

Crop systems of the study area: Farmers in the sloping areas were focusing on the planting of annual crops such as maize, soybean, groundnuts, sweet potato, rice paddy, as well as perennial crops such as tea, pepper, cashew nut, sugar cane, fruit crops. The information of crop systems and SWOT analysis was showed in the Table 2 and 3

Table 3: Land use types and cropping systems

Land use types	Area (ha)	Cropping systems	Terrain
1. Rice-Rice	37.70	Winter rice – Summer rice	Low land, valley land, near the streams
2. Rice-other cereals	27.50	Rice- bean	Flat land
		Rice- maize	Flat land
3. Rice-fallow	17.00	Rice- sweet potato	Flat land
		Winter rice- Summer fallow	Valley land, terraced fields
3. Annual crops	73.70	Peanut-casava	Upland, hilly side
		Maize-fallow	Flat land, terraced fields
		Sweet potato-casava	Flat land, terraced fields
4. Perennial industrial crops	50.02	Vegetables- peanut or bean	Flat land, near the streams
		Rubber tree, pepper, cinamon tree, guava.	Halfway down the hill, flat
5. Fruit crops	38.20	Citrus fruit, banana, jackfruit, etc.	Halfway down the hill, flat
6. Forest trees	1873.00	Eucalyptus, cajuput tree, native forest trees, etc.	Upland, slope land

Soil loss is not the only loss that occurs with soil erosion, the loss of plant nutrients in the topsoil makes it increasingly more difficult each year to grow a crop in the study area. Fertilizers used on these other crops were much less than on the rice and not sufficient to replace the main plant nutrients (N,P,K) required bay crops.

Conclusions

- Land use management is still limited and lack of land information for local people, the land use issues for all purposes are the lack of precision planning. Major constraints were the poor cultural, educational and economics situation of the residents and the poor professional competence of the local land administration staffs.

- The development of sustainable, intensive agricultural production systems for uplands of central Vietnam is a major development challenge for the country.

Table 1: Area of land in 1995, 2000 and 2005 by type of land (ha)

Items	1995	2000	2005	(%)
Total	2298.00	2298.00	2298.00	100
1. Agricultural land	254.45	249.99	250.61	
1.1 Annual crops land	225.35	217.89	218.51	
1.1.1 Paddy land	120.25	117.42	117.95	
1.1.2 Others	102.10	100.47	100.56	
1.2 Multi-year crops land	32.20	32.10	32.10	
1.3 Water surface land for fishing	3.10	3.10	3.10	
2. Forest land	867.76	868.00	802.40	
2.1 Production forest land	390.65	389.70	375.70	
2.2 Special forest land	-	-	-	
2.3 Protective forest land	477.11	478.30	426.70	
3. Specially used land	254.91	255.84	290.13	
4. Inhabitant land	64.42	75.13	69.75	
5. Unused land	852.86	848.93	882.01	

Table 2: SWOT analysis on social-economic and cultivated conditions

Factors	Strengths (S)	Weaknesses (W)	Opportunities (O)	Threats (T)
Location	Border with many big communes of district.	Far to central district, upland.	Investment for infrastructure development	Lack of information, difficult transportation.
Rural road systems	Quiet synchronous, provincial road 16 pass	Road is small, narrow, path to farming is undeveloped	Products transport with other communes	Difficult for product transportation
Product transport vehicles	Service vehicles are much	Family vehicles are lack and unsatisfied	Could develop big scale production	Passive in product transportation
Agricultural implements	Having a few mechanical implements	Incomprehensive and backward	Mechanical implements are available in markets	To meet with difficulties in cultivation
Markets	Diversified market channels	Lack information of markets and prices	Trade in domestic or many other provinces	Have no strategies for markets development
Incomes of farmers	Quiet stable in forest and industrial crop section	Low incomes	Increase incomes by fruit trees and services	Enough capital for production investments
Labour forces	Young labour and profuse	Low education	Training and improvement the skill	Manual labour and low technology
Capital source	Accumulated capital by family and rural credit	Lack of long-term credit. Many poor families	Could expand the scale production	Hesitate to borrow the credits and inappropriately use the credits
Cultivated land area per capita	Cultivated area per head is fair	Spitted land by many plots and low fertility	Some area could develop the farming	To meet the difficulty for intensive cultivation
Land use rights of farmers	70% farmers have certificates of land use rights for 20-50 years	Progress of granting a certificates is late	Stable for production and chance for borrowing the credits	Farmers are limited understanding on land law.
Crop structure	Diversified crops	Some crops are low yield and low qualities.	Many new crop varieties are import with high yield.	Crop structure is inappropriately and monoculture is still popular
Planting techniques	Some new technologies are transferred to farmers	Several farmers are still achieved new cultivated technologies. Knowledge ability is limited	Having extension workers support monthly and when applying new crops.	Big gap between farmers and extension workers.
Methods to reduce erosion	Having some SALT model for reduce erosion	Limited awareness of farmers about soil erosion, complicated terrain, heavy rain.	Trained and transferred SALT model by extension workers	Soil erosion is too strong and low vegetation cover level
Extension workers	Enthusiastic and hard working.	Limited professional skills.	Will be update new technologies frequently	Lack of extension works in every hamlets often
Accessibility to new technology	Many programmes to support new technologies	Local habits and low education to access the new technologies	Integrated the new technologies with new agricultural projects	Effect of new technologies is still low and unremarkable
Attitudes of farmers	Enthusiastic and ardent	Some farmers are still hesitate to accept new technologies.	Young farmers are easy to access to new technology	Backward habits are still maintained.

Acknowledgments

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