MINISTRY OF EDUCATION AND TRAINING
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STUDIES ON CROP TRANSFORMATION IN THANH HOA PROVINCE

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INTRODUCTION

1. Rationale for the study

Crops structure (CS) is a part of agricultural structure as well as economic structure. Research on CS is necessary for building up a high and sustainable commodities agriculture. CS transformation is a basic characteristic of agricultural development (AD), which is the cause also the result of the growth. Transformation is indispensable and objective in the trend of economic integration. The final result of transformation process is gaining socio-economic and environmental goals.

Cultivation sector contributes a dominant achievement into Vietnamese agriculture, which occupies nearly 70% of production value, more than 50% of the export turn-over and 50% of agricultural growth. This economic sector excellently undertook the role of ensuring national food security, created stable politics, solved the unemployment issue, reduced poverty, increased foreign currency and improved Vietnamese position in the world. Increasing cultivated area, improving production technologies, changing CS are important factors to generate development for this economic sector.

Thanh Hoa Province has favorable conditions for agricultural development based on diversification of natural resources and socio-economic conditions. In the past recent years, Thanh Hoa's agriculture affirmed an important part in the Province's economy as well as national agriculture. The main motive power of Thanh Hoa's agriculture comes from cultivation sector, which occupies 68,5% of agricultural production value. However, this economic sector develops mainly base on natural resources with low efficiency. Typically is rice, which only occupies 24,42% agricultural production value but accounts for 58,9% agricultural land and 70,3% short day crops' land. This proves that SC is necessary to improve efficiency and competitiveness of Thanh Hoa's cultivation sector. In the trend of integration, competition and adaptation to climate change, this economic sector is facing with many challenges such as increasing of production cost due to competition between labor, land and water resource and urbanization, industrial and service development; changing in agricultural product; narrowing in traditional agricultural product market; commercial barriers; natural calamity and the weakness in production organization, etc.… Therefore, it is emerging the issue that how to develop this economic sector based on natural resources and low production cost. And, SC transformation is an significant solution. It is necessary to study CS transformation for building up a suitable CS that appropriate to the new trend, also can exploit Thanh Hoa Province's advantages. This is reason for choosing the topic of PhD dissertation.

2. Literature review

2.1. In the world

Studies on CS and CS transformation can be generalized into four directions:

- Agricultural ecology direction: is the most public study direction about CS. Remarkable studies include Robert G.Conway(1986), Beets, Bill-Mollison(1991), Ridder(1997), Zandstra(1981),.... ect. In this direction, the result of studies often associate with the concept of agricultural systems, cropping systems, sustainable agriculture,

ecological agriculture, farming systems. Scholars used systematic methods in CS studies. Thereby, crops were studied in relationship with other factors such as natural environment, biological environment and socio-economic environment. Researchers also mentioned about improving CS by maintaining and enhancing the whole system's productivity. The goal is building up an ecological stability system with economic potential which not only satisfy human need without land over-exploitation, environmental contamination, but also can exploit ecological potential of the territory.

- Territory organization direction: CS studies were associated with researches on agricultural territory organization. Typical scholars are Russian geographers such as K.I. Ivanov (1974), V.G. Kriutskov (1978), A.N Rakitnhikov (1974),...ect. Thereby, cultivation is a part of agricultural production; organization and CS transformation need to base on natural and socio-economic conditions assessment of the region, especially it must obey territory organization principles.

- Ecological landscape assessment direction: This is a geographical general assessment direction for reasonable use of natural resources and environmental protection. Remarkable scholars such as Mukhina (1973), Zvoruvkin K.B (1968) Leopold (1972), Hudson (1984), Shishenko (1988),…ect. Results of assessment process are important basis in order to recommend solotions for CS transformation.

- Land adaptation assessment direction: are presented in studies of FAO. FAO suggested 10 steps in crops organization in relationship with land use. The main method of this direction is choosing land use types base on land assessment. Land assessment can assist organization and CS transformation by given adaptation principles of FAO.

2.2. In Vietnam

Studies on CS and CS transformation in Vietnam can be also generalized into four directions:

- Agricultural ecology direction: Presented in many researches of agronomist, agro-economists such as Dao The Tuan(1977)(1983)(1997), Bui Huy Dap(1998), Pham Chi Thanh(1996), Nguyen Duy Tinh(1995),... and continue to study in the works of Le Huu Can(1998), Le Quoc Doanh(2001), Nguyen Huu Thap(2010), Vu Duc Kinh(2015)... Concepts about CS and CS transformation were pressented great deal in this study direction.

- Territory organization direction: results of geographical studies in cultivation and agricultural territory organization presented scientific basis of CS transformation. In studies of Nguyen Viet Thinh, Do Thi Minh Duc, Le Thong, Nguyen Minh Tue, Nguyen Phi Hanh, Dang Ngoc Lan, Dang Van Phan, Ong Thi Dan Thanh… focused on analyzing and evaluating geographical conditions for crops organization in the territory (natural and socio-economic conditions), whereby recommended solutions for more and more reasonable transformation and effective use of territory's advantages.

- Ecological landscape assessment direction: this direction mainly serves perennial plants development including industrial perennial and fruit-tree. Typically, studies of Nguyen Cao Huan (2005), Pham Quang Tuan (2003), Nguyen Xuan Do (2003), Nguyen Dinh Giang

(1996), and recently is study of Do Van Thanh (2011) with economic and ecological assessment of Thieu Litchi and persimmon in Bac Giang Province.

- Land adaptation assessment direction: Studies in this direction focus on land classification for planning and CS transformation toward sustainable development. Vu Cao Thai and nnk (1989) classified land accoding to FAO's method to determine adaption level of rubber, coffee tree, tea and mulberry in Tay Nguyen; Nguyen Khang, Pham Duong Ung (1995), Mai Ha Phuong (2010), Duong Thanh Nam (2010) also used this method to evaluate land's adaptation for CS transformation. Studies showed that land classification was basis to project agricultural development and arrange crops production to ensure economic and environmental efficiency. Nevertheless, evaluation criterias attended on land factor more than ecological and socio-economic factors.

Besides studies of scientists, some Ministries, Departments, research institutes and international orgnizations also have projects related to CS transformation. Mainly are publications of the Institute of Agricultural Planning and Design, Institute of Geography, Forest Inventory and Planning Institute, Institute of Policy and Strategy for Agricultural and Rural Development, Institute of Development Strategy, Central Institute for Studying Economic Management, Ministry of Planning and Investment, Department of Agricultural and Rural Development; or some reports of the World Bank, FAO, WTO.

Studies in Thanh Hoa's territory under different aspects are all related to CS and CS transformation such as: Thanh Hoa monography (volume III – economy); studies of Le Van Truong, Le Kim Chi, Nguyen Dinh Giang. Agricultural ecology direction has studies of Le Huu Can (1998), Vu Duc Kinh (2015)....ect.

3. Aim and objectives

3.1. Aim

Applying theoretical and practical basises of CS and CS transformation for evaluating influential factors, analyzing real situation of CS transformation in Thanh Hoa Province. Thenceforth, recommending solutions to improve CS transformation effect in the comming period.

3.2. Objectives

To achieve given aim, the thesis focus on solving following objectives:

- Systematizing theoretical and practical basises of CS and CS transformation
- Evaluating factors that impact CS transformation in Thanh Hoa Province
- Analyzing real situation of CS transfromation and CS transfromation effect in Thanh Hoa Province in the period 2000 - 2013 under geographical aspect.
- Recommending solutions to impulse CS transformation and improve CS transfromation effect in Thanh Hoa Province by 2020 and 2030 vision.

4. Study limit

4.1. Spatial limitation

The thesis studies CS transformation in Thanh Hoa's territory, including 27 districts, city, towns. However, basing on geographical conditions and feature of ecological zones, the study's territory was focused on two regions: flat country (10 districts, city, towns) and coastal areas (6 districts, towns).

4.2. Temporal limitation

- The study about real situation of CS transformation in Thanh Hoa Province started from 2000 to 2013.
- The study forecasts and orients by 2030.

4.3. Content limitation

The thesis studies CS transformation in Thanh Hoa Province according to classification of crops' growth period (perennial and short-day crops) and use value (food crops, foodstuff crops, industrial crops, fruit crops). However, the thesis focuses on transformation of short-day crops which are mainstay crops in Thanh Hoa Province. In this type of crops, the thesis concentrates in transformation of rice and vegetables.

5. Study viewpoint

The thesis applied 5 following viewpoints: general viewpoint, territorial viewpoint, systematic viewpoint, historical – hypermetropic viewpoint and sustainable development viewpoint.

6. Methodology

The thesis used 7 main methodologies: collecting, processing and generalizing data method; analyzing, comparing and generalizing method; statistical and mathematical method; investigation and field-work method; GIS and cartographic method; professional method and forecating method.

7. Thesis contributions

- Clarifying theorecal basis of CS transformation
- Determining normal system to avaluate CS transformation applied in provincial level (Thanh Hoa Province)
- Analyzing overall factors that impact CS transformation in Thanh Hoa Province, clarifying advantages and disadvantages in transformation process.
- Clarifying current situation of CS transformation, achievements as well as limitations in CS transformation in Thanh Hoa Province in the period 2000 – 2013 according to identified criterias and the sociological survey in Thieu Hoa and Hau Loc Districts. Evaluating effect of CS transformation process in socio-economic aspect.
- Recommending solution system to implement CS transformation and improve CS transfromation effect in Thanh Hoa Province in the future.

8. Structure of the thesis

Besides introduction and conclusion, references and appendix; the thesis content was presented into 4 chapters.

Chapter 1
THEORETICAL AND PRACTICAL BASISES OF CROPS STRUCTURE TRANSFORMATION

1.1. Theoretical basis of CS transformation

1.1.1. About crops

1.1.1.1. The concept of crops

According to Vietnamese encyclopedia dictionary: "*crops is a tamed and selected plant for cultivating, putting into agricultural production*". Cultivation is a sector that uses crops as the main object to produce food, raw material for industry and satisfy human entertainment demand.

1.1.1.2. Characteristics of crops

a. Ecological characteristic: crops are alive bodies which are grown up and developed according as natural law and closely affected by surroundings conditions. Each type of crops has its own adaptation to a given ecological condition.

b. Distributive characteristic: crops are presented in all continents; however, crops distribution picture in the world nowadays mainly affected by socio-economic factors. The distribution of crops is widespread in many parts of the world.

c. Production characteristic: each crops group has its own gowing and developing characteristic, adaptation level, seasonal quality, technical demand, intensive cultivation demand, investment demand and technical and scientific advance. Production of short-day crops (SC) is highly seasonal because this type of crops has short growing period and a wide adaptation level. On the contrary, perennial plants (PP) have narrow ecological amplitude, they demand high investment, skilled and experienced labour, and use lot of labour force.

1.1.1.3. Crops classification

There are many ways to classify crops, the thesis used classification mode base on crops' growth period and use purpose:

+ Basing on crops' growth period can classify crops as short-day plants (annual crops) and perennial crops.

+ Basing on use purpose can classify crops as food crops, foodstuff crops, industrial crops and fruit crops.

1.1.2. Crops structure

1.1.2.1. Concept of crops structure

- The term "structure" is used to refer to the constituent parts of a whole and the relationship between them in general. In this whole, constituent parts are structured in a lawful and systematic manner follow a corresponding order and proportion.

- "Crop structure" is a part of agricultural production structure and rural economy structure. The concept of CS was given in many studies of Dao The Tuan, Pham Chi Thanh, Nguyen Duy

Tinh, Bui Huy Dap. Accordingly, CS is attached to concepts of "*Agricultural system*", *"cultivation system", "farming system"*. Under geographical aspect, CS is cultivation structure, which is proportion of many plants in term of area, output, production value,... in a certain territory and a given period, by that CS reflects the characteristics of agricultural production.

1.1.2.2. Crops structure characteristic

Specific characteristics of CS were analyzed in the thesis, including:

- CS is objective
- CS is historical and social aspect
- Determining CS is often associated with uniting industry with service.

1.1.3. Crops structure transformation

1.1.3.1. Definition

The concept of CS transformation was mentioned in many studies about Agricultural ecology of Nguyen Duy Tinh, Nguyen Dien, Bui Huy Dap...ect. Accordingly, CS transformation is the change in farming and cultivation system; the change in economic-technical solutions and seasonal structure to exploit effectively the ecological potential of the territory.

From the standpoint of production organization, CS transformation is the process of adjusting the size of the area and the distribution of crops in a territory; It is also the introduction of new crops with higher quality and value to replace traditional crops. CS transformation is also reflected in the formation and development of agricultural commodity production areas, specialized farming areas, large-scale material areas.

1.1.3.2. Target and content of CS transformation

a. Target of CS transformation

CS transformation is a general target of agriculture sector. Changing from old CS to new CS not only meet economic targets such as profits, production value, income; but also meet social and environmental targets as creating jobs, reducing poverty, protecting natural resources and environment and adapting to climate change.

b. Content of CS transformation study

Content of CS transformation study under many different viewpoints are all focus on following main matters: natural, socio-economic and environmental conditions assessment of a territory; evaluating and analyzing real situation of CS transformation in order to figure out remaining issues, experienced lessons of transformation; discovering regularity as well as dissimilarity in the trend of transformation among different territories; basing on studies about new techinical factors, technical facilities, customs, experiences, market demand to determines directions and solutions for solving CS transformation in the future.

1.1.3.3. Objective necessity of CS transformation

CS transformation is an objective necessity phenomenon in economy. This is caused from following laws:

- Consumer law of E.Engel
- The suitability with the demand of developing an commodities agriculture.
- The suitability with the trend of agricultural sustainable development.

1.1.3.4. Trends of CS transformation

In general, 3 trends of CS transformation are occuring as follows:

- CS transformation focuses on two directions: specialization and diversification
- CS transformation in the direction of commodities production and exports.
- CS transformation in the direction of "*green agriculture*" development.

1.1.4. Factors impact on CS transformation

The thesis focuses on analyzing 3 main factors: (1) Geographical location; (2) Natural conditions and resources (including 4 factors: topography and soil, climate, water and biological resources); (3) Socio-economic factors (including 7 factors: markets, scientific and technological advances, agricultural development policies, population and labour force, infrastructure and technical facilities, capital investment; the trend of globalization and international integration).

1.1.5. Indicator of CS transformation assessment applied in Thanh Hoa Province

The thesis determines indicators in CS transformation assessment, including: area, cultivated land structure by crops groups, crops types; seasonal CS transformation; seed structure transformation; transformation in mode of crops' rotation; territorial CS transformation; diversification index of CS. Norms of CS transformation effect assessment includes: profits, production value, growth rate, crops' productivity and output, production value per hectare of cultivation land, coefficient of agricultural land use,…etc. Norms of socio-economic and environmental effect in CS transformation such as: ability to creating job, labor attraction and labor use level; norms in solving food security, reducing poverty, increasing income and protecting environment.

1.2. Practical basis

The thesis emphasizes on studying experiences of CS transformation in typical countries such as: Holland, Israel, Thailand and China; also generalizing real situation of CS transformation in Vietnam, the Middle Northern part of the country and introducing several models of effective CS transformation in selected provinces, towns over the country. Thereby, drawing trends, experienced lessons about CS transformation applying for Thanh Hoa Province.

Chapter 2
FACTORS INFLUENCING TRANSFER OF PLANT STRUCTURE IN THANH HOA

2.1. Location and territory

Thanh Hoa is one of the five biggest provinces in Vietnam, which has 11.130,5 square kilometers, occupies 3,36% of Vietnamese territory. Located in the Northern Center Coast region of the country, Thanh Hoa has second rank in area, just behind Nghe An Province. Thanh Hoa is subdivided into 27 district- levels which includes 1 city, 2 townships and 24 districts.

Thanh Hoa Province has an essential position because of being next to Red river delta, Northern, Hanoi capital and key economic zones (Northeast and Northwest). Thanh Hoa is as a bridge to connect Northern and Middle regions to the Southern. This brings to Thanh Hoa many conveniences such as chance for trading exchanges and international intergration. Also, being located in convenient location, Thanh Hoa becomes a focal point in both production and consumption of agricultural products and supplies. These are perfect conditions for farmers to convert plants.

Because of its geography, Thanh Hoa's nature is specified with tropical monsoons; thus nature here is diverse and abundant. Therefore, agriculture steps up intensive cultivation, increasing productivity, conversion of crops structure.

However, Thanh Hoa's CS transformation is also facing with some difficulties due to its location. For example, its vast territory, complicated distribution, mountainous districts far from central; the transportation and communication of high moutainous areas are restricted. In addition, Thanh Hoa is located in a place which often has typhoons, flood, ...brings about bad effects to agriculture, especially to good quality crops in restructuring plants.

2.2. Factors of natural conditions and natural resources

2.2.1. Topography

Thanh Hoa's territory is made up of moutainuos hilly, plain and coastal regions. The mountainous and hilly regions account for above 71,8% of Thanh Hoa's total area with many low hills and even terrain. Thus, the terrain refers advantages to convert of cultivated crops by forming specialized crop zones, material zones of perenial industrial plants and fruits along with a processing industry. However, CS transformation here has to deal with the disadvantages according to cutting terrain, undeveloped transportation and limited irrigation. In these mountainous areas, it is sometimes very cold, flooding and foggy that harms to growing of crops. Then, converting plant structure needs to focus on developing the crops which are meaningful to environmental protection and setting up reasonable cultivation.

The plain terrain, occupies 17,6% of total land, 5 -15 meter average height and quite flat. Accordingly, it is easy and favorable to transfer almost crops. In addition, with many propitious conditions such as mechanization, irrigation, and transportations there has built up a highly concentrated agricultural production in Thanh Hoa. Annual crops in which cereal and vegetables\ crops play the most vital role and the most approciated crops in Thanh Hoa's plain terrain. An other issue here is transfering plant structure not only need to determine suitable crops but also toward high economic value cropping.

Coastal terrain is built up by river alluvial and marine sediment with 2-3meter average height, even 0,5 m in somewhere. This suitably arranges groups of food crops, annual industrial

plants which is able to suffer drought. To sumarize, in order to effectively cropping restructure, Thanh Hoa need to develop irrigation system, soil reclamation and protective forest.

2.2.2. Soil

Thanh Hoa' s total area is 1.112.948 ha, includes 1.007.290 ha divided into 9 different soil groups; 38.275 ha of rocky without forest; 67.363 ha of ponds, lakes, streams and rivers.

Ferralsols account for 62% of nature land. This type of soils distributes in mountains and hills, accordance with growing of perennial industrial crops, fruits, annual industrial crops and cereals.

Delta soils are annually fertilized alluvial, unfertilized alluvial, gray,…Alluvial are distributed along Ma - Chu rivers on all 3 terrains (low, medium and high). With high quality and concentrated distribution, the soils contribute to increase transferring crop structure.

In addition to 2 soil groups above, Thanh Hoa also has sandy, saline soils,.. approciated with plant diversification and transformation.

2.2.3. Climate

Thanh Hoa's climate is humid tropical monsoon that is favorable for the formation of tropical, subtropical plants with high yiel. High temperature is a good condition for growing and developing of crops as well as crop rotation, multicropping and intermixcrop. Because of high humidy and rainfall, plants are fully provided water for growth; on the other hand, temperature and humidy are divided into seasons with lots of disaster which causes a vast of difficulties for cropping transformation.

2.2.4. Water

Thanh Hoa has a network of rivers with density of 0,51km/km^2.There are 4 main rivers: Ma river, Hoat river, Bang river and 173 smaller rivers. River systems provide water, alluvials, exentended plain and play important in converting crops.

Besisde, Thanh Hoa has about 1.760 lakes, dams with intergrated functions of water accumualting, flood prevention, electricity, providing water for acquaculture,... However, the amount of water is not distributed regulary, often concentrating from May to October (occupied 70% in July, August and September), causing floods. On the contrary, from November to April, the amount of rainfall only accounts for 15-25%, causing drought, salinity, lack of water for agriculture production.

2.3. Factors of social economy.

2.3.1. Market

Being one of the most 3 populous provinces in Vietnam, Thanh Hoa has a very large domestic consumption market of agricultural products such as paddy, other cereals and vegetables. At the same time, with rapidly growth rate of economy, GDP per person annual is increasing quickly. These raise comsumption capicity and diversify request in both quality and quantity. Next to China, Laos, Hong river delta, Northwest and Northern regions; brings to Thanh Hoa big comsumption markets of agricultural products.

2.3.2. Science and technology

Factors of improvement in science and technology affects to CS transformation in Thanh Hoa in term of mechanizing, seeding and acouraging farm expansion.

In crop structure, paddy is the most mechanized with 80% area of preparing, 15% cultivating and 30% harvesting. According to it, paddy land is released quickly, being in time to switch crops and raise production effectively.

However, for vegetables, annual industrial crops and perenial industrial crops; its 80% area is mechanized, the rest one is still handmade. Thanh Hoa successfully applied progress of new seeding product with high quality and yiel; formed F1 paddy area, F1 corn area, sugarcane,...Therefore, crop structure is actively transfered, saved both time and money.

2.3.3. Agricultural institution and policy.

Agricultural institutions and policies play an essential role in plant transformation, for examples: land policy, production planning,… In Thanh Hoa, converting crops is fostered by the land policies like "land consolidation", developing and protecting policy, and the plans as building a new countryside,… All is done that boosts the transformation of crops.

2.3.4. Population and labor

Thanh Hoa has a big population with 3,5 billion people. In many stages the population decreased when people moved out of the Province for study and job. However, the flow of population and labor out of the Province has decreased. It is forecasted that by 2030 the population will reach nearly 4 billions. This is an advantage to creat a potential agricultural products market. Demand and purchasing power of agricultural products such as vegetables, fruits or high quality rice increased significantly. New demands for agricultural products in this market is an opportunity to transform CS suitably.

The percentage of agriclutural labors in Thanh Hoa occupies 94,3% of total labor in Agriculture - Forestry and Fishery. In quantity, the labors here are met the CS transformation demand toward commodity production in the next period. Thanh Hoa’s labors are hardworking, experienced in intensive rice cultivation, skilled in taking care of many material plants; labor quality is being improved. Nonetheless, they still have agricultural manners, afraid of risk, afraid to change, slow to adapt; labor’s level has not met the requirements of the transition. The distribution of agricultural labor in Thanh Hoa is also unreasonable, affecting the CS transfromation ability of the region.

2.3.5. Infrastructure and facility

The factors of infrastructure are focused on analysing, including transport system, electricity power, communication systems. The factors of facility consist of irrigation, dikes, stations, farms, warehouses and other agricultural processing facilities. In general, infrastructure and facility for agricultural production is being significantly improved, efficiently support CS transformation toward commodity production. However, some of these are reduced in quality, not suitable in the design, outdated production technology ... In general, they do not meet the demand of crops diversification of the transition.

2.3.6. Investment funds

In recent years, Thanh Hoa's investment funds for agriculture and aquaculture is significantly rising. Between 2010 and 2013, total investment budget is 15.390 billion vnds, increase 2,6 times compared with 2006-2009. In which, agriculture accounts for 58,4% equal to 8.987 billion vnds. However, if comparing with industry and service sectors, the proportion of investment for agriculture is still the lowest and slow increase. There is an imbalance and limitation in investment structure. Investment for CS transformation maily comes from household economy with small scale. Ability of attraction FDI funds and personal budget is dificult because of high risk and low profit, investment policies of the Province are not strong and attractive.

CHAPTER 3
CURRENT STATUS OF CROP TRANSFORMATION IN THANH HOA PROVINCE IN THE PERIOD 2000- 2013

3.1. Introduction to agriculture and cultivation sector in Thanh Hoa

3.1.1. Introduction to agriculture sector.

It can be stated that agriculture, silviculture and aquaculture sectors occupied a small percentage of economy sectors due to a siginificant increase in manufactoring and services sectors in Thanh Hoa province. Agriculture, silviculture and aquaculture sector, on the other hand, plays a crucial role in contributing local socio- economic stabilization and solving many social problems such as: unemployment, poverty- alleviation, food security. More importantly, the sector is seen as the prop and stay in the process of industrialization and modernization.

Agriculture is one of the most important sector of Thanh Hoa's agriculture, silviculture and aquaculture sectors. Density of agriculture holds nearly 80% and slowly change. However, the productive value (PV) is constantly increasing, in 2013 reached 25.047 billion vietnam dong. In the period from 2000 to 2013, the growth rate of agriculture production of the province reached a new high of 5.5% (2000- 2005), but remained stable around 1,6- 2,9% by the following years and this rate is much lower than the growth rate of Forestry and fisheries sector.

Agriculture, silviculture and aquaculture sectors structure of Thanh Hoa province has been transformed slowly but Agricutural structure of Thanh Hoa province has been transformed postively. The proportion of cultivation constantly decreased while the ratio of animal husbandry and agricultural services significantly increased by the time. The transformation is essential to meets the market trends as well as the economic development strategy of the local government.

3.1.1. Introduction to cultivation sector.

Cultivation is a dominant form of agriculture in Thanh Hoa province in the period from 2000 to 2013. The average growth rate of cultivation maintains the same at 0,7- 3.7%, mostly shows a lower rate than breeding of animal and agricultural services parts. The cultivation production value rose dramatically throughout and achieved 16.761,400 millions vietnam dong in 2013 which accounted for 65.3% of the total value of agriculture production. Although the proportion in the base decreased by 15.5% but still mainstream.

Crop acreage shows signs of a gradual increase by the time. Over a thirteen year period, the crop acreage of Thanh Hoa province increased from 452,900 ha (2000) to 480,100 ha (2013). There is an increase in area of cultivation mainly in certain high value plants such as: vegetables and beans, annual industrial plants, rubber tree... Accordingly, cultivation production value and seed structures has changed positively. However, cultivation still remains some related problems such as decreasing crop productivity, processing industry, agriculture products less competitive in the market due to a lack of poor quality and high cost. The Cultivation sector's achievements are based primarily on the advantages of resource use (land, water, climate) and labor. Therefore, in the development orientation, crop restructuring transformation is considered as a strategic solution, very important to improve the efficiency of this sector.

3.2 Current status of crop transformation in Thanh Hoa province.

3.2.1 Changes in agricultural land.

3.2.1.1. Current status of crop transformation.

Change in agricultural land is closely related to crop transformation. This caused a significant change in crop acreage by the time.

The use of agriculture land accounted for 91,0% of total natural land area, unused land decreases and the proportion of only 9.0%. In the structure of land use in the province of Thanh Hoa, land used for agricultural purposes with the largest, accounting for 76.1%, non-agricultural land tends to rise, accounting for 14.9% in 2013 (2000 is 7.8%).

The change of land usage for agricultural production takes place with different trends. Overall, considering the annual crop land, the proportion of rice land, pasture land for livestock on a downward trend due to change of purpose of use (to non-agricultural land into land for agricultural production or other conversion) , other annual crops increased. For perennial crops include perennial industrial plant soil and fruit tend to increase stability in the whole period.

The change of agricultural production land in Thanh Hoa tied to the program of economic restructuring, such as regional construction materials and specialized areas, large sample field, development of farm economy; urban development, industrial parks and infrastructure projects. Potential conversions in Thanh Hoa's croptransformation mainly on rice land conversion and other annual crops.

3.2.1.2. Assessment of land potential, existence and limitation in the process of using agricultural land.

The land potential for crop transformation in Thanh Hoa to 2020 is mainly in rice paddies with different extension possibilities for each crop. The unused land area is unlikely to be reclaimed or rehabilitated in the mountainous areas. It is difficult to put into use. The scale of agricultural land use in agricultural production in Thanh Hoa was very small, land fragmentation was initially remedied but was basically unfinished.

3.2.2. Crop area transformation(by the group of plants).

Regardless crop transformation of Thanh Hoa province in the period 2000 - 2013, corporations with annual crops hold crucia position which accounted for 92-93% the and 92-95% of cultivation area value of cultivation production. The proportion of perennial accounted for around 7-8% cultivation area and 5-8% of production value. It shows that the characteristics of cultivation in Thanh Hoa province determined by annual crops and crop transformation mainly in this crop groups.

3.2.2.1. Transformation of annual crops plant group area.

In the period 2000 - 2013, the annual plant area in Thanh Hoa province tends to increase rapidly. After 13 years in the area of this group of plants has increased by 28.7 thousand hectares, to reach 447.1 thousand hectares scale in 2013. Except cereal crops group has significantly reduced while others has increased. The group of vegetables and legumes with growth fastest area; industria plant has steady annual increased; cereal crops (wheat, corn) were little changed; Root crops plummeted. Therefore, the conversion trend also positive place: reducing the proportion of food crops, increasing the proportion of vegetables and annual industrial plants.

The crops transformation changed drammatically in the period 2000 - 2005 reached 0.52 coefficient shift; the period 2010 - 2013 is 0.33; the period 2005 - 2010 almost stable, with little switching between crops. Overall, Thanh Hoa achieve better shift than the national average.

The result of the restructuring of annual plants in the period 2000 - 2013 food crop that is still the main role; group of vegetables is low density, annual perennial is unstable. Overall, the transition has been relatively slow and no breakthrough. Crop transformation exhibits the backward and inefficient, not to exploit the strengths of the province.

3.2.2.2. Transformation of perennial crops plant group area.

The cultivated area in Thanh Hoa perennials in the period 2000-2013 fluctuate with the opposite trend. Perennial increased significantly, mainly due to expansion of rubber, while

the fruit has fallen rapidly. Basically, Thanh Hoa little advantage in developing perennial crops, mainly due to the climatic condition is not suitable. 2013, area of planting perennial is about 33 thousand hectares, accounting for only 6.9% of the total acreage of province.

Despite its small size, perennial tree structure in Thanh Hoa is more volatile than annual crops. The coefficient of conversion of perennial tree structure reached 54.5 in the period 2010 - 2013, the lowest in the period 2000-2005 also reached 7.15.

3.2.3. Transformation of seasonal plant area.

Annual plants group in Thanh Hoa are arranged into 3 main productions: crop of spring and winter crops. In the period 2000 - 2013, crop acreage increased in all cases. The area of winter crops, but the fastest growth is quite strong fluctuations; crop of spring crop area increased relatively steadily; while the crop area increased more slowly. In terms of structure, distribution seasonal crop acreage positive transformation; and increasing the proportion of winter-spring crop of reducing the proportion of the crop. However, the restructuring on the overall crop is considered slow.

3.2.3.1. Transformation of spring plant area.

According to the agricultural calendar, the spring crop of Thanh Hoa start from March 12 to early May next year. This is the case with crop transformation diversity; there are many plants from the winter to the knee, so much as or known as the winter-spring crop. In the spring crop of structure, the group cereals crop accounted for 70% area in 2013 (of which rice 60%, maize by 8.3%), the rest are all kinds of annual crops and vegetables and legumes. The conversion of spring crop is improving by reducing the percentage area of rice, sweet potatoes and peanuts; increase the area for vegetables, maize and sugarcane. Achieve a positive shift in this case is mainly due to technical advances are widely used (seeds, mechanization sync); land consolidation program, building a large sample field continues to be expanded; system of dams, canals, inland transport investment upgrade. More important is the support policy for the province's manufacturing plant variety to be enhanced in this case.

Crop of spring with a average degree of specialization is shown by Simpson Index Diversity (SID) rather low index. Although crop diversity group but produced in this case is arranged to focus on the scale in the form of specialized areas for most of the crops. The evolution of the SID index shows that the trend of this crop is still largely focused on the production of food crops.

3.2.3.2. Transformation of crop plants

Thanh Hoa season runs from late May to early October with thermophilic consortium typical trees. In crop transformation, rice is the staple crops account for 77%, the second largest corn is 10.1%, followed by beans and vegetables account for about 6,5%, other crops accounted for about 6% rate. In the period 2000 - 2013, the structure strong crop conversion, density season rice area dropped sharply from 81.3% to 77.0%. Other crops also tend to decline as sweet potato, soybean, and peanut; instead of corn and legumes acreage increase. Because of the natural disadvantages, to convert crop transformation in crops need large investments in irrigation, crop layout logical structure to avoid the heat wave in the beginning of the season, floods and storms in the last dodged service; use the same structure to suit each barefoot. Besides, it should be synchronized mechanized crops for land.

The degree of crop diversification is the highest in the index was only 0.393 SID 2013, this index trend the upward but not much, it shows that crop transformation and extreme specialization of these services.

3.2.3.3. Transformation of winter crops

Winter crops production take place in a short time about 3- 4 months, starting from

mid- September to the end of December. In crop transformatin in the winter time period 2000 - 2013, corn and sweet potato area decreased whereas area of vegetables and legumes and soybeans increased. The proportion dropped from 57.9 corn acreage% to 34.9%; sweet potatoes dropped from 28.7% to 10.3%. East soybean acreage in 2013 reached 7.6 thousand hectares, accounting for 15.2% crop acreage, up 13.8% points. Area for vegetables increased steadily from 11.8 thousand ha (24.5%) in 2000 to 17.3 thousand ha (34.5%) in 2013. The area of vegetables rose sharply due to the growth of the tree exports grow as peppers, tomatoes, zucchini, sweet corn, watermelon stomach, vegetables…

The winter crop achieved the most significant shift in the three crops in Thanh Hoa. The conversion factor of this case is high. Trends in crop diversification in the Eastern crop are evident through the SID, which is the highest of the three and tends to diversify further and deeper. This index in the winter season has increased from 0.652 in 2000 to 0.725 in 2013. For crop groups with short seasons, they are often rotational, intercropping, small-scale production and distribution scattered. The winter-spring crop area has been shaken due to severe weather, labor shortages, high production costs and unstable markets.

3.2.4. Transformation of crops by territory.

3.2.4.1. Transformation of crops in plains

This is advantageous in rural areas in the direction of commodity production. Areas with flat terrain, fertile alluvial soil, densely populated, human resources highly qualified, infrastructure development. In 2013, 39% plains production value of agriculture, forestry and fisheries; 46.5% of the value of agricultural production, 53.2% of the rice, soybean acreage 73.6%, 30.3% of corn, 45% of the province's vegetables. Annual crop area accounted for 95-96% crop acreage whole region. In that group of food crops and vegetables and legumes maintained a dominant role. Group annual perennial has the advantage of sugarcane and soybeans.

In the period 2000 - 2013, the area of cereals crop decreased drammatically, while the biggest drop was sweet potatoes, followed by maize and rice. Three trees were down 8% compared to 2000. In contrast, the percentage of vegetables area and legumes of the region has increased from 5.3% in 2000 to 8.6% in 2013. In details, annua crops plant such as soybeans and sugarcane also converted under upward trend.

Specialization of the plains is the highest in all regions in Thanh Hoa province. The index hit a low SID and did not increase significantly (2013 is 0.479, 0.441 in 2000). Here the two rice cropping pattern - a rotational winter and 3- 4 for a typical color and offer high economic value. Therefore, shifting the crops in the delta should be concentrated in the direction of forming the high-yielding rice-growing, vegetable production zones for export processing, the production of flowers, plants, vegetables and safe areas.

3.2.4.2 Transformation of crops in coastal areas

Crops transformation in coastal areas has shifted strongly and positively. Put more details, it tends to increase the proportion of vegetables and legumes, corn, peanuts; decrease sweet potato and remain stable in growing rice area. In coastal regions have been formed exports the vegetable food (chili, pickled tripe, sweet corn, tomato…) in Hoang Hoa Hau Loc, Quang Xuong districts. The annual crops plant exports mainly in Nga Son, Hau Loc, Hoang Hoa, Tinh Gia districts. A high-quality rice field is concentrated in the western sub-region.

Thanh Hoa’s coastal region has diverse natural condition, in particular terrain and terrain diversity, which leads to a wealth of farming systems and farming systems. Besides rice is the staple, CCCT of the region is also diversified with food colors, annual CCN, vegetables and legumes. The narrow area, fragmented layout also leads to a high degree of diversification in the coastal zone and tends to increase (from 0.546 in 2000 to 0.600 in

2013). The transitional difficulty of the region is salinity intrusion in the dry seasonas a result, in this land also is diversified. The diversification of crop transformation in this area is quite high and ikely to increase. The SID increased from 0.546 (2000) to 0.600 (2013). The index is higher the SID crops in detal area but it is lower than in mountainous areas. This is appropriate with unique crop transformation in the region.

3.2.4.3 Transformation of crops in mountainous area.

Plant material is the strong point in cutivation of Thanh Hoa province. In the total crops proportion, rice area tends to decrease which accounted for approximately 40% of crop acreage. It is mainly to protect food self-sufficiency for the region, not to sell in markets. Vegetables, legumes, peanut, soybean, sesame are grown on a small scales with the purpose of serving the local market and taking fu advantage of land. Group of plant materials is potential for growth and showing an increase trend like sugarcane, cassava, rubber, and pineapple.

The region achieves the highest SID in three ecoregions in Thanh Hoa province. The SID of the region in 2013 was 0.753 (2000: 0.714), with little variation between districts in the region. This is consistent with the production characteristics and farming system of the region. Due to the vast territory with varied weather, then crops structure is also diversified with variety of plants. Indeed, the proportion of cultivating these plants is quite balance. In general, basic infrastructure, material and technical of the region is insufficient. For example, it shows a lack of irrigation sources, low-qualified employees, and outdated farming practices. This leads to less productivity. By that way achieving the high output mainly depends on high cultivating land areas.

3.2.4.4. Crop transformation by forming major agricultural products area.

- The sugar cane: Thanh Hoa has formed three regional supplies of raw materials for processing three business lines in the province. The expansion and contraction of the sugar area changes each year, closely depends on the ability to purchase and processing of sugar mills.

- The cassava: The supply of cassava starch factory with 4,202 hectares wide. The second area 4,139 hectares wide in the districts of Ba Thuoc, Lang Chanh and Quan Hoa been established since 2002. By 2013, the region accounted for 54% of cassava area of the province.

- The rice intensive farming: From 2009 to now (according to Decision No. 1304/QĐ-UBND dated 29/4/2009 of Thanh Hoa provincial People's Committee), Thanh Hoa province has been concentrating on forming intensive rice production areas and High quality, specialized in producing commodity rice. The intensive farming area concentrated in 12 districts in the province.

- The rubber materials zones: rubber zones in Thanh Hoa have expanded to 11 districts in the province mainly concentrated in Nhu Xuan, Thach Thanh and Ngoc Lac. Most of planting rubber trees areas converted from inefficient forestry land used, poor natural forest, planting sugar canes, and cassava.

3.2.5. Transforming some major crops

3.2.5.1. Shift of the rice areas

Crops transformation In Thanh Hoa, rice is the staple crop, the most important position. In 2013, 256.3 thousand hectares of rice in crops acreage, 53.4% crops acreage, 57.2% of the annual crops and 76.7% of cereals pants. In the restructuring of rice production in Thanh Hoa period 2000 - 2013, the trend is going strong structural transformation crops, seed structure, conversion of a shift of crops on land and rice converting production territory.

Changing the structure of the rice crop: As the agricultural calendar, crop structure in Thanh Hoa is arranged in two main productions: crop of spring (from late December to April next year) and season (from May to october). In the period 2000 - 2013, the structure of the rice crop in Thanh Hoa converted under trend-spring rice acreage, stability season

rice area. Structural transformation is also stepping up in each case. The trend is to increase the area late spring wheat, spring wheat acreage fell early and mid-season. For the season, the trend is the opposite, increasing the area of tea early and very early season, reducing the area of the main season rice tea and late season.

Varied changes in the period 2000 - 2013, the trend is to increase the area of hybrid rice, high-quality rice for consumption and exports, reduced net rice area, the local rice. The old varieties, long growth time, susceptible to pests and diseases, poor adaptation to external, unstable yields are replaced by new varieties with shorter growing time and ultra-short, high yield, quality better quality, adapted to local geographical conditions.

Crop transformation on rice land:

Switch on the land for rice: Convert specialized rice land in Thanh Hoa in the past period increased production 3 service areas instead of 2 seasons. The result is that in the period 2000 - 2005, Thanh Hoa has reached more than 4,000 hectares of land for rice production 3 seasons, from 2006 to 2013 over 38,000 hectares increased. Of which, the period 2010 - 2013, Thanh Hoa each year nearly 4000 hectares of land converted to specialized rice production 3 cases per year. Group staple crop rotation is arranged on the land for rice in Thanh Hoa as corn, soybeans, vegetables, peppers, watermelon stomach, and sweet potatoes.

Crop transformation on land for winter wheat is also transformed in the direction of diversification. The three main crops in winter formerly corn, sweet potatoes and soybeans have been by many food commodity vegetables: peppers, pickled tripe, tomato, potato, zucchini, and vegetable types. Economic effect from expanding on land for winter wheat is expressed very clearly. There are 3 cases cropping systems such as 2 rice - one cereal plant for higher efficiency compared to monoculture 2 rice from 1.5 to 3 times.

Convert crop structures on other rice land: As of 2013, more land has been converted rice in the whole province reached 3,000 hectares. In particular, the crop has "a bond" rice include: switching to corn 720 ha; peppers to 685 hectares; switch to 600 ha vegetables; transforming maize seed, sweet corn and 245 hectares switched to other crops on 430 hectares (cane, grass, corn, animal feed). Inefficient rice acreage in the deep-lying areas, frequently flooded during the rainy season, producing only 1-spring rice crop, fallow crop yield or production, but precarious, low efficiency have been converted to rice pattern - fish, rice - fish - duck, rice - shrimp, rice - fish - sen, or switch entirely to aquaculture. Conversion area concentrated mainly in the districts of the delta and coastal areas such as Ha Trung, Nong Cong, Yen Dinh, Nga Son, Tinh Gia, Quang Xuong, Tho Xuan and Vinh Loc district.

3.2.5.2. Shift of vegetables

Vegetable area in Thanh Hoa is increased by the time because of the growing demand for consumer markets. In the period 2000-2013, the area of vegetables has increased 2.2 times, the average growth rate of 6.14% / year. The rate is 7.3% vegetables crop acreage and about 7.9% of the province's annual crop. The structural change is significant compared to the changes of vegetables and vegetable crops.

- Structure in Thanh Hoa vegetables including 3 main groups: Group leaves staple vegetable is spinach, vegetables of all kinds, malabar nightshade vegetables, vegetables, shrinkage, parsley and some others. Fruit and vegetables group includes peppers, cucumbers, zucchini, watermelon, gourd, pumpkin, Susu, tomatoes. Tuber Vegetables Group includes kohlrabi, carrots, potatoes, garlic, and onions. In the period 2000 - 2013, planted area in Thanh Hoa vegetables by fluctuating market factors. Some types have a favorable consumer market has increased and the proportion of the area, mainly in fresh vegetables such as onions root from 0.3% (2000) to 4.0% (2013); tomatoes from 0.68% to 2.34%; kohlrabi from 1.21% to 4.26%, followed by 10.8% to spinach from 13.7%. Some kind of plants such

as carrots, celery, chayote fell down due to less demand and low economic efficiency. Vegetable food structure has transformed towards diversification towards food grown vegetables for export, mainly peppers of all kinds, pickled tripe, sweet corn, tomatoes and zucchini. Vegetable export area has expanded from 390 hectares in 2000 to 825 hectares in 2013, mainly on rice land, specialized land in districts plain colors, mainly coastal and expanded planting in winter.

Structure of seasonal vegetables had the positive changes. Seasonal vegetable in Thanh Hoa includes winter-spring crop and vegetable season service. Most spring vegetables has high economic value, does not require the strict technical measures and major investment; less winter-spring crop pests, large cultivated land and irrigation conditions (irrigation conditions) better. Meanwhile, vegetable crops mainly hot favorite vegetables, such as spinach leaf vegetables, malabar nightshade vegetables, vegetables, shrinkage, and melon. Land banks are not major crop growing vegetables due primarily used to grow food crops (maize, rice), irrigation and drainage conditions also more limited, often hit by natural disasters, epidemics, uncertain yield.

- Conversion of rotation vegetables: Many different cropping patterns have been given trials and bring high efficiency. Due to the nature of short vegetable production should largely intercropping, planting food crops pillow with (corn, sweet potatoes) and annual industrial pllants (peanut, soybean, sesame). In the period 2000 - 2013, with vegetable cropping patterns have been converted from manufacturing to service production 2 3-4 cases per year. Typically, the transition from one peanut crop production and 1 for corn or soybean 1 - 1 formula for vegetables to 3-4 vegetable crops; 2 vegetables - 1 corn, 2 vegetable - soybean, 2 vegetables (peppers) - 1 rice, peanuts - sesame - vegetables, peanuts - corn - vegetables, 3 vegetable - soybean, ... The transformation first rotation due to the development of irrigation systems, especially inland canals of water to the field guide. The advantages of consuming a variety of vegetables for food and become motivated to farmers convert. However, in transition, needs the support of the extension of the temporary arrangement, cultivation techniques and investment. Converting crop’s shifting formula towards increasing vegetable production, from 2 cases of 3-4 cases per year to better exploit the potential of land, enhance the value of 1 ha of arable land, increase incomes and create jobs for farmers.

Geographical areas in Thanh Hoa vegetable production of large-scaleconcentrated in the delta accounted for 42.9% of the vegetables in the province; accounting for 31.8% of coastal areas; mountainous area accounts for 25.3%. However, due to the conditions governed by the size and geographic distribution, the kind of vegetables is also differentiation between districts. Largest vegetable area centered on the city of Thanh Hoa (Thieu Hoa, Hoang Hoa, Quang Xuong, Dong Son), the average of 2000-3000 ha, mainly to serve the needs of the municipality. Vegetable area is concentrated in some districts based on terrain, fertile alluvial soil, combined with irrigation systems such as Tho Xuan, Yen Dinh, Trieu Son, Hau Loc, Ngoc Lac, Ba Thuoc.

3.3. The effectiveness evaluation of the plant restructuring.

3.3.1. Evaluation of economic efficiency of the plant restructuring.

3.3.1.1. The production value of cultivation

The period 2000 - 2010, production value (PV) of cultivation sector in Thanh Hoa has increased relatively from 3.925,7 billion Vietnam dong to 2.841,5 billion Vietnam dong, an increase of 1,4 times (at constant prices 94). The average growth rate reached 3,28% per year. The period 2011 - 2013, the cultivation sector continues to grow 3,22% good per year, passing over challenges. This is one of the important achievements show the result of

investment in the development process, including the plant restructuring (PR). The plant restructuring initially create a new plant structure, which is reasonable and economic efficient more than the old plant restructuring.

In terms of production value of each type of plant, the production value growth belongs to the plants which have high economic values, expansion of fast and stable conversion. Head of food crops are cassava growth rate of 8,1% per year, followed by maize 4,28% per year, rice rose 2,1% fairly per year, reducing the average sweet potato own 4,45%. In the groups of annual food crops, noteworthy was the increase of soybean 11,29% per year, followed by peanuts, sugarcane 2% per year. Group of vegetables and legumes with impressive gains of 7,14%, particularly sedge, sesame although acreage and yields reducced but still increased value. Rubber plants worth 279,4 billion Vietnam dong in 2005, to 2013, the production value of Rubber plants increased 452,3 billion Vietnam dong. Rubber plants are high-value thanks to favorable consumer market for many years, although their productivity and yields are still low.

The structure of plant growing production has shifted positively trending sharply reduced the proportion of the group of food crops, increasing the proportion of vegetables crop group, significantly increased the proportion of the food crops and fruit trees. In the period 2000 - 2013, the group of food crops has decreased from 63,9% down to 57,5%, vegetables and legumes group increased from 4,1% to 12,4%, from 14,7% annual industrial crops up 16,8%, from 0,4% perennial the group of food crops to 2,4%, from fruit trees increased by 3,3% to 4,7% of production value cultivation sector in Thanh Hoa province.

In the structure of agricultural production value of the product's key Thanh Hoa, showed significantly reduced the proportion of the rice; instead increase the proportion of material plants such as cassava, sugarcane, rubber plants; exports plants suchs as vegetables or environmentally efficient plants such as soybeans, peanuts. The restructuring gave food vegetables, sugarcane, soybean and rubber plants became major plants, contributed significantly to the growth of agriculture in Thanh Hoa province for several years and passed over sweet potatoes, corn, sedge.

3.3.1.2. The land use coefficient for annual crops.

In the period 2000 - 2013, the land use coefficient of Thanh Hoa constantly increasing. The land use coefficient rose from 2,05 in 2000 to 2,09 in 2010 and reach 2,16 in 2013. Thus, in many areas has produced annual plants 3 crops per year. The land use coefficient of food crops is highest, averaging 2,5 crops per year due to the food crops because of they have a short growing period, favorable crop change. Much of the land use coefficient increase is due to conversion of rice land into food crops land, the land transfer 1 crop or 2 crops to 3 crops per year. In corporation with annual crops, some plants have coefficients equal to 1, it means acreage by area of cultivation as cassava cultivation, production miado time of these plants all year long.

The land use coefficient in Thanh Hoa for growing rice during the above period also increased from 1,72 to above 1,76. This shows the result of rice land convertion. Based on the plant restructuring, cropping patterns, Thanh Hoa moved paddy land is producing from 1 crop to 2 crops per year. However coefficient of 1,76 times per year showed fallow land and rice paddy 1 service area remains significantly, mainly due to irrigation is not met. This coefficient is lower than the coefficient of land use is the national average of 1,93 times per year. Thus, the potential for raising the coefficient of land use is still large, but does not affect the productivity of land.

3.3.1.3. Product value of 1 hectare of agricultural production land in Thanh Hoa

Value of products per 1 hectare of arable land in Thanh Hoa constantly increasing; from 27,34 million Vietnam dong per hectare in 2006 to 50,92 million Vietnam dong in 2010 and reached 69,52 million vietnam dong per hectare in 2013. Restructuring crop diversification crop structure; create intercropping cropping patterns have high economic value as the value of the product obtained is greater than annual crops twice the value of the products obtained by perennials. The result of the conversion process has increased the the plant restructuring value on 1 hectare of arable land.

3.3.2. Social and environmental efficiency of the plant restructuring.

3.3.2.1. The plant restructuring contribute to ensuring food security, political - social stability, national security, create a solid basis for economic growth.

3.3.2.2. The plant restructuring contribute to create jobs, reduce the seasonal workers, increase income and reduce poverty in rural areas in Thanh Hoa.

3.3.2.3. The plant restructuring contributes improve agricultural workers improve their thinking, change habits, style of work of rural workers.

3.3.2.4. The plant restructuring contributes to improve infrastructure, agricultural technical basis, contributing to building new rural criteria, the industrialization of agriculture and rural areas.

Chapter 4
ORIENTATIONS AND SOLUTIONS FOR CROPS STRUCTURE TRANSFORMATION IN THANH HOA PROVINCE BY 2020, VISION 2030

4.1. Basis of orientation in crops structure transformation in Thanh Hoa Province by 2020

4.1.1. International and national contex impact crops structure transformation

The thesis mentioned the impacts of international and domestic market for agricultural products; the impacts of climate change and the impacts of science and technology on CST.

4.1.2. Forecast of demand for cultivation products in Thanh Hoa province by 2020

4.1.3. Lines and policies in agricultural and rural development of Vietnam.

4.2. Viewpoints, targets and orientations of crops structure transformation in Thanh Hoa Province by 2020, vision 2030.

4.2.1. Viewpoints

CST in Thanh Hoa Province by 2025 bases on following viewpoints: CST orients commodity producing, CST orients production diversity, CST ensures a high economic effect and CST comes along with environmental protection.

4.2.2. Targets

Targets of CST in Thanh Hoa Province focus on: CST for building and expanding large-scale specializing commodity area, raw material areas for processing industry; expending export markets of leading products by improving productivity and product quality; basing on local advantages to taking form suitable CS associating with consumer market; applying widely sciences and technology combining with production organization in accordance with value sequence to improving productive effect, value and farmers' income. This is basis to develop a modern, effective and sustainable agriculture.

4.2.3. Orientaions

a. General developing orienation for cultivation sector: by 2025, reducing proportion of rice area from 50,5% in 2013 to 46,6%, sugar cane area from 10,4% to 9,4%, increasing vegetables area from 8,7% to 10,5%, corn area from 7% to 9,4%, fruit tree from 4,5% to 7,2%, cattle-feed trees from 0,1% to 2,8%. Thus, by 2025, crops that have decrease in area include: rice reduces 33,3 thousand hectares, sugar cane reduces 8,5 thousand hectares, peanut reduces 7,45 thousand hectares, cassava reduces 3,1 thousand hectares, rush reduces 800 hectares. Crops that have increased in area are high value and effect, including: cattle-feed trees increase 12,5 thousand hectares, corn increases 20 thousand hectares, vegetables increase 5,7 thousand hectares, fruit trees increase 8,1 thousand hectares.

b. Transformation orientation for some main crops

- *Transformation orientation for rice*

+ Gradual transformation in rice area: by 2025, reducing over 32 thousand hectares rice area, including: 11,4 thousand hectares of rice area into non-agricultural land; 3,5 thousand hectares of hollow rice area into aquaculture; 17,3 thousand hectares of rice area into growing grass (8,8 thousand hectares), vegetables (2,5 thousand hectares), corn (3 thousand hectares), soybeans (3 thousand hectares). Therefore, by 2025, rice area will remain stable with 223 thousand hectares.

+ Production development in the form of intensived cultivation area: by 2025, the intensived cultivation area will be 150 thousand hectares in 19 districts, occupies 67% of total rice area of the Province, including: high productivity - high quality area, high productivity - moderate quality area.

+ Transformation orientation for rice area: transforming rice area into area of growing corn, material sugar cane, vegetables, fruit trees and aquculture, or intergration.

- *Transformation orientation for corn***:** expanding 20 thousand hectares of corn area, by 2025, corn area will be 72 thousand hectares

- *Transformation orientation for sugar cane:* 7 thousand hectares of material sugar cane will be transfromed into higher effetive crops.

- *Transformation orientation for cassava:* Developing material cassava area, by 2020 the area will be 11 thousand hectares and remain stable by 2025.

- *Transformation orientation for peanut*: By 2020, reducing peanut area to 6 thousand hectares and remain stable by 2025.

- *Transformation orientation for soybeans*: Developing soybeans, by 2025 the area will be 21 thousand hectares, in which winter crops occupy over 60% of total area.

- *Transformation orientation for safety vegetables:* By 2025, expanding vegetables area into 10 thousand hectares. Developing safety vegetables area in the form of large-scale fields, applying VietGAP, by 2025 the area will be 30 thousand hectares.

- *Transformation orientation for rubber:* Expanding rubber area in different soil types, by 2020, the area will be 23 thousand hectares and remain stable by 2025.

- *Transformation orientation for fruit trees:* By 2025, the area will be 10 thousand hectares, in which: pineapple: 2.500 hectares, orange: 5.000 hectares, pomelo trees: 1.000 hectares, banana: 1.500 hectares….

- *Transformation orientation for flowers, ornamental plants*: Developing flower growing in the form of intensive and high-tech farrming with the area of 100 hectares by 2020 and 150 hectares by 2025.

- *Transformation orientation for cattle-feed trees*: Increasing cattle-feed trees by 12,7 thousand hectares by 2020 and 15 thousand hectares by 2025.

- *Spatial transformation orientation of territory*

+ Plain areas: Building high quality production area, vegetables area, industrial short-day crops.

+ Coastal areas: Focusing on growing export crops, industrial short-day crops.

+ Mountainous areas: Focusing on growing material crops and fruit trees.

4.3. Solutions for converting structure of crops in Thanh Hoa.

4.3.1. Production planning

- To complete the specific planning for each plant, each region, each district and each crop.

-To review, supplement, timely adjust for orientation of transfering crops structure in the new decades.

- To carry on detail planning before converting; particularly it is very nescessary to connect industrial development plans to consumption market and adapt to climate change as well as environmental protection.

- To strengthen mangement the implementation of planning, regularly check, to be publicized to all sector, people classes and organization in whole province.

4.3.2. Land use and land management

- To continously promote land consolidation, encourage land accumulation, form the large-scale concentrated production region.

- To encourage farmers buy stocks and partipate in business and investment projects.

- The province can also accumulate land focusing on good producers with more land. In additon, the households who have less land and unexperienced, should be encouraged to find other jobs.

4.3.3. Investment fundings

- The government of Thanh Hoa needs to announce the plans, schemes to all people in means of communication, website. Thus, all organizations and private could search eaily, find out chance of investment in agriculture.

- To promote the reform of administrative procedures, widely "OSS" that implement and create an opened investing environment.

- For domestic investment, continuing to follow the motto "State and people working together"

- For foreign investment, the province should strengthen cooperation expansion with large financial institutions like World Bank, ADB, EXIMBANK, JICA, and so on to take advantage of investment capital for ODA projects in agricultural growth and rural development.

4.3.4. Markets

- Guide the business how to plan, invest, make a contract with producers. This not only ensures foods for processing and exporting but also comfort assurance to farmers.

- Set up market system in the rural areas, specially in the towns, industrial centers for products consumption.

- Develop strongly agricultural markets in the tourist areas, large urban areas, industry zones in the province.

- For the new crop, in order to switch, the province needs to step up the marketing information , encourages enterprises and farmers to make the contract of production and consumption of products.

- Stepping up trade promotion, improve capacity of forecasts through raising the level of knowledge about international law in order to proactively deal with disputes and trade barriers.

- Support and facilitate business building brand and quality standards of major exported products, meet the requirements of quality, design and specifications of the importing countries.

4.3.5. Science and technology

Thanh Hoa should focus on breeding technology in term of research, selection the good varieties and exotic varieties of abroads. The goal is to create the varieties that has best quality, adapting to ecological environment and gives high quality products. Thus, the varieties need to be developed for all annual crops and perennial crops.

4.3.6. Human resouces training and utilization

- Focus on improving quality of employees by diversifying training especially for farmers.

- Need to improve quality of managers regularly by continuously training in theoretics and practicals.

- To attach much importance to the agricultural, forestry, particularly mountainous areas with the forms of new technology, how to use fertilizer and pesticides.

- To diversify trade structures is an important solution for more efficient use of agricultural labors.

- The issue of increasing agricultural productivity in Thanh Hoa should be addressed by concentrating rural goods on a large scale, continuing formation and expansion of cultivation areas, intensive farming areas, towards the commodities agricultural products valuable and highly competitive.

4.3.7. Infastructure and facility

- The province should increase investment in infrastructure, especially for concentrated material zones, the intensive cultivation

- Investing irrigation system and improvement transport system must be given on top priority. Continously build new upgrading rural transport systems, especially inland transport system.

- Mechanisation is an important solution for rural - agriculture development and plant transformation successfully in the coming periods.

4.3.8. Renovation and construction of the organizing forms in agriculture

- Implement policies to encourage development of economic cooperation (cooperatives, cooperative groups), voluntary economic groups involved in manufacturing, agribusiness:

- Continue to develop household economy with large scale farms.

- Enhance the participation of the associations, industrial associations in Rural Development programs, rural; promote the relationship between the state, farmers, scientists, entrepreneurs.

- Create a favorable environment for the formation and development of various types of rural businesses, especially enterprises in the processing industry of agricultural, forestry and fisheries.

CONCLUSION

1. The CS transformation is inevitable and objective process of development in commodities agriculture. Across the world, most countries with developed agriculture based on breakthroughs on the CS transformation. Trends convert food crops area reduced, increasing the area of vegetable crops, food crops, industrial crops common in most countries. This trend has contributed to increase the production value of agriculture, create jobs, raise incomes, reduce poverty, improve living conditions of farmers, effectively use of scarce resources of the territory and in line with context new economy. The CS transformation in Vietnam has been a marked improvement in the first decade of the 21st century with many positive trends and switch accordingly. Besides traditional crops, new crops increased significantly. The transition is also associated with the formation and development of the specialized areas of goods production, raw materials associated with processing and consumption. Efficiency from the current conversion has been quite clear that many of the agricultural sector indicators.

2. In Thanh Hoa, the natural conditions are diverse, this is an important basis for the CS transformation. Characteristics and trends of the CS transformation in the Province affected by the synthesis of natural, economic and social factors. In particular, intra-provincial markets create unique structure of plants, export markets are pushing forward converted at the direction of commodity production. The internal factors such as agricultural policy, science and technology advance, labor with no breakthrough impact. During the conversion process, Thanh Hoa facing many difficulties and challenges, such as extreme natural conditions, the material and technical basis of backwardness, irrationality, lack of investment capital; customs and habits of farmers, agricultural workers with low levels.

3. The CS transformation in Thanh Hoa Province in the period 2000-2013 has achieved important results:

- Acreage keeps growing, Thanh Hoa topped in Economic Zone of North Central Region with 35,6% occupancy rate of acreage of this region. This is the result of chemical processes for reclamation and conversion is basically due to seasonality, the layout structure of plants suitable for production territory

- In the process of the CS transformation in Thanh Hoa, annual crops hold key positions with the rate of more than 95% of the area and crop production value. In recent years, there have been changes to the perennial group but not significantly and still large differences. Characterized by natural conditions, social - economic characteristics which mainly markets, labor, production practices, facilities created.

- In each group of crops, the transformation takes place clearly, especially in the group of annual plants: proportion of food crops significantly reduced, instead of the rapid rise of food groups of vegetables and plants annual industry. Perennials marked by rapid growth and strength of the rubber tree.

- For many of the Province's main crops: Rice is achieved significant shift in the structure of crops, seed structure and crop rotation conversion on wheat rotations. Many new plants replace rice and become effective production models: chili, corn, vegetables. Especially the rapid growth of the area of crops has changed the crop structure of Thanh Hoa Province.

- The structure of active crop conversion. Winter crops is gradually becoming the main season production; and the proportion of area crops of spring tends to increase while summer crops decreasing. The transformation of plants in each case also quite strong place to make a pretty big difference in levels of plant diversity. While the winter crops has a high diversity index, crops has a relatively low diversity index. This also shows the nature of specialization and the ability to produce the goods in the case.

- Restructuring territorial plant attained significant achievements. The material area is formed in association with the processing industry, notably three of the cane areas with the advent and development of the three sugar mills; the cassava, the pineapple, rubber areas are linked to processing and marketing. Initially formed the specialized areas of commodity production in association with market demand and exports in Hoang Hoa, Hau Loc, Thieu Hoa, Yen Dinh, Trieu Son, ...

- The subject of the CS transformation in Thanh Hoa is the household. Through the survey, most of the farmers are advocates conversion and conversion in response to the new plant; mostly converted from rice to vegetables and legumes. The reason is that economic efficiency is higher than rice cultivation; Besides of supporting the production policy, agricultural and cooperative role also shows quite clear in this transition.

- Efficient conversion was initially expressed through many social - economic indicators: production value, yield and production of crops growing, coefficient of land use increased significantly. The CS transformation improved income, employment, land use efficiency, reduced seasonality in agricultural production.

- Limitation of the CS transformation in Thanh Hoa is mainly the conversion speed is very slow, fragmented, basically no breakthrough. Group food crops remain key role, vegetables and legumes group proportion modest annual industrial crops has yet to confirm the strength of the role in the plant structure. The conversion efficiency model may be small, fragmented, unstable economic performance, instability due to dependence on foreign markets. Switching to high-tech products, clean technology is almost zero. Converting to form specialized and intensive farming areas, intensive production of goods has not been clear.

4. Orientation of the CS transformation was maded specific to each group of plants. This convertion focuses towards reducing rice area, increasing the area of maize, vegetable, soybean and fruit tree. Formation of specialized areas, the intensive production of goods for most of the crops, which focuses on building the intensification of rice, maize, vegetable-growing regions; stability of the area of raw materials, conversion of paddy land inefficiency, low productivity, not proactive irrigation to grow vegetables, annual industrial crops and rubber plants. To implement the CS transformation effectively, should make synchronizing critical solutions including: policy, production planning, marketing support, strengthen scientific and technical progress, training human resources, attract investment, innovation production organization, material and technical basis. In particular, the success of the CS transformation is determined by provincial policy, the support markets and modernization of technical infrastructure.

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