

Sustainable and Effective Farmland Use in Viet Nam Case Study in the Red River Delta and Practical Experiences from Korea

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ABSTRACT

Sustainable and Effective Farmland Use in Viet Nam - Case Study in the Red River Delta and Practical Experiences from Korea

Agriculture is very important to Viet Nam as it plays role in ensuring the national food security, poverty reduction, and preservation of natural landscape, the economic growth of the country. With more than 70% of the population living in rural areas and 48% of population live on farming directly, so the farmland is very valuable assets to rural households, especially the poor farmers who are depending very much on cultivating activities as for their livelihood. Hence, the efficient use of farmland is necessary to increase agricultural productivity and its competitiveness in the international market, as well as to improve income for farm households.

The research try to review and identify issues in farmland use in Viet Nam, particularly in the Red River Delta to make recommendations for improvement of efficient use of farmland referring Korean practical experiences in farmland management and preservation through programs on farmland bank and farmland consolidation.

The research includes five chapters. The first chapter is about the general introduction of the research. The second chapter mentions on the agriculture and farmland use in Viet Nam. Matters such as impact of climate change on farmland use and impact of farmland use to the national food security are also focused. The next chapter is about the farmland use in the Red River Delta and issues in farmland use. At this chapter, the research had found issues of land fragmentation and farmland reduction that the Red River Delta are now facing with and limit to the agricultural development, reduce the competitiveness of agricultural products of the region. The chapter four on Korea experiences on farmland management and preservation through its programs on farmland bank and farmland consolidation is as important foundation for the final chapter to make recommendations for the efficient farmland use and management in Viet Nam and in the Red River Delta in the future, as well.

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ABBREVIATION

AC	Agricultural cooperative
CC	Climate change
CH	The Central Highlands
FB	Farmland Bank
GGs	Green growth strategy
GSO	General Statistic Office
LUR	Land use right
MARD/BNNPTNT	Ministry of Agriculture and Rural Development
MONRE/BKHCNMT	Ministry of Natural Resources and Environment
MRD	Mekong River Delta
NCCA	North Central Coastal Areas
NIAPP	National Institute of Agricultural Planning and Projection
NMMA	North Midland and Mountainous Areas
RRD	Red River Delta
SA	Southeast Area
SCA	South Central Area
SD	Sustainable development
SLR	Sea level rising
VN Agenda	Viet Nam Agenda

1. Necessity of the study

Land is a special commodity and asset, quite different with the other commodities. Land does not mean merely in term of economy but also in term of politic, culture, and history. Land relations are not relation between people and land but relation between people who are directly or indirect-involved to land or reflect opinions of agencies on land use management to land user in particular and in the society in general.

In the decades of 1940s to 1970s, the land relation has changed fundamentally. After independence, the Viet Nam State carried out a policy on land allocation to the farmers. The land of landlords was confiscated and divided to poor people. In the decades of 1975-1981, it was marked by collectivization. All land area of farmers was gathered and managed by cooperatives for concentrated production. At the end of 1980s and early 1990s, the land management by cooperative was removed and again was allocated to farmers.

Viet Nam is a pure agricultural country, with approximately 70% of the population living in rural areas and 48% of population live on farming directly, so the land is very valuable assets to rural households, especially the poor farmers who are depending very much on cultivating activities. Farmland plays a crucial role in development process of Viet Nam agriculture. Farmland resource is one of elements affecting to poverty and hunger. The policy on farmland use may affect to: i) capability of households to meet food self-sufficient need and then can sell the abundant products, ii) situation of economic households, and iii) foster households to use land sustainably.

Land use patterns in Viet Nam may change dramatically over time as a consequence of several global and local interacting processes. Key global drivers that may affect land use in Viet Nam are climate change, international trade, population growth, and technological change. At the national and local level, spatial policies that safeguard areas with rich biodiversity, climate adaptation, and mitigation strategies, the growth of urban and industrial zones and food security policies, such as a mandatory allocation of land for the production of paddy rice, will have important consequences for land use.

At the present, farmland loss and unemployment of the farmers becomes popular as the result narrowed farmland due to rapidly development of the industrialization and urbanization process. According the preliminary statistic of Ministry of Natural Resources and Environment (MONRE), during 7 years (2001-2007), total area of farmland confiscated for non-agricultural land was over 500,000 hectares (accounting for 5% of using farmland). Especially, the confiscated farmland for urbanization and industrialization is increasing year after year. Together with it, the average farmland use area per capita reduced from 630 m² in 2005 to 437m² in 2011 (MARD, 2012). With the small area of farmland use, it is difficult for farmer to expand and stabilize their agricultural production. Additionally, the decreasing of farmland will affect to growth speed of agriculture and income of farmers, and change sectoral labor structure, as well. The farmer who lost farmland has

2 Introduction

to move to the urban area to find job or do non-agricultural occupation for their livelihood. So that, the labor structure in non-agricultural sector will increase and one in agriculture will decrease.

The Resolution 10 (Khoan 10) issued by the Government has made sudden attack on empowerment of stable land use to the farmer (20-30 years or 50 years depending on each purpose of land use). However, the division into many small plots is lag behind to the sub-agricultural economy. Viet Nam has more than 11 million farm households with about 70 millions of agricultural plots, in average 3-8 plots/households. With such small and fragmented size of farmland, the farmer can only be self-sufficient and reproduce in simple way. Ability to apply advanced technology, crop and animal intensiveness and productivity increase oriented to commodity is very low.

In term of land use certificate provision, the administrative procedures take time so it does not attractive investment of the farmers in this sector. Additionally, most rural households own some agricultural plots but they have only one certificate for the whole agricultural area of these plots. This will be obstruction for them when they want to transfer one of these plots to other household in case they are unable to do or do not want to do the agricultural work anymore.

Though Viet Nam is in the 3rd rank of rice export in the world in 2013, but the food security is in danger because of reduction of rice cultivation land, population growth together with the increase of cereal demand. The most important thing is that the farmers do not want to depend much on their farmland and produce rice any more due to the low benefit while income from another source is more attractive.

Red River Delta is one of the largest bowls of rice production in Vietnam with role of supplying food for the North region and a part for export, so that the farmland use in this region is very important as to contribute to the sustainable rural and agricultural development in Vietnam. The Red River Delta affected much by the policy of equal land allocation after Doi Moi than Mekong River Delta. Thus, the farmland in this region is fragmented and divided into small plots, limiting the efficient farmland use, agricultural machine application, and irrigation system in agricultural production. Additionally, the farmland consolidation in this region has been implementing but in slow progress and facing with many constraints related to the land use right of farm households.

Therefore, the research aims to review situation of farmland use in Viet Nam as well as in the Red River Delta for the improvement of efficient farmland use through practical experiences learnt from Korea. The research will focus on situation and issues of farmland use in the Red River Delta, experiences and case studies from the Korean agriculture and try to find out the best experience on farmland use appropriate with the context of Viet Nam agriculture for applying it in the future. Furthermore, the research result will be considered as a contributing factor to the formulation of ODA proposal that is cooperated with Korea Rural Economic Institute (KREI) and Ministry of Agriculture and Rural Development (MARD), in which National Institute of Agricultural Planning and Projection (NIAPP) plays as implementer.

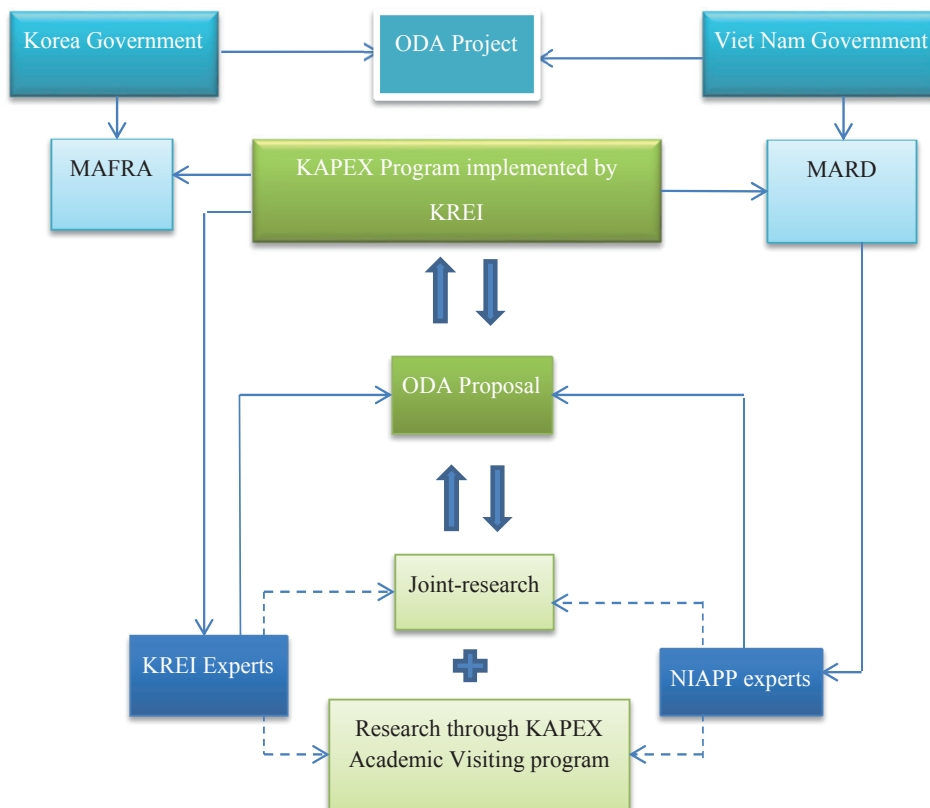
2. Purpose and scope of the study

In the above-mentioned situation, the aim of my research is to improve the efficient management of the farmland use in Viet Nam through practical case studies in Korea. To attain this aim, my research recognizes the key objectives as follows:

- Review situation and identify issues of land use in Viet Nam and in the Red River Delta;
- Improve the efficient farmland use in Viet Nam through experiences from Korea, contributing to the formulation of ODA proposal between Korean Rural Economic Institute and National Institute of Agricultural Planning and Projection.

The research will focus on the farmland use in the Red River Delta – one of the two largest bowls of rice production in Viet Nam, in the context of the climate change and food security that is appropriate with the goal of KAPEX program between Korea's Government and Viet Nam's Government.

Figure 1-1: Cooperation between Korea and Vietnam in the KAPEX Program



3. Methodology

The used methodology for the research is the literature review. Numerous of government policy papers and research documents from international and domestic organizations related to farmland use in Viet Nam were studied. The research had references from papers of domestic organizations as well as individual researchers from Ministry of Agriculture and Rural Development (MARD), Ministry of Natural Resources and Environment (MONRE), National Institute of Agricultural Planning and Projection (NIAPP). Furthermore, the research also referred to documents from foreign professors and international organization of Korea Rural Economic Institute (KREI), Asian Bank Development (ADB), World Bank, (WB), Danish International Development Agency (DANIDA), Food and Agriculture Organization of United Nations (FAO), International Food Policy Research Institute (IFPRI).

1. General information of agriculture in Viet Nam

Viet Nam situated in Indochinese Peninsula in Southeast Asia, is located at 102°8' to 109°27' East longitude and 8°27' to 23°23' North latitude. It has border length of 4,550 km with China in the North, Lao and Cambodia in the West, and East Sea in the East. From the North to the South, it is 1,650 km with the largest mainland area of about 500 km, and the narrowest mainland area of 50 km.

In 2013, the population in Viet Nam is 89,708.9 thousand people, of which rural population accounts for 67.8% of total population and 60.6% of them depends on agriculture as livelihood (GSO, 2013).

Table 2-1: Population, rural population, population density by regions in 2013

	1990	2000	2005	2010	2013
Total population (1,000 people)	66016.7	77630.9	82392.1	86932.5	89708.9
Rural population (1,000 people)	53136.4	58905.5	60060.1	60416.6	60834.0
Population density (person/km2)	193	236	249	263	271
Total natural area (km2)	34,187.81	32,924.06	33,121.16	33,095.74	33,097.24
Agricultural area (1,000 ha)	16,655.22	20,939.68	24,583.78	26,226.40	26,371.52
<i>Agricultural production area (1,000 ha)</i>	<i>7,087.70</i>	<i>8,977.50</i>	<i>9,412.18</i>	<i>10,126.11</i>	<i>10,211.00</i>

Source: General Statistic Office, 2013

Viet Nam has been pursuing the open economy and has actively participated in the globalization process. Viet Nam joined the World Trade Organization in January 2007, which has promoted more competitive, export-driven industries, and became an official negotiating partner in the Trans-Pacific Partnership trade agreement in 2010.

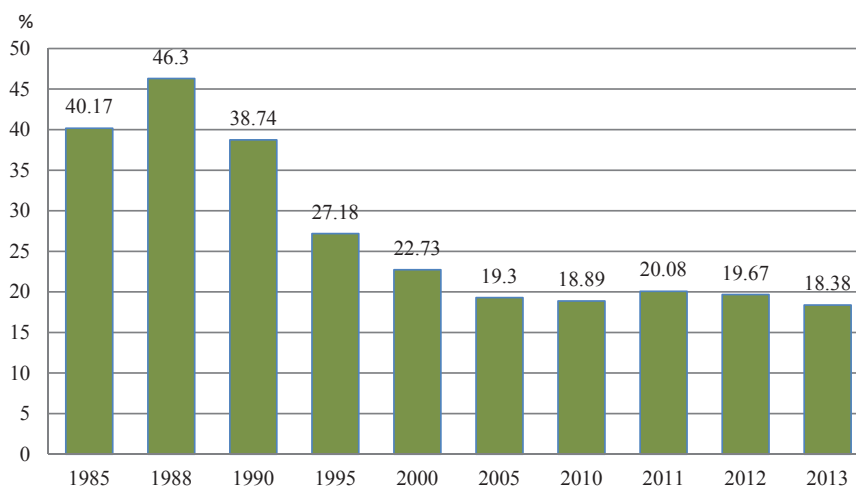
During the last 20 years Viet Nam experienced high rates of economic growth. Real GDP increased at an average annual growth rate of 7% between 1986 and 2008. This economic expansion was accompanied by a drastic shift in the composition of Viet Nam's GDP, as economic activities shifted away from agriculture toward services and manufacturing. But in period of 2009-2014, the average GDP growth is about more than 5%.

Since Doi Moi (Renovation) in 1986, Viet Nam has been transitioning from the rigidity of a centrally-planned economy to the market-oriented economy. From a backward agricultural economy in 1980s and food import country, after 30 years, Viet Nam has been rising as a leading agricultural exporter of agro-products such as rice, cashew nut, black pepper, coffee, tea, fishery and rubber, and an attractive foreign investment destination.

Agricultural sector attracted more than 68% of total population and accounting for 20% of GDP of the country. In 1988, the agricultural share achieved the highest share in GDP of 46.3%, but then its share decreased year by year to 18.66% in 2007. In the period of 2008 to 2013, this share is fluctuating between 18% and 20% (see figure 2 - 1). Despite a smaller portion in GDP, Viet Nam's

agricultural sector played an important role along the road of development. It contributed a great deal to preserve material and non-material cultural values that existed thousands of years ago.

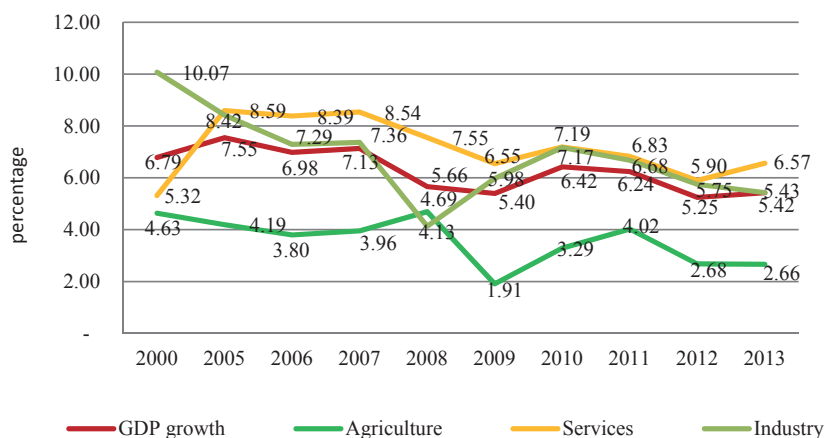
Figure 2-1: Share of agriculture in GDP (%)



Source: World Bank (1985-2000) and General Statistical Office (2005-2013)

The growth rate of agricultural sector has experienced a downward trend of 3.81%/year during 2000-2006 compared to 3.26%/year during 2007-2012 while the GDP growth rate of fishery sectors is higher than that of the agricultural sector of 10.4% in 2000-2006 and 4.19% during 2007-2012 and vs. for the forestry sector of 0.97% and 3.24%, respectively, as shown in the figure 2 - 2.

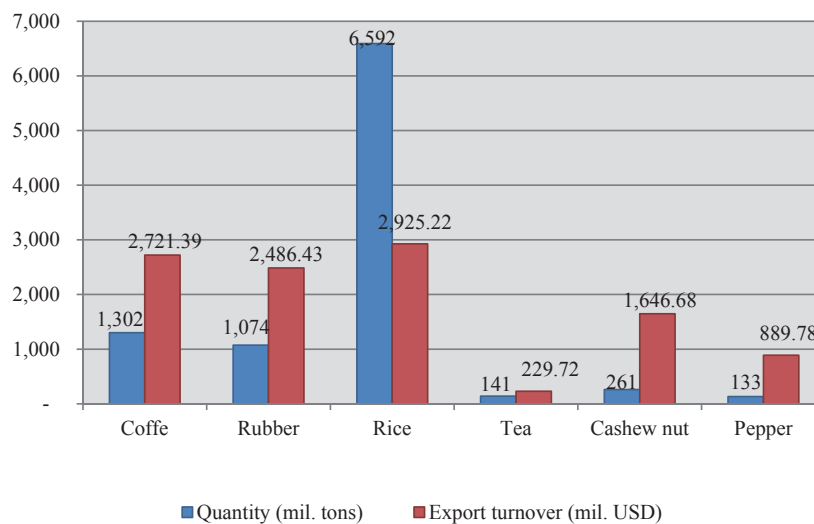
Figure 2-2: Annual growth rate by sectors (%)



Source: World Bank – Indicators

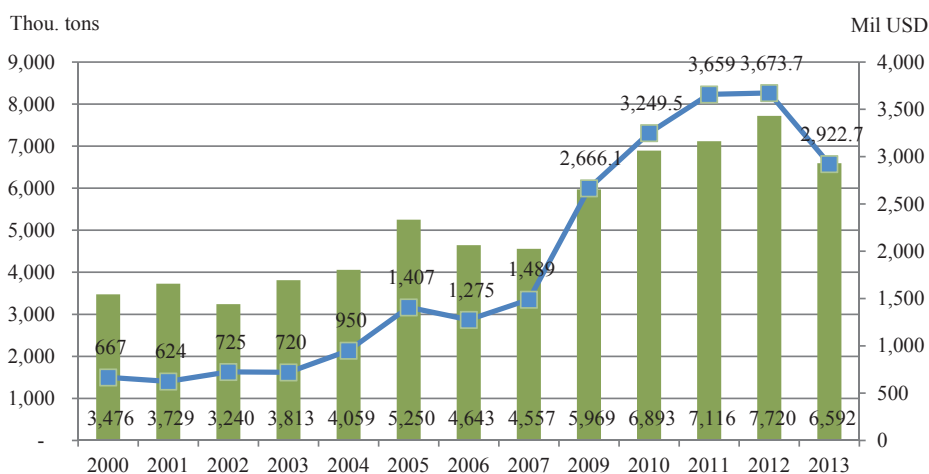
Viet Nam became a member of the ASEAN Free Trade Agreement (FTA) in 2002. The impact of trade liberalization on Viet Nam's economy is significant in terms of promoting exports, imports, and economic growth in the country. The contribution of agricultural products to the total exports of Viet Nam keeps increasing over time, from 49% in 2001 to 57.7% in 2012 (Thang T. C et al. 2014). The export value of agricultural sector has significantly increased since 2000 (except 2009) but its growth rate has reduced from 18.4% during 2000-2007 to 15.6% during 2008-2012. The export growth of agriculture bases mainly on the export of 5 major commodities including rice, coffee, pepper, cashew, and rubber (see figure 2 - 3). Export turnover of agriculture increased less than 2 billion USD in 2000 to 5.94 billion USD in 2013, achieving the growth rate of 5.1% (Business times, 2014). However, high growth rates are resulted from quantity increases instead of unit price increases, proving the decrease in competitiveness and low value added of agricultural products. This below figure shows the export quantity and turnover of major agricultural products of Viet Nam in 2013.

Figure 2-3: Export quantity and turnover of some agricultural products in 2013



Source: MARD, 2014

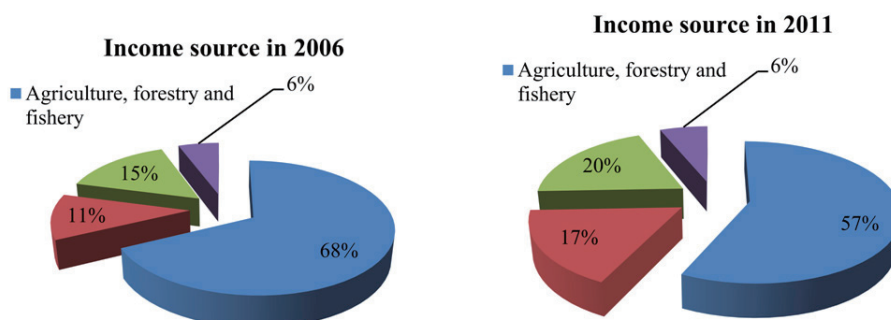
Among agricultural products, rice still plays an important role in Viet Nam, not only in food security but also in export. Together with the allocation policy of land use and increase of investment and technological application into agriculture, rice production achieved 44.1 million tons in 2013, and export volume of over 6.59 million tons of rice, reducing more than one million compared with 2012. Thus, the rank of rice export of Viet Nam descended to third position after India and Thailand because of the reduction of rice demand of traditional markets of Malaysia, Philippines, and Indonesia.

Figure 2-4: Rice export of Viet Nam period 2000-2013

Source: GSO, 2014

Income sources of rural households

According to the survey on rural, agriculture and fishery by GSO in 2011, total number of rural household was more than 15 million, of which households with income from agricultural sector accounted for 57.6% of total households. The income source from agriculture is in declining tendency gradually and replaced by income from non-agricultural sectors. It states that some rural households are escaping from the natural dependence to move to other sector with higher income and less risks.

Figure 2-5: Income sources of rural households

Source: Survey on rural, agriculture and fishery by GSO 2011

Though main income of rural households is from agriculture, but agricultural income occupies only 27.5 % of total average income per capital per month in rural area and 14.5% of one in urban areas (GSO, 2012). The reason for it is that farm households cultivate in the small and scattered farmland area with traditional cultivating method, leading to low productivity and difficulty in mechanization.

Challenges of agricultural sector in the context of land use

- Need on increasing and developing farm economy through land consolidation and accumulation;
- With the rising opportunity cost of labor, there are opportunities for the under-utilized labor in agricultural areas to be employed; and the labor withdrawn from agriculture, land consolidation and accumulation can occur to raise the overall economic efficiency in rural areas;
- Maintaining self-sufficient livelihoods for household subsistence with small farm size when there is fluctuating prices for crops being sold on world markets, and increasing of input prices.
- The need to allow flexibility in land use (at the moment constrained by policy) to allow farmers to respond to market signals and thus maximize their incomes.

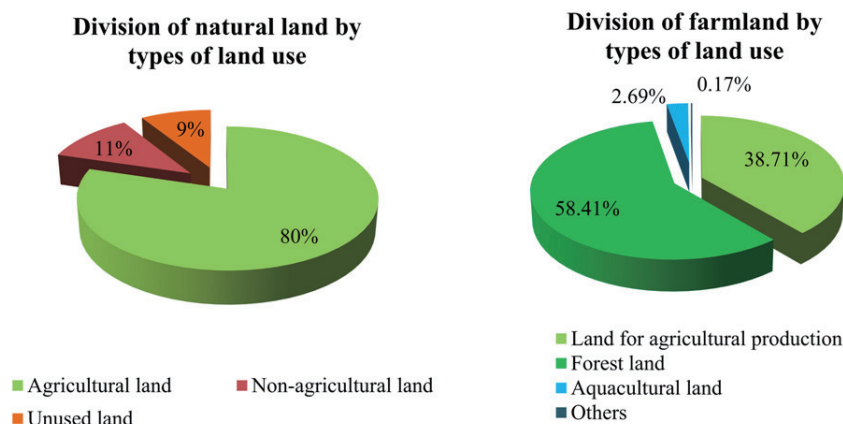
2. Farmland use in Viet Nam

Land is a vitally important resource in Viet Nam. The long-term development of Viet Nam's agriculture depends on the efficient and effective use of land, and on the adoption of policies in relation to land, land markets, and associated inputs and resources. For the farmer households, land is the most important asset and they can use it as the mortgage to borrow money in case of emergency such as illness, debt, etc.

2.1. Status of land use in Viet Nam

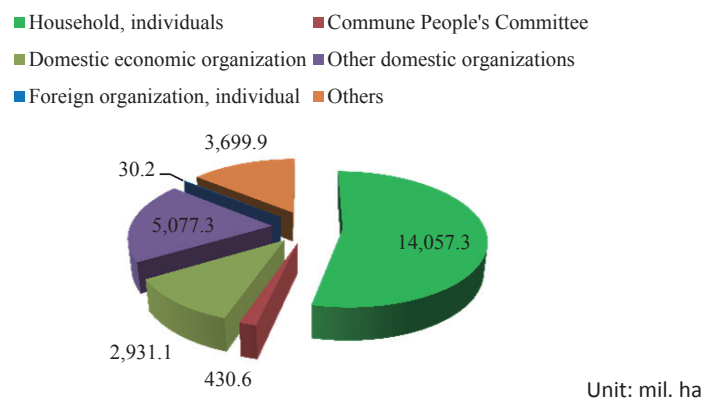
Total natural area of Viet Nam is 33,097.2 million hectares with three forth of low mountainous area. The land for agriculture occupies nearly 80% of total natural area (26,371.52 million hectares) in 2013 (MONRE, 2014). With less than 0.3 hectares of land per capita divided into many small plots, Viet Nam has one of the lowest land endowments per person in the world (WB, 2011). Nevertheless, the combination of fertile land, favorable weather conditions and abundant labor enables the country to maintain national food security and still export a number of crucial agricultural products such as rice, rubber, cashew, coffee, and pepper, etc. As a result, in Viet Nam's rural areas which have three-quarters of the total population and most of the poor, agricultural production is the main livelihood for more than half of the total workforce (WB, 2011).

According to MONRE, farmland is divided in agricultural production land with 10,211 million hectares (38.72%), forest land with 15,405.82 million hectares (58.42%), aquaculture land with 0.71 million hectares (2.69%), and the rest one (salt production and other farmland) of 0.45 million hectares (0.17%) (see figure 2 -6).

Figure 2-6: Division of natural land and farmland by types of land use in 2013

Source: MONRE, 2014

The survey on rural, agriculture and fishery in 2011 showed that farmland is used by 6 main users of households or individuals, Commune People's Committee, domestic economic organization¹, foreign organizations, other domestic organizations², and others (see figure 2 - 7). Farmland area used by households and individuals accounts for 53.6% of total farmland area, then domestic organization of 19.36%, and domestic economic organization of 11.18%, etc.. However, the size of farmland of farm households is quite small and scattered. There are about 69% of household with the farmland size of under 0.5 hectares, and 34.7% of households with size of under 0.2 hectares, whilst number of households cultivated with area of 2 hectares and over occupied only 6.18% in 2011. This is as constraint for application of technical and technological advances in agricultural production.

Figure 2-7: Farmland divided by main users

Source: Survey on Rural, Agriculture and Fishery by GSO

¹ Domestic economic organizations include State-owned enterprises, cooperatives

² Domestic organizations include stock companies, private companies

*For the agricultural production land*³, the total agricultural production land area nationwide in 2013 is 10.2 million hectares in 2013, increasing about 1.23 million hectares compared with 2000. The increasing area is mainly land for perennial crop and forest land. Land for annual crops reduced more than 372 thousand hectares, of which 45.8% is paddy land. This reduction may be due to the conversion of farmland for construction of urban, industrial zones, infrastructure or other national purposes.

Table 2-2: Farmland use by years

Year	2000	2006	2011	2013
Farmland	20,939.68	24,696.00	26,280.55	26,371.52
Land for agricultural production	8,977.50	9,436.16	10,151.06	10,211.00
Land for annual crop	6,795.61	6,348.15	6,401.39	6,423.00
<i>Paddy land</i>	<i>4,267.85</i>	<i>4,130.94</i>	<i>4,092.83</i>	<i>4,097.07</i>
Weed land for animal husbandry	37.58	53.39	45.49	42.74
Other annual crop	2,490.11	2,163.81	2,263.07	2,283.00
Perennial crop	2,181.94	3,088.01	3,749.67	3,788.03
Forest land	11,575.43	14,514.23	15,373.06	15,405.82
Productive forest land	4,733.68	5,672.48	7,406.56	7,391.84
Protective forest land	5,398.18	6,766.28	5,827.31	5,851.75
Special use forest land	1,443.16	2,075.46	2,139.19	2,162.22
Aquaculture land	367.85	715.11	712.00	710.02
Land for salt production	18.90	14.05	17.90	17.89
Other farmland	2.00	16.45	26.53	27.00

Source: MONRE, 2014

In Viet Nam, paddy land accounts for more than 60% of annual crops and 40% of agricultural production land in 2013. However in the reality, the farm households can grow 3 rice crops⁴ per year in paddy land, especially in the Mekong River Delta. For other annual crops, the area is fluctuating year by year because the farm households change their crop every year together with the change of price of these crops.

For perennial crops, the area of these crops is in tendency of increase, excepting area of cashew nut. In period of 2000-2006, the price of cashew nut increase, farm households invest much in this crop, so that the area of cashew nut increased more than 200 thousand hectares. However, from 2007 up to now, the price of cashew nut reduced strongly with low benefit, the farm household cut it down for planting other perennial crops. This shows that farm households depend much on market of agricultural products. They are willing to change their agricultural production area to other crops with higher profit and price.

³ Agricultural production land consists of land for annual crops and land for perennial crops

⁴ Three rice crops are winter-spring rice crop, summer-autumn rice crop, and winter rice crop

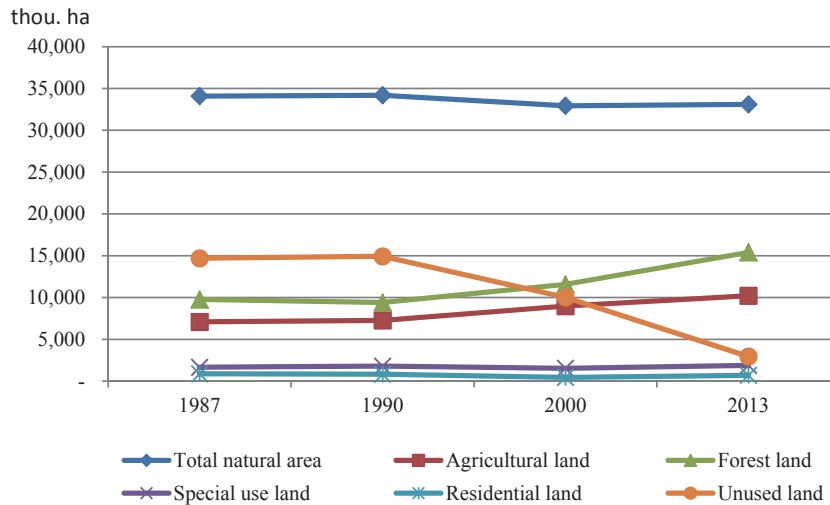
Table 2-3: Area and production of annual crops and perennial crops

		2000	2006	2011	2013
Annual crop					
Paddy of whole year	Area (1,000 ha)	7,666.3	7,324.8	7,655.4	7,899.4
	Production (1,000 tons)	32,529.5	35,849.5	42,398.5	44,076.1
Maize of whole year	Area (1,000 ha)	730.2	1,033.1	1,121.3	1,172.5
	Production (1,000 tons)	2,005.9	3,854.6	4,835.6	5,193.5
Sweet potato of whole year	Area (1,000 ha)	254.3	181.2	146.8	135.5
	Production (1,000 tons)	1,611.3	1,460.9	1,362.1	1,364.2
Cassava of whole year	Area (1,000 ha)	237.6	475.2	558.4	544.1
	Production (1,000 tons)	1,986.3	7,782.5	9,897.9	9,742.2
Sugarcane	Area (1,000 ha)	302.3	288.1	282.2	309.4
	Production (1,000 tons)	15,044.3	16,719.5	17,539.6	20,016.2
Groundnut	Area (1,000 ha)	244.9	246.7	223.8	216.3
	Production (1,000 tons)	355.3	462.5	468.7	492.6
Soybean	Area (1,000 ha)	124.0	185.0	181.1	117.8
	Production (1,000 tons)	149.3	258.1	266.9	168.3
Perennial crop					
Tea	Area (1,000 ha)	87.7	122.9	127.8	128.2
	Production (1,000 tons)	802.5	985.3	1,276.5	
Coffee	Area (1,000 ha)	561.9	497.0	586.2	635.0
	Production (1,000 tons)	290.8	555.4	789.6	
Rubber	Area (1,000 ha)	413.8	522.2	801.6	955.7
	Production (1,000 tons)	39.2	78.9	112	
Pepper	Area (1,000 ha)	27.9	48.5	55.5	67.9
	Production (1,000 tons)	71.57	270.04	309.3	
Cashew nut	Area (1,000 ha)	195.7	402.0	364.0	325.9
	Production (1,000 tons)	884.8	1,000.8	1,188.8	

Source: *MARD*

Farmland use after Doi Moi

Together with a number of reforms since 1986 to change itself from a centrally planned to a marketed oriented economy, the Viet Nam Government also carried out the land reform. This is one of the most important and decisive factors for the agricultural development in Viet Nam. The land reform not only dissolved collective farms but also granted land use rights to farm households (Kirk M. et al, 2009). Farm households can use farmland in long-term and stability, and self-control in their agricultural production. Thanks to it, the situation of farmland use had obtained some remarkable achievements. Portion of agricultural production land in total natural area had increased from 20.8% in 1987 to nearly 30.85% in 2013.

Figure 2-8: Land use after Doi Moi

Source: General Statistics Office by years

Though agricultural production land area increased, but the average of land use per capita reduced. According to the GSO in 1994, average agricultural production land per household was 4,984 m², reducing 1,000m² compared with 1989. Reason for this reduction is the rapid increase of population and number of households. Since 1989, in Viet Nam, number of household increased 314,000 on average (population growth of 2.6%/year) (Hoang Viet, 1999). Similarly, average of farmland use per capita also reduced from 1.137 m² to 1,034 m² (Khanh, 2004). In 1999, thanks to the policy on family planning and land reclamation combined with land improvement, the average farmland use per capita had increased to 1,224m². Until 2011, this figure was only 437m²/person.

In brief, Doi Moi process has remarked as an important step of land reform in Viet Nam, contributing to the development of agricultural production, and helping Viet Nam become one of the largest exporters of agricultural products in the world.

2.2. Issues of farmland use in Viet Nam

2.2.1. Land fragmentation

Land fragmentation means that one household owns more than one agricultural parcel and it is one of the important characteristics of the agriculture in developing country. In Viet Nam, the land fragmentation is quite popular, especially in the North. It was estimated that there were about

75 million of land parcels plots allocated to 9,259 thousand households in Viet Nam after the implementation of Decree 64/ND-CP (General Office of Land Administration, 1993), about

7-8 plots per household (Hung et al, 2004). Around 10% of these plots have an area for only 100m² or less (Phien, 2001).

The land fragmentation has different level in each region because of the complicated topography, and also the farmland allocation between North and South before. According to the Land Management Office in 1998, averagely each household in the RRD owned about 7 - 8 plots while in the North area it was from 10 - 20 plots (Lan, 2001). In the South, the land fragmentation is not so serious, about 1-2 plots per household in the MRD. It is because of less concern with equitable land distribution and land allocation to households likely based on the land status that the households owned before the national reunification in 1975 (Do et al, 2003). According to rural survey implemented by DANIDA in 12 provinces of Viet Nam from 2008 - 2010, average cultivated area per household was 0.85 hectares, with average plot per household of 4.7 plots, total distance from their household to the field of about 4.7 km. The largest average cultivated area was found in The Central Highlands of 1.83 hectares, whilst the smallest one in the North Delta of 0.41 hectare (see table 2 - 4). With such small and scattered cultivated land surely hampers mechanization and technological application, and involved additional time and labor for farming activities that must be carried out in geographically distant plots (Hung et al, 2004). Additionally, it can make input costs increase, and cause more difficult in irrigation and drainage with lots of field-boundaries (Le Thi Anh, 2014).

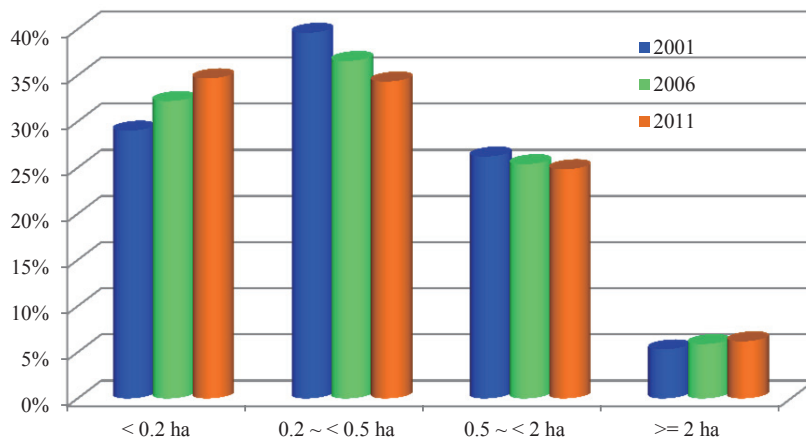
Table 2-4: Average cultivated area, average plot number, and distance from farm household to their fields of 12 provinces in Viet Nam

	Average cultivated area (ha)	Average plot	Total distance to the field (m)
Provinces			
Lao Cai	1.06	5.1	6,499
Phu Tho	0.51	6.2	4,084
Lai Chau	0.95	5.3	9,655
Dien Bien	1.19	6.1	12,196
Nghe An	0.68	4.8	3,871
Quang Nam	0.36	4.5	3,180
Khanh Hoa	1.00	3.5	4,242
Dak Lak	1.47	3.9	5,754
Dak Nong	2.61	3.1	7,188
Lam Dong	1.37	2.9	5,036
Long An	1.52	3	2,298
Regions			
North Delta Areas	0.41	5.5	4,034
North mountainous Area	1.06	5.5	9,602
Central Highland	1.83	3.4	6,066
South Delta	0.94	3.7	2,828
Total	0.85	4.7	4,766

Source: DANIDA, 2011

Land fragmentation is reflected not only by number of plot per households but also the small farmland-used size. In 2001, rate of household used farmland size less than 0.2 hectares was 29% but in 2011 this figure increased to 36.67%. It means that farmland is divided into small plots for inheritance of rural households. Percentage of household use farmland size from 0.2 hectares to under 0.5 hectares decreased from 68.5% to 59.15% in period 2001-2011. Conversely, increase of number of household using farmland size from 2 hectares and over of nearly 1% shows that land consolidation process is in progress but slow. With such small area of farmland use, it is difficult for farmer to expand and stabilize their agricultural production, as well as utilize machine for their production.

Figure 2-9: Structure of household's farmland use by size



Source; Survey on Rural, Agriculture and Fishery by GSO, 2001, 2006, 2011

Reasons for land fragmentation in Viet Nam

There are some reasons for land fragmentation in Viet Nam, but it is mostly caused by the result of land allocation policy in 1988 with the view of equitable allocation. Farmland is allocated to farm households based on the land quality and number of household members. Each farm household received several small and non-contiguous plots of land with various sizes and quality.

The second reason for more and more fragmented farmland is due to the increase of rural population and the land inheritance policy. The Land Law in 1993 gives the farmers use their land-use rights as inherit, and its revision in 2001 allow them assign the land use right as the gift to relatives, friends or others. With this right, the farm household can divide the land to their children easily when their children want to live separately. After that the households have to renew their land use right certificate because one household is issued only one certificate of land use for all land plots, simultaneously, their children also have to apply for approval the inherited land. It is estimated about 90% of farm households divided their land into smaller pieces for the inherit purposes (Magazine of Finance, 2012). And of course, farmland again is divided into

smaller plots, preventing the application of technologies to improve productivity of agricultural production.

Finally, the failure of land markets to operate effectively also causes the land fragmentation because of Government regulations on land transactions (Blarel et al, 1992). Now market for the exchange of land use rights in Viet Nam is still complicated and not well developed. Farmer households, who want to use their land as collateral for borrowing money from the banks, need permission and the seal of local authority. Other transactions such as selling or buying of land use rights are completed only if they are recorded and certified by the local government. In many cases, this is not done (*this issue will be focused on next part*).

Although land allocation policy has contributed significantly to agriculture and rural development in recent years in Viet Nam, small-sized and scattered farmland areas are crucial issues which can lead to less efficient land use and conflicts about the land. Land fragmentation can constrain the potential income of the agricultural production. It can reduce incentives for mechanization, higher cost, loss of land use due to boundaries, or increase negative externalities and more limited application of new technologies. However, it also has to say that land fragmentation may benefit farmers by spreading output risk and seasonal labor use, and allowing crop diversification (Sally, 2007).

In brief, the small and fragmented land holdings are considered as a problem for agricultural development in Viet Nam. Thus, the Viet Nam's Government is actively encouraging the land consolidation, especially in the North, and allowing larger land holdings through supportive policies of commercial farm development.

2.2.2. Land consolidation and accumulation

Land consolidation

Land consolidation will help farm household cultivate in large plots and be easy to use machine in their agricultural production. In 1998, the government issued Decree 64/CP to promote the exchange of land plots so as to encourage larger plot areas. Since then, the provinces nationwide have established steering committee for conducting pilot studies on plot exchanges. Throughout the whole country there are 700 communes in 20 provinces where plot exchanges were and are being implemented, but progress is still slow (Sally, 2007). In these areas land was effectively reallocated to farmers with the aim of reducing the number of plots. On average, the number of plots per farm household decreased from 7.8 in 2002 to 4.9 in 2006, and to 4.3 in 2012 (Thang et al, 2014). Nevertheless, size of cultivated land per households increased unremarkably, because some farm households did not want to transfer their LUR for others.

In some reports made to the central and local governments, the conclusion is that the policy of plot exchange should be implemented wherever farmers realize there is a problem caused by fragmentation and where land relations are in order. This means that plot exchange should not lead to new conflicts related to land allocation because to increase one household's land area will require reducing the area available to one or more other households. The most important principle is that farmers should voluntarily exchange land such that the result is larger plot areas for each individual (MONRE, 2002). However, in many provinces the land reallocation process occurs

without much participation of farmers, who are only involved in the assessment of land quality in order to determine the exchange coefficients between different classes of land. Because land in Viet Nam is still owned by the State, many farmers believe they do not have rights to be involved in either the reallocation process or discussion about land use planning in general.

Land accumulation

And land accumulation will help to use the land in long-term, efficiency, and boosting crop productivity and the commodity production up. However, in the current circumstance of Viet Nam, land cannot be accumulated freely but step by step because land accumulation can lead to the landlessness of farmers, causing the social and economic instability. Additionally, the non-agricultural employment is now not enough for surplus agricultural labors if the land is allowed to accumulate in some households; and land accumulation also requires the management capability of great enterprises that few farmers can acquire it.

In 2001-2006, total area of agriculture, forestry, and fishery is accumulated about 142 thousand hectares for farm development. In 2007, total accumulated area was 17,563 hectares, of which land transfer was 14,024, land lease of 2,710 hectares, and land bidding of 802 hectares (Nghia, 2009). The farm households who accumulate the farmland are rich knowledge and experiences in agricultural production, but some of people who are not farmers, accumulate land for farm development, construction of eco-tourism zone, or resort place in rural areas.

2.2.3. Farmland conversion to other purposes and the State policies

At the present, farmland is diminishing year by year because of the land conversion to other use purposes such as industrialization, urbanization, infrastructure, and other national use purposes. Nguyen (2009) stated that there is no accurate statistical data on the total area of land, especially the farmland area that has been acquired by the State since the early 1990s for other purposes. However, according to Le (2007), from 1990 to 2003, 697,417 hectares of land were taken for the construction of industrial zones, urban areas and infrastructure and other national use purposes.

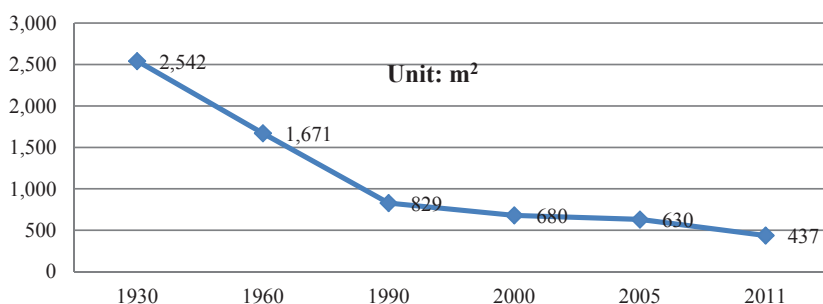
The conversion of farmland to non-agricultural uses is a common way to provide the space for urbanization and industrialization and is, therefore, an almost unavoidable tendency in economic development and population growth (Tan et al 2009). In Viet Nam over the past two decades, escalated industrialization and urbanization have encroached on a huge area of farmland. During period of 2000-2005, 366.44 thousand hectares of farmland became non-agricultural land, of which 302.5 thousand hectares were rice fields (Cuc, 2008). About 75,000 hectares of farmland were transferred into non-agricultural land in 2008, of which around 82.5% of fertile farmland and suitable for rice cultivation (Cuc, 2008). While loss one hectare of rice field affected the livelihood of 12 to 25 rural people, thus was also harmful to the food security of the country (Do, 2008).

Viet Nam rural laborers are mainly unskilled and low skilled and their single valuable livelihood asset is farmland. In 2013, around 68% of Viet Nam's population lived in rural areas, about 60.6% of the population engaged in agriculture. Therefore, the farmland acquisition has a major effect on poor households in Viet Nam rural and peri-urban areas (ADB, 2007). On average, the loss of 1 hectare of farmland will cause the jobless of 13 farmers, and the figures are much

higher in the RRD (15.53) and Ha Noi (20) (T. Nghi, 2009). Consequently, in 2003-2008, it was estimated that the acquisition of farmland considerably affected the livelihood of 950,000 farmers in 627,000 farming households. About 25-30% of these farmers became jobless or had unstable jobs and 53% of households suffered from a decline in income (Vietnamnet/TN, 2009). The loss of farmland causes the loss of traditional agricultural livelihoods and threatens food security.

In Viet Nam, the average farm size is around 0.2 hectares per capita. However, together with population increase and agricultural production land conversion, average farmland use per capita has reduced from 2,542m² in 1930, to 829m² in 1990 to 680m² in 2000 and to 437m² in 2011.

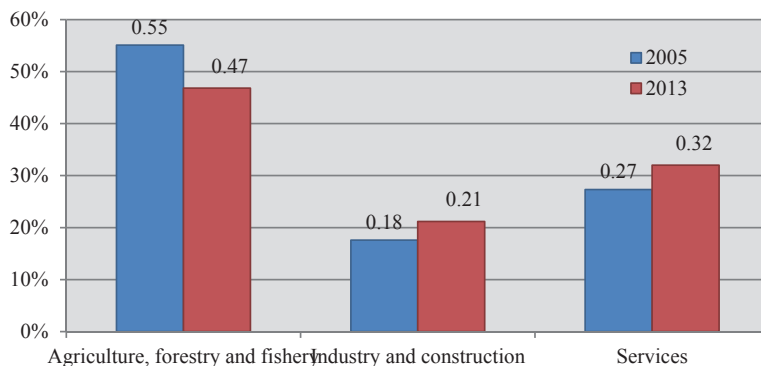
Figure 2-10: Farmland per capita



Source: Data from 1930-1990 quoted from Do Kim Chung (2008), data from 2000-2011 from GSO

In addition, the decreasing of farmland will affect to growth speed of agriculture and income of farmers, change sectorial labor structure. Rate of agricultural labor reduced from 55.09% in 2005 to 48.81% in 2013, whilst rate of labor involved in industry and construction, and services increased from 17.59% to 21.18%, and 27.32% to 32%, respectively. The farmer who lost farmland has to move to the urban area to find job or do non-agricultural occupation for their livelihood, leading to the increasing of labor structure in non-agricultural sector and the decreasing of one in agriculture.

Figure 2-11: Employment by economic sectors



Source: GSO, 2013

However, it has to say that the land conversion can bring about a wide range of new opportunities for households to diversify their livelihoods and sources of well-being. Land conversion directly and indirectly affects livelihood choices through creating new non-farm employment opportunities and livelihood asset changes, respectively. Apart from a number of rural households who attain benefits from this process because such households have enough resources or take full advantages of urbanization to reach better livelihoods, many other households have become jobless and vulnerable and had precarious livelihoods even after receiving a significant money compensation for their land loss. In practice, farmland conversion has resulted in distinct impacts among households. Approximately 60% of land-losing households, whose farmland was converted to other purposes, received favorable opportunities for non-farm employment, improved infrastructure, and a significant amount of compensation money for losing land (ADB, 2006). In practice, the greatest problem is the lack of opportunities for farmers to transfer job and recover livelihoods. This is because farmers might not meet necessary qualifications for non-agricultural jobs, while the local government and the investor may not be active in searching for a practical solution to this issue (WB, 2011a).

Land compensation for confiscated farmland areas for conversion to other purposes

According to the Decree 17/2006/ND-CP by the Viet Nam's Government, for the confiscation of farmland, farmers must be compensated with other types of cultivable land, and cash compensation is the last option. In the case of having no more cultivable land for compensation, the provincial authority can compensate farmers with a plot of land for doing services, which provide farm households with conditions to change their livelihoods. If cash compensation is the only choice, the provincial government must have specific planned solution for job assistance to farmers (General Department of Taxation, 2006). In some localities, the provincial authority has compensated farmers who lose more than 30% of their farmland with a plot of commercial land close to industrial zones or residential land in urban areas. This compensation with "land for land" has been successfully implemented in some localities, while others do not believe in the appropriateness of this policy because more farmland needs to be converted to non-agricultural land (WB, 2011a).

For the land confiscated compulsorily for a project, farmers will receive direct compensation from investors (compensation for the loss of land, crops and assets attached to the area of confiscated land, and job transfer, etc.). Besides, some additional assistance is also provided by the city/provincial government such as job transition training courses, agricultural extension, and new job introduction services (Nguyen Q.V. et al., 2005).

Though the Land Law stipulates that the farmers have right for transfer and exchange their land use right, but they do not have right for making decision their land price when the State wants to change the purpose of farmland. Subject to Decree 197/2004/ND-CP dated on 3rd December 2004, compensation for land losing people will be based on land area, and land category (residential, non-agricultural, and farmland) being used by the land users. As indicated in this Decree, the land prices applied to the compensation will be decided by the Provincial People's Committee at the time of making the decision on land acquisition (The Viet Nam's Government, 2004). However, in the fact there exists a large gap between the compensation level defined by the government guidelines and that determined by market principles (Han et al, 2008). Such compensation is unsatisfactory to many farmers because the compensation price is often

much lower than the real value of land, leading to a boom in complaints about land acquisition in Viet Nam (Thien Thu et al, 2011).

Policy on farmland price in Viet Nam

The price on farmland is stipulated at Article 12 of Land Law in 1993, 2003, and in Decree no. 188/2004/ND-CP on 16th November, 2004. Price determination of farmland is based on either market price or income from the farmland. The local authorities are assigned to determine land price. Mechanism of land adjustment is more dynamic than before and in-line with one from the market. It means that if there is disparity over 30% lasting within 60 days between the price set by the local authority and price in the market, Ministry of Finance will submit plan on farmland price to the Government for its adjustment.

2.2.4. Market for land use right

The Land Law in 1993 and its revision in 1998 has given the farmers right of land use as transfer, exchange, inherit, lease, mortgage, release, and used as capital contribution for joint-venture arrangements. It makes to increase household's ability on accessing to the credit and land use right trade-able.

In Viet Nam, there are two types of land market. The primary market is the land transaction between the State and farmland users such as land allocation with or without payment, allocation with different land use tenure, or land lease, etc. Subjects, price, tenure of land allocation, and purposes of land use are controlled strictly by the State in this market.

The secondary market is transaction between farmland users for transfer or lease of LUR as stipulated by the State and operates spontaneously. The State only plays role as providing necessary service on legislation for LUR transaction and tax collection. Hence, for the land use and land transactions in the rural areas, the State cannot manage all of them. There are cases in which farmers do not till the land themselves but rent it out, e.g. in trading villages on the outskirts of big cities including Ha Noi and traditional handicraft villages, using written contract between lesser and lessors without record of local authorities.

In reality, this market is newly emerging in Viet Nam in response to land reforms, however, it is not so strong because i) the agricultural production has high risks and poor efficiency so less people invest in it; ii) farmland is still considered as precious asset of farm households, so the farm households sell their land only due to some family crisis; iii) rate of farm households who divided their land for their children as the traditional inheritance accounts for 90%, whilst rate of households of land accumulation for farm development is only 3% (Magazine of Finance, 2012). Hence, the farmland market develops only at the place where agricultural and non-agricultural production is developed oriented to commodity.

There are some constraints of the LUR market with official decrees that stipulate the circumstances under which, and to whom, the LUR can be transferred (Marsh, 2002). First constraint is the illegal LUR transaction. The reasons for illegal transactions are the costs associated with registering LUR transactions, time-consuming and cumbersome procedures. It notes that a household was issued with only one land use certificate for all their plots. If the

household wishes to dispose of or exchange any one of him/her plots, he/she must surrender their land use certificate and has it reissued. Therefore, transaction cost involved in doing this occurs without being officially registered.

The second constraint is that the land rental and transfer values do not reflect the true market prices, but rather are determined with a pricing framework set by the central government, with the actual prices fixed by the provincial or municipal authorities.

The final one relates to the reluctance of farm households to transfer their LUR unless they have better prospect elsewhere with reasonably low risk.

2.3. Changes in farmland policy

Reform of land policy has become the center of economic recovery (Dang Kim Son et al, 2011). The Communist Party and the State of Viet Nam have issued hundreds of documents and policies related to land. The land reform policies had brought many remarkable achievements such as reduction of land fragmentation, increase of land use area per household, long-term land use, increase the flexibility in land use and freedom in transfer of land use right. This below part presents the change of land policy in some stages.

From the country establishment until the French colony (1945)

Wet rice cultivation came from very early in Viet Nam. Land was exploited by the communities and belonged to the communities. All community members were responsible for land protection and usage. Together with the development of production tools and experiences in cultivation allowed the village leaders to allocate farmland to cultivate and benefit. And community members had tasks of irrigation, flood preservation, or participation in general activities, etc.

However, during the period of Chinese domination of more than 1,000 years, the regime of land provision from the China applied in Viet Nam set up large farms of dominant mandarins. And thousand Chinese people had immigrated and reclaimed virgin land, set up new villages, and allocated land by their own ways. At that time, forms of land ownership were supreme ownership of the State and private ownership but unpopular, the collective ownership still had domination.

The French colonist had invaded into Viet Nam since 1858. In term of land field, the French had carried out land measure, and made topographic map, and brought the French land law for foundation of land management and land ownership protection. In Viet Nam, there were two law systems of land ownership, one of French law applied in Viet Nam and one of the feudal court. But after that, the Viet Nam's traditional land was gradually ineffective by the one of French colonist. And land ownership that were protected by the Law included four types: the public ownership (the State ownership and community ownership), juridical ownership (ownership of Trade Association, and Associations protected by the Law), general ownership (one land lot owned by many people that could not be divided), and private ownership. But in reality, the land ownership of the poor farmers was not respected. They were lost or lacked their land for cultivation due to the regulation of providing plantation, and they had reluctantly to become to tenants.

The French colonist had remained two different land ownership systems in Viet Nam. In the South, the French colonist established large plantations (event over 2,000 hectares) owned by the great landlords with economic and political power. It was a great chance to produce agricultural products to promote export activities of agro-products to the world markets at that time. In the North, they remained the small-scale land ownership by an appropriate public land fund to avoid the farmer's leave from agricultural production. But the fact that farmers were not benefit from these land but the village bullies.

In brief, in this period, farmland was divided into two categories of communal and private and there were two main classes of land ownership: landlords and tenants. The landlord class accounted for only 2% of the whole population but occupied more than half of the total land area, while 59% of farm households were landless tenants of the landlord class (Cuc, 1995).

Period of 1945 – 1975

After 1945 the new government implemented changes to economic development policy, including agricultural policy. In the first stage, up to 1952, the government carried out land redistribution and reduced land tax for poor farmers and tenants. After the Genève convention, Viet Nam was temporarily divided into two parts of North and South, so that the land reform of each part was also different.

After the end of the French War in 1954 the north of Viet Nam implemented a radical land reform program. The target was to nationalize land of the Viet Nam's and French landlords and to redistribute it to peasants with little or no land, using the slogan "land for ploughmen". The land was confiscated from the landlord and allocated to the tenant, and private land ownership was still recognized. As a result, about a quarter of the land was redistributed to farmers on a more or less equitable basis, benefiting about 73% of the rural population in the North (Kerkvliet, 2000).

Following the land reform, the North entered a stage of agricultural collectivization involving "low-level" and "high-level" cooperatives. By 1960, about 86% of all peasant households and 68% of total farmland were in low-level agricultural cooperatives, where farmers were still owners of their land and other production assets. In high-level cooperatives, farmers pooled their land and other production forces (e.g. buffaloes, cattle and production tools) under unified management. From 1961 to 1975 about 20,000 high-level cooperatives involving 80% of households were established (Nakachi, 2001).

In the South, the land reform was carried out in a different way. The Government in the South set up at first, the "principle of tenant", aims at making contract and determining of land-owned level between tenant and landlord. However, this principle could not solve the basic problem of farmland ownership. The landlords, whose land was confiscated before, came back and re-appropriated the land, so that the Government in the South could not control the land area of the landlords. After that, the Government had carried out the second land reform. The landlord was allowed to keep 115 hectares of farmland; the rest area would be sold to the tenant who lacked cultivated land, but not over 5 hectares per plot. About 261,874 households became the landlord, owning 495,120 hectares of farmland area (Lam, 1995). Up to 1969, about 48% of households owned the area from 1 to 3 hectares (Lam, 1995).

In 1970, Law on "Land for ploughmen" had been issued, including land-owned limitation of landlord of 15 hectares, land allocation to the farmers from the landlord-confiscated land fund without payment with area of maximum 3 hectares, provision of land-owned certificate for farmers. Approximately 1.3 million hectares of farmland were redistributed to over one million

farmers (Pingali et al, 1992). At that time, the rate of landlord accounted for only 0.71% of total household and owned 0.41% of land area, whilst number of farmers occupied more than 70% of total population and owned over 80% of land area (Khanh, 2013). Farmers were considered as the basic economic unit for agricultural development. The relationship between landlord and tenant had been abolished and replaced by relationship between land owner and hired worker. This change together with the economic development oriented to commodity production had led to *deep changes in the farmland ownership regime*.

Period of 1975 – 1981

After the country reunification in 1975, the Viet Nam's Government planned to further develop the movement toward agricultural collectivization. In the North, agricultural cooperatives enlarged their size from village to commune level. In the South, the farmers were still allowed to operate under a relatively free market until 1978, but then it moved gradually toward collectivization as the model in the North. The whole South area had established 1,518 cooperatives and 9,350 agricultural collectivities.

However, due to the policies based on the central planning model and the agricultural collectivization, the Viet Nam economy in general and agricultural sector in particular had to suffer from the heavily consequences after the war and felt into serious crisis. The agricultural production fell as a result of a lack of incentive for individuals to contribute to the production, and gross output of agriculture was annually at low rate of 2%. The average production of this period gained only 13.3 million tons/year (Nguyen Duc Kha). At the same time, population growth increased rapidly (2.2 – 2.35% per year), so that the State had to import one million ton of food to meet the domestic demand.

Period of 1981 – 1985

In 1981, reform in the agricultural sector started with the Instruction no. 100 (Contract 100) of the Central Party Secretary. The policy had linked farmers with the land use and created advanced progress in food production. Under this policy, agricultural cooperatives (AC) assigned farmland to farming groups and individual farmers, who were responsible for three stages of crop cultivation. But outputs were still under the ACs' management, and farmers' income was paid in kind of the paddy at the end of the season based on the output levels produced and contributed man-day throughout three stages of production process. Land was still owned by the Government and managed by the ACs.

The Instruction no. 35 issued on 18th January 1984 allowed farming households to utilize land sources that were not used by the ACs to put into food production. The farmers did not have to pay the tax for their business or production but tax for slaughter and tax for cultivated land. For long-time fallow land area that was replanted was exempted from the tax during 5 years.

Although simple and small, the Contract 100 was *the first step in the process of moving toward market-oriented economy*. The Contract 100 had affected remarkably agricultural production, especially rice production with increase by 6.3%/year in period of 1981-1985 (see table 2 – 5). However, after 1985, the growth of agriculture declined and was only 2.2%/year (see the table 2 – 5). The agricultural sector felt into the crisis again from 1985 to 1987, resulting in 2 millions of people in hunger.

Policies for land reform after Doi Moi (1986)

Since 1986, implementing of renovation of the whole country, the Viet Nam's agriculture has been changing step by step together with the annual growth rate thanks to the land reform policies. A series of policies and laws related to farmland use were issued.

In order to create conditions for promotion of agricultural development, the Resolution no. 10 (Khoan 10) dated in 5th April 1988 had made a sudden attack on renovation of agricultural economy management. **The right of farmland use, inheritance or transfer to other household** was allocated to farming households. The **Khoan 10** officially recognized the farmer household as a self-controlled economic unit. The farmer household could use the farmland for 10 to 15 years. For the farm households in the South, they could be re-assigned the land they had owned prior to 1975 (MARD, 2000). For the agricultural outputs after deducted from the tax or sold to organizations according to the contracts, the farmers had right to sell their products in the market. Practically, the management of farmland had been shifted from AC to farm households. And with this change, farm households have been created favorable conditions to exploit and use the land resource. After one year of implementation, the rice production had increased more than 2 million tons, the previously chronic hunger basically stopped. It had to say that **Khoan 10** was a real "renovation" policy in agriculture issuing new regulation on piece-work contract, marking *the second important stage of the process of land reform* of Viet Nam in the modern time. This reform enabled Viet Nam from a rice deficit country to become to the largest rice exporters today.

The Land Law was issued initially in 1988⁵ with new land ownership regime in Viet Nam with three basically right of land: right of land ownership, right of land management, and right of land use. This first Land Law recognized the land use rights of households and individuals. Nevertheless, the necessary legal basic to adjust farmland relationship during process of moving to market economy was not stipulated clearly in the Law, such as unclear financial policy for farmland did not allow the household with LUR transfer their right of land use to other households.

Table 2-5: Annual growth rates of agriculture and crop outputs (%)

Periods	Gross agricultural output with fixed price in 1994	Rice	Sugarcane	Soybean	Tea	Coffee	Rubber
1976-1980	2.0	-0.4	9.9	11.6	5.1	8.8	0.6
1981-1985	5.5	6.3	8.8	9.5	7.4	23.4	2.4
1986-1988	2.2	3.1	7.1	0.4	-0.4	29.0	-0.3
1989-1993	4.8	4.7	3.3	6.6	5.7	35.1	17.6
1994-1999	6.7	5.9	18.2	3.0	9.0	22.0	14.1
2000-2003	4.6	2.4	1.8	11.8	11.7	8.7	6.2
1981-1988 (averaged)	4.5	4.6	5.3	6.5	5.0	28.9	1.9
1989-2003 (averaged)	5.4	4.4	8.4	7.5	7.9	23.3	14.6

Source: General Statistical Office 1999, 2000, 2001 and 2004.

⁵ The land was classified into 5 types: farmland, forestry land, residential land, special-used land, and unused land.

Based on the Constitution in 1992, the Land Law had passed and adjusted in 1993⁶ by the National Assembly to overcome the disadvantages of the Law in 1988 and enhance household's right of land use to encourage farmers to expand the cultivated area. The principle "Land for ploughmen" became the real meaning for the farmers. The farmers' long-term and stable use of farmland has been secured (Nguyen T.T, 2012). The farmland still belongs to the State but the farmer had right of land use for long term and stability, and rights of lease, mortgage, transfer, and inheritance. With the land use right, farm households are given the decision-making rights related to the purchase and use of inputs, the sale of outputs and some extent, the land use. Under this policy, the land tenure was extended to 20 years for annual crops, and 50 years for perennial crops. The land allocation could be renewed at the end of the period if the farmers still had a need for the land. The Law also put ceilings on the land area allocated to farm households. This limit for annual crop land was 2 hectares in the North and Central Provinces, and 3 hectares in the South provinces. For perennial crop land, land limit was 10 hectares in communes with flat fields and 30 hectares in midland or mountainous communes (MARD, 2000). This Law also regulated responsibilities at levels in managing land use purposes: *"When the farmers wanted to converse the purpose of farmland use, they had to be permitted by Provincial People's Committee with the agricultural area less than 2 hectares"* (Thang T. C et al., 2014), to minimize the risks of rice land conversion by urbanization and industrialization in the provinces. By 1999, more than 10 million households had been granted land use certificates of farmland, accounting for 87% of agricultural households and 78% of farmland in Viet Nam (ANZDEC Limited, 2000). And at the end of 2000, rate of farm household with land use certificate was over 90% (Do et al, 2003).

Under the Land Law 1993 revision in 1998, two additional LURs for farmers were release and use the value of land use right as joint venture capital for investment⁷. And the revision in 2001 allowed farmers assign their land right as the gift to relatives, friends or others. These revisions had set out a variety of changes related to the land and procedures for land registration. Thus, the Land Law in 2003 was promulgated and replaced for the one in 1993.

The Land Law in 2003⁸ continues to confirm that land is not privately owned because it is the collective property of the entire people, which is representatively owned and administrated by the State and the LURs are to be granted to individuals, households, enterprises and other organizations. Such rights include the rights to exchange, transfer, inherit, lease, mortgage land and use land as a capital contribution (National Assembly of Viet Nam, 2003). However, the duration of land allocation is still short and has not been changed. The farmland was assigned to farmer household within 20 years. The question here is whether is the farmland confiscated by the State or allocated continuously to farmers when the tenure finished? A cycle of land use planning of the commune, ward, or town was stipulated in 10 years⁹, it meant that farmland allocation to farmers was equal to two cycles of land use planning. Thus, the farmers did not feel assured to

⁶ The land was classified into 6 types: farmland, forestry land, rural residential land, urban land, special-used land, and unused land.

⁷ The capital contribution by right of land use now does not develop well in Viet Nam because the benefit received by the farmer is too low, and depends on the business result of the enterprise, so it does not ensure the capital contribution of the farmers when the enterprise was broken up (IPSARD, 2012)

⁸ The Land Law in 2003 divided land into three groups of farmland, non-agricultural land, and unused land. According to this Law, farmland included 8 types of land and some of them were not included before. Right of land use consisted of many attached rights, such as for the subjects, who hold the right of land use, can benefit not only income from agricultural production, but also from exchange or using right of land use as special commodity (Nguyen Van Khanh, 2013)

⁹ Land use planning period is 10 years, period of land use plan at national, provincial level and land-use plan for national defense, security is 5 years; land use plan at district level is developed annually.

keep their investment for the allocated farmland area. Additionally, the land use flexibility is still constrained, particularly the land conversion to other crops in paddy areas that traditionally have grown rice.

In order to innovation of the land policy system, in 2013, the Land Law has been amended by the National Assembly. Accordingly, the right of land use of households and individuals is extended from 20 years to 50 years. The extension could be seen as incentives for individuals or entities to invest in agricultural sector in a long-term manner. For paddy land, the State supports infrastructure investment, science and modern technology applied in the paddy rice to increase yield and quality. Individuals or organizations who are allocated land for non-agricultural purposes from rice-cultivated land have to pay a sum of money to supplement land for rice cultivation or to increase the efficiency of rice land under the provisions of the Government. The Land Law in 2013 covers the size of farmland and the land use planning and plan, as follows:

- *Size of farmland*
 - Limits of annual crop land, aquaculture land or salt land allocated for each household or individual: 3 hectares and under for each type of land in the provinces and cities in the North Southeast region and in the Mekong River Delta, and 2 hectares and under in remaining provinces and cities;
 - Limits of perennial crop land per household: 10 hectares and under in the delta areas, and 30 hectares and under in the mid-land and mountainous region;
 - Limits of forest land per household: 30 hectares and under for protection forest land, production forest land;
 - Limit of aquaculture land and salt land per household: 3 hectares and under.
- *Land use planning and plan*
 - Planning system, land-use planning (planning, land use planning at national, provincial and district levels; National defense and security land use planning and plan);
 - Period of land use planning and plan (Land use planning period is 10 years; Period of land-use plan at national, provincial level and land-use plan for national defense, security is 05 years. Land use plan at district level is developed annually);
 - Principles of land use (comply with land-use planning and plan and land-use purposes; economization and efficiency, environmental protection and without prejudice to the legitimate interests of the surrounding land users, and land users exercise their rights, obligations within the land use term under the provisions of this Law and other provisions of the relevant legislation);
 - Land classification(used for agricultural purposes): (i) land for annual crops including paddy land and other annual crop land; (ii) perennial crop land; (iii) production forest land; (iv) protection forest land; (v) special use forestland; (vi) Aquaculture land; (vii) Land for salt production; and (viii) other farmland(land used to build green houses and academic purposes, research, experiments, etc.).

In brief, after the Resolution 10 and many changes in the Land Law, right of land use for each farmer household were limited to 3 hectare size. The land tenure continued to hinder the development of production on large scale. A significant amount of resources for agricultural production has been wasted due to land reallocation for industrialization. The imbalance between rural and urban public investment makes the income gap expanding. Limitation in the land redistribution right of farmers is among reasons for lower agricultural growth than potential (Tran Cong Thang et al. 2014).

3. Sustainable development

Since the Earth Summit on Environment and Development, Rio de Janeiro, Brazil in 1992, Viet Nam has been making progress in efforts towards achieving sustainable development with important gains shown in economic, social, and environmental sectors. Gains in economic development have created a sound basis for successful resolution of a variety of social issues, specifically in poverty reduction, education development, health care, achieving the Millennium Development Goals to constantly improve the quality of people's life (UN, 2012).

Sustainable development in Viet Nam has been endorsed by the leaders of the leading Party and serves as a Guideline for the State. The Resolution of the Ninth National Party Congress states *“Fast, efficient, and sustainable development and economic growth is consistent with the realization of social progress, equity, and environmental protection”*, and *“socio-economic development is closely combined with the protection and improvement of environmental resources, ensuring a harmony between the artificial environment and natural one, which maintain biodiversity”*.

In August 2004, **the Strategic orientation for sustainable development in Viet Nam** (called VN Agenda 21) has been approved by the Viet Nam's Government. This is a framework plan to realize the targets of national sustainable development in the 21st century. And then to manage the implementation of VN Agenda 21, **the VN Agenda 21 Office** was established by the Ministry of Planning and Investment in 2004, and **National Council for Sustainable Development** was set up by the Prime Minister in 2005. At the localities, local Agenda office also established for the implementation. In the VN Agenda 21, eight principles¹⁰ for sustainable development have been set up, and 19 priority areas¹¹ are focused. The Agenda emphasized that agriculture, forestry,

¹⁰ (1) Human beings are at the center of sustainable development; (2) Economic development is considered the central task of the next development periods; (3) Protection and improvement of environment quality are to be considered an inseparable factor of the development process; (4) The development process must satisfy the needs of present generations without causing obstacles for the life of future generations; (5) Science and technology are the foundations and momentum for the country's industrialization and rapid, strong and sustainable development; (6) Sustainable development is the cause of the whole Party, of governments at all levels, of ministries, sectors and localities, agencies, businesses, social organizations, communities and of the whole people; (7) Development of an independent and autonomous economy must be linked with international economic integration in order to ensure sustainable development of the country; (8) Socio-economic development and environmental protection should be closely tied with a guarantee of national defense and security as well as of social safety and order.

¹¹ **5 Priority economic areas:** (1) Maintaining rapid and sustainable economic growth rate; (2) Switching to environmentally-friendly production and consumption models; (3) Implementing the "clean industrialization" process; (4) Ensuring sustainable agricultural and rural development; (5) Ensuring sustainable development of regions and localities; **5 Priority social areas:** (6) Making focused efforts to eliminate hunger and reduce poverty, and furthering efforts to achieve social progress and equity; (7) Continuing to reduce population growth rate and creating jobs for the workforce; (8) Setting directions for urbanization and population resettlement with an aim to ensure sustainable development of urban areas and reasonable distribution of population and labor force for each region; (9) Improving education quality in order to raise the education level, professional skills and qualifications of the population and to meet the requirements for development of the country; (10) Developing healthcare services, improving working conditions and healthy living environments; **9 priority areas of natural resource and environment:** (11) Preventing soil degradation and using land resources in an efficient and sustainable manner; (12) Protecting water bodies and using water resources in a sustainable manner; (13) Ensuring rational exploitation and sustainable use of mineral resources; (14) Protecting marine, coastal and islands environments and developing marine resources; (15) Protecting and developing forests; (16) Reducing air pollution in urban and industrial zones; (17) Managing solid waste and hazardous

and fisheries have close relationships with ecological environment and have been participated by two-third of the national population, and gave major orientations of i) improvement of policy and legislation that relate to the exploitation and use of natural resources, ii) plan for the sustainable development of rural areas, iii) adjustment of the economic structure aiming at economic growth, employment creation, poverty reduction, and environmental protection, iv) application of an agricultural system that is suitable to the local ecological condition, and v) promotion of the application of agricultural modern technology and ecological agriculture.

Programs on agriculture and rural development towards sustainability in Viet Nam¹²

In order to contribute to the SD in Viet Nam, many programs have been deployed by the Government, as follows:

(1) Restructure of agricultural production and rural development towards sustainability:

- Formulate strategy for agriculture and rural development oriented to industrialization, modernization, sectorial and occupational diversification, and shift of rural economic structure;
- Formulate program to put technical and scientific advances into agriculture, especially seed variety program; formulate and expand model of commodity production for remote and difficult mountainous areas;
- Adjust, supplement, and update planning on agro-forestry and fishery for each economic zones and inter-zones towards sustainable orientation combined the production with the market, material zone with the processing industry;
- Formulate program on shifting agricultural and rural structure towards industrialization and promotion of potential of each region; develop agro-product production with high quality linking with domestic and international markets in order to improve efficiency of natural resource use (land, labor, and capital), increase income per unit of cultivated area and man-day, and improve living standard of the farmers.

(2) Formulate program on appropriate usage of resources of agriculture and rural:

- Formulate and implement program on increase productivity of land use, appropriate use of water resource; apply system of agricultural and forestry production and agro-forestry and fishery production suitable with the regional-ecological condition;
- Formulate program on boosting up technical and scientific advances into agriculture, especially bio-technology; and implement the program on improving crop varieties and animal breeding.

(3) Formulate and implement program on rural market development, increase capability of agro-product consumption combining with development of human resource serving for production development:

- Promote and development the linkage between channel of production and product circulation, create and stable market channels to maximize the benefit of stakeholders;
- Formulate program on development of occupational and service diversify, create non-agricultural jobs, increase labor time, and restructure rural labor resource.

waste; (18) Conserving biodiversity; (19) Adopting measures for mitigating climate change and limiting its negative impacts, preventing and combating natural disasters.

¹² Strategy for sustainable development in Viet Nam in period of 2011-2020 approved by the Prime Minister on 12 April 2012

For the land use, the improvement of land use right, planning and management, and programs on intensive farming and land cultivation is considered as one of priority fields such as increase the productivity of land eco-systems and consider sustainable agriculture production through promulgating policies on poverty reduction based on the view of climate change adaptation and biodiversity conservation; applying cultivation techniques in order to mitigate the use of fertilizer and chemical substances in agricultural production; enhancing scientific and technological research in combination with preservation of indigenous knowledge to prevent land degradation and improve degraded land, etc.

4. Food security in Viet Nam

Policies on food security in Viet Nam

(1) Resolution no. 26/NQ-TW on 5th August 2008 on agriculture, farmer, and rural stated that policy to ensure the national food security, management of agricultural resources, especially rice cultivation land, and new rural development;

(2) Conclusion no. 53 KL/TW on 8th August 2009 of the Political Ministry on project of national food security, determining the views and objectives of ensuring the national food security up to 2020 and the view of 2030;

(3) Resolution no. 63/NQ-CP on 23rd December 2009 on ensuring the national food security. The Resolution orients to fulfillment of synchronous policy system to ensure the national food security, of which it focused on policy of protecting rice cultivation land, policy of encouraging farmers, localities, and enterprises, which produce and do business of rice.

This policy supports the rice production and other agricultural production in order to assure the food security such as protecting 3.8 million hectares of rice land, of which wet rice land area of double crop will reach 3.2 million hectares, to yield 41-43 million tons of rice to be able to cover all demand for domestic consumption, and export of about 4 million ton of rice per year; increasing corn acreage to 1.3 million hectares with quantity up to 7.5 million tons; ensuring fruit trees planted area of 1.2 million hectares with yield of 12 million tons of fruit; 1.2 million hectares of vegetables to yield 20 million tons, producing 8 million tons livestock meat, etc. Additionally, it provides important measures to reduce production cost, increase incomes for rice farmers, and ensuring the profit from rice production of over 30% compared to the production cost.

(4) Decree no. 42/2012/NĐ-CP on 11th May 2012 on management and usage of rice cultivation land.

These policies become more and more important when the farmland affected by the market economy factors, pressures from the process of industrialization and urbanization which lead to conversion of farmland and rice land for other purposes.

Rice production and export in Viet Nam

Rice production has great impact on the people's life (64% of rural households and more than 94% of households involved in agricultura, forestry and fishery production). Since 1930, Viet Nam had exported more than 1 million ton of rice. From 1975 to 1988, Viet Nam fell into the

serious shortage of rice and had to import food. But after the farmers were allocated land for cultivation in 1988, the food production is increasing year by year and Viet Nam became one of the largest rice exporters in the world.

In 2006, total rice area of Viet Nam was 7,324.9 thousand hectares with production of 35,843.3 thousand tons these figures in 2013 was 7,899.4 thousand hectares and 44,076.1 thousand tons, respectively (see the table 2 - 6).

Table 2-6: Area, production and yield of rice production in period of 2006-2013

No.	Region	2006			2013		
		Area (1,000 ha)	Yield (tons/ha)	Production (1,000 tons)	Area (1,000 ha)	Yield (tons/ha)	Production (1,000 tons)
	The whole country	7,324.8	4.89	35,843.3	7,899.4	5.58	44,076.1
1	Red River Delta	1,171.2	5.74	6,722.7	1,130.7	5.92	6,698.0
2	Northern Mountainous Midland Area	661.0	4.39	2,901.8	688.8	4.76	3,275.8
3	North Central Area	683.6	5.10	3,486.4	696.5	5.17	3,601.4
4	South Central Coastal Area	523.3	4.71	2,464.7	533.7	5.62	2,999.3
5	The Central Highlands	206.5	4.26	879.7	231.5	5.02	1,162.8
6	Southeast Area	305.3	3.80	1,160.1	280.3	4.80	1,345.8
7	Mekong River Delta	3,773.9	48.3	18,227.9	4,337.9	5.76	24,993.0

Source: General Statistic Office

Since 1989, Viet Nam became the second rice exporter in the world. The rice production increased from 18,996 million tons in 1990 to 44,100 million tons in 2013. The average volume of rice export was more than 3 million tons in period of 1990 - 2005, and around 7.1 million tons in period of 2006 - 2013, especially over 8 million tons in 2012. Now, rice production in Viet Nam develops oriented to expansion of rice cultivation area with high quality and high value.

Table 2-7: Rice production and export in period of 1990-2013

Item	Unit	1990	1995	2000	2005	2010	2012	2013
Rice production	1,000 tons	18,996	26,143	34,539	35,833	39,989	43,662	44,100
Rice production compared with the world	%	-	-	-	26	28	29	-
Rice volume for export	1,000 tons	1,478	1,988	3,477	5,235	6,828	8,015	6,683
Export quota	Mil. USD	275.4	538.8	668	1,408.4	3,249.5	3,673	2,893
Rice export compared with one of the world	%	12	8,6	12,6	18	21	22	-

Source: General Statistic Office

Challenges for the national food security in Viet Nam

- (1) There exists rice shortage in some remote and mountainous areas due to:
 - Unreasonable food usage structure (rice is the main diet);
 - Difficulty in access to food of poor and vulnerable people, especially when natural disasters happen, food price increases or it is in between-crop period;
 - In-equal living standard between regions. Rate of population under poverty line is 6.7%, of which rate in rural area occupies 8.7%. Especially, the poverty rate of the ethnic minority groups is in high one of 52.3% with the highest food shortage rate of 29.2% (Phuong, 2014).
- (2) Farmland area, particularly rice cultivated area, is in decreasing tendency because of the demand on industrialization, modernization, and movement of production structure. In average, around 73.29 thousand hectares of farmland is converted to non-agricultural land annually in period of 2000-2005, of which 302.5 thousand hectares of rice land. It is estimated that it needs about 600 thousand hectares of farmland (about 270 thousand hectares of rice land) in 2009-2020, and 400-500 thousand hectares (55 thousand hectares of rice land) in 2020 - 2030 for non-agricultural purpose.
- (3) Low income of farmer household with high risks. Rate of households with average cultivated areas under 0.5 hectares accounts for 61.2%. As calculation from MARD (2009), the profit rate of rice production was 35-45% (depending on each crop), and the average income of farming household was around VND 2 million or VND 3 million/household/crop plus with the household labor (household labor accounting for 16.64% production cost). Meanwhile, the contribution and fee for production of farming households occupies from 2.5 to 5.2 % of their income with about 28 items. Additionally, the natural disasters and unusual weather caused drought, floods and storms, along with unsteady prices creates various difficulties for farmers, especially rice producers.
- (4) Low renovation in agricultural production and agricultural science does not meet demand of the production. In some mountainous areas, agricultural production is characterized self-sufficient with backward cultivation custom, shifting cultivation and living, low and unstable productivity. The agricultural products cannot compete with other countries because of the low quality. Majority of exported agro-products are pre-processed with low added value, no trade label.
- (5) High requirements of food quality and hygiene
- (6) Loss of post-harvest due to the poor system of processing, preservation and storage of food and agricultural products, e.g. loss of rice post-harvest is the Mekong River Delta of 13.7%, in Red River Delta and other regions of 11.6%, whilst one of ASEAN countries are 10% and Japan is 3.9-5.6%.
- (7) Process of international economic integration creates many opportunities for production development and meets various demands on food consumption but it also increases competitiveness pressure for domestic-produced commodities. Viet Nam has participated in WTO since 2007. According to the commitment, tax for about 500 agro-product items such as meat, vegetables, fruit, or processed agro-products, etc. will be reduced, whereas tax of 535 items such as living cattle, crop varieties, animal breeding, or raw agro-products) will increase.

- (8) Climate change (CC) affects reduction of land and water resources, impacting on the national food security. According to studies of the committee of inter-governments on the climate change of the United Nations and World Bank, Viet Nam is one of 5 countries who is affected seriously of the sea-water level rising due to the climate change. If the temperature rises by 2°C and sea-water level rises by one meter, in the next 100 years, about 1.5-2 million hectares of farmland in the Mekong River Delta (MRD) and 0.3-0.5 million hectares of farmland in the Red River Delta (RRD), which most of them are for rice cultivation, are unable to cultivate rice due to flooding or salinity. Additionally, the climate change also makes natural disasters and phenomenon of extreme climate (storm, flood, drought, etc.) increase, leading to native impact on food production and threatening of vulnerable and poor groups. Together with the impact of climate change, the fresh water will become scarcity, and about 8.4 million people in Viet Nam will be fallen into status of fresh water shortage in 2050. The sea-water level rising will be 30 cm in 2050 and more 70 cm in 2100, so that regular tide-inundated area would gain at level of 20% and about living place of 20 million people will be affected.

5. Climate change and its impact on farmland use in Viet Nam

Farmland plays a crucial role in the development process in Viet Nam. Over 68% of population now living in the rural areas, mostly consisting of poor and small-scale farmers involved in the rice production, depends much on agriculture. Though agricultural share in GDP is small portion of approximately 20%, agricultural sector is the key for the national poverty reduction and food security.

Farmland and its changes in land use patterns over time somehow contribute to the climate change mitigation and adaptation. In 2000, total emissions in Viet Nam were reported to equal 151 million tons of GHG in carbon dioxide equivalent (CO_{2e}), of which 53% was attributable to agriculture and land use change, of which over half in turn was accounted for by rice (MONRE, 2010). This number is relatively low in the global context, but it is expected to continue to grow rapidly and will likely triply by 2030 unless significant mitigation options are undertaken.

Viet Nam is considered to be the 13th high-risk country of 16 countries in the context of the climate change because of its delta structure and the long coastline that is sensitive to flooding and extreme weather events. This makes the rural households increasingly vulnerable in terms of poverty and food security.

Table 2-8: Impact of climate change in Viet Nam (2020-2100)

	2020	2060	2100
Annual average temperature change relative to 1980 - 99(°C)	0.4	1.4	2.3
Annual average rainfall change relative to 1980 - 99 (%)	1.2	3.7	5.8
Sea level rise (m)	12	37	75

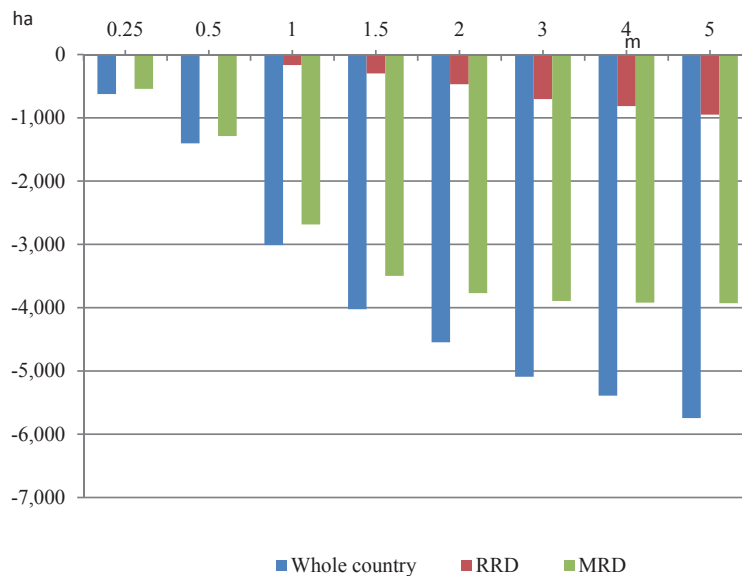
Source: MONRE, 2009

According to FAO (2011), in Viet Nam, the increase of temperature may make the winter crop patterns change in terms of growing season, seed and crop types. It also may increase the crop growth rate and shorten plant's growth cycle, and harmful pests such as rice-feeding ear-cutting caterpillars, black cutworms, fungi, etc. Additionally, water demand for agriculture may double or triple by 2100 compared to 2000. For the land use, due to rising sea level, arable land in Viet Nam will be significantly reduced, leading to reduction of agricultural production. As the initial assessment of the climate change (CC) impact on Viet Nam agriculture, total crop production may reduce 1 – 5%, and productivity of some main crops may drop 10%, especially rice crop. It is forecasted that in 2100, the rice production of Mekong River Delta (MRD) will reduce 7.6 million tons/year, accounting for more than 40% of total rice production of Viet Nam (Magazine on Trade and Fishery, 2013).

Scenarios of the climate change impact on farmland use

According to MONRE, 2009, the CC will make the sea level rise (SLR) and have a great impact on food crop areas. The **agricultural production inundated area** will increase together with grade of sea level rising. The MRD and Red River Delta (RRD), where the large rice bowl of Viet Nam, are impacted greatly. The largest inundated area in MRD of 542.84 thousand hectares with SLR of 0.05 meters and nearly 4 million hectares with SLR of 5 meters, accounting for more than 87% and 72% of total inundated area of the country; then these figures in RRD are 10.5 thousand hectares and 950.55 thousand hectares, respectively.

Figure 2-12: Agricultural production inundated areas in the scenario of sea level rising



Source: MONRE, 2012

Table 2-9: Agricultural production inundated areas in the scenario of sea-water level rising

	Sea level rising (m)							
	0.25	0.5	1.0	1.5	2.0	3.0	4.0	5.0
	Inundated area (1,000 ha)							
Whole country	623.71	1,403.44	3,011.66	4,024.24	4,547.91	5,090.82	5,390.90	5,744.78
NMMA	2.17	3.74	9.77	14.25	17.96	24.46	29.14	36.00
RRD	10.50	21.60	166.81	298.31	469.27	704.06	815.28	950.55
NCCA	37.86	49.01	79.78	118.24	164.84	282.06	379.06	517.72
SCCA	4.94	6.25	10.56	14.93	22.28	44.08	73.37	114.17
SA	25.40	35.52	59.19	80.23	102.91	142.86	173.05	197.02
MRD	542.84	1,287.32	2,685.55	3,498.28	3,770.65	3,893.30	3,921.00	3,929.32

Source: MONRE, 2009

For the rice cultivated land, the selected scenario states that up to 2020, the sea-water level rises 12 cm, inundating about 32,497 hectares of agricultural production land, of which rice cultivated area is 5,714 hectares. In 2030, these figures are 17 cm, 42,420 hectares, and 19,873 hectares, respectively.

Table 2-10: Inundated area up to 2030

Region	2020 (12cm)		2030 (17cm)	
	Inundated area (ha)	Inundated rice area (ha)	Inundated area (ha)	Inundated rice area (ha)
Whole country	32,497	5,714	42,420	19,873
NMMA	98	20	124	56
RRD	1,042	288	1,506	622
NCCA	3,757	838	5,429	2,184
SCCA	490	89	709	293
SA	2,520	579	3,642	1,565
MRD	24,590	3,900	31,010	15,152

Source: MONRE, 2012

The reduction of rice cultivated area in the future will lead to the reduction of rice production and other agricultural crops. Up to 2030, the rice production is forecasted to drop more than 2 million tons, and 3.6 million tons in 2050, accounting for 8.37% and 15.24% of total rice production of the country. Production of maize and soybean also drop to 18.71% in 2030 and 32.91% in 2050, and 14.38% and 9.03%, respectively.

Table 2-11: Impact of climate change on crop production and productivity

Criteria	Forecast up to 2030		Forecast up to 2050	
	Production (1,000 tons)	Rate (%)	Production (1,000 tons)	Rate (%)
1. Rice crop	-2,031.87	-8.37	-3,699.97	-15.24
1.1. Production reduced by natural disasters	-65.27	-0.18	- 65.27	-0.18
1.2. Production reduced by reduction of productivity potential	-1,966.6	-8.10	-3,634.7	-14.97
- Spring rice crop	-1,222.8	-7.93	-2,159.3	-14.01
- Summer-autumn rice crop	-743.8	-8.40	-1,475.4	-16.66
2. Maize	-500.4	-18.71	-880.4	- 32.91
3. Soybean crop	- 14.38	-3.51	-37.01	-9.03

Source: Research on the climate change impact, MARD, 2009

The Viet Nam's Government has demonstrated its commitment to combat the climate change by signing Decision 3119/QD-BNN-KHCN in December of 2011 on confirmation of the country's commitment to increase agricultural production by 20% and reduce emissions and poverty by 20% by 2020, and approving the Green Growth Strategy (GGS) in 2012 and the National Action Plan on GGS in 2014¹³.

¹³ Three strategic targets of the National Action Plan on Green Growth Strategy are i) reduction of the intensity of GHG emission and promotion of the use of clean energy and renewable energy, ii) greening of production, and iii) greening of lifestyle and promotion of sustainable consumption.

1. General information of Red River Delta

Geography

Red River Delta (RRD) is located in the North of Viet Nam, with geographic coordinate between 20°00' to 21°20' north latitude and 105°30' to 107°00' east longitude. It has borders with East Sea in the East, Hoa Binh and Phu Tho Provinces in the West, Thanh Hoa Province in the South, and Provinces of Tuyen Quang, Thai Nguyen, Bac Giang in the North.

The RRD is surrounded by hilly terrain by three sides from the North to the West and to the South. In the East, it is extended as the base of a triangle with a length of 130 km with large estuaries and closed bays.

Topography

The topography of the RRD is relatively diverse, dividing into 4 sub-regions (mountainous, midland, plain and coastal areas). Its topography is lower and lower from northwest to southeast. The average height is from 0.4m to 12m above sea level. The mountainous and midland sub-regions in the North, West, and South of the RRD include lime-stone mountains and low hills. This sub-region has high topography with good quality of soil for shifting animal breeding and crop cultivation. The plan and coastal sub-regions have relatively flat topography.

The area of the RRD is not large but has a lot of rivers with different flowing orientations. The large rivers flowing through the region have created different terrains. Annually, the river shorelines are consolidated increasingly. The river bottom with deposit of sand, gravels, and alluvial made the water level raise, affecting people's production and life activities.

Climate

The RRD has tropical monsoonal climate affected strongly by Northeast wind and Southeast wind with four distinguishing seasons (spring, summer, autumn, and winter). The region has average temperature of 23.5°C and average rainfall of 1,500 – 2,000 mm. In the rainy season, the rainfall accounts for more than 85% of total rainfall of whole year. The humidity of the region is different between months. The max average humidity is 92%, and min one is 80%. Generally, the large disparities of temperature, rainfall, and windy regime are characteristics of the climate in RRD.



Hydrography

The RRD has various river and lake systems. There are two main river systems of Red River and Thai Binh River in the RRD with river density from 1-1.3 km/km², creating a fertile delta and good for agricultural production. The Red River is the largest river in the North with a length of 200 km and annual average water volume of $1,220 \times 10^9 \text{ m}^3$. Thai Binh River includes three tributaries of Cau River, Thuong River and Luc Nam River. These are small rivers with less flowing discharge, low sediment deposition than the Red River.

Natural resources

For soil resource, RRD has total natural area of 2,105.9 thousand hectares with 8 main soil groups of arenosols, salic fluvisols, alluvial soils, gleysols and histosols, thionic fluvisols, yellow reddish soils, gleyic acrisols, and leptosols.

For water resource, RRD is rich in water resource of Red River System and Thai Binh River with great economic value. Besides it has the underground water, hot-spring water and mineral water sources. With the coastline length of 400 kilometers, the region has potential for development of economic sectors such as aquaculture, transportation, and tourism, etc.

For forest resource, RRD has 782.82 thousand hectares of forest, accounting for 37.15% of total natural area. There are 3 National Parks of Ba Vi, Cat Ba, and Cuc Phuong with a lot of rare plants and animals characterized of Viet Nam. The forest area is allocated unequally, majority in Ninh Binh, Ha Tay, Hai Duong, Hai Phong, Hung Yen and Quang Ninh.

For the mineral resource, this region is relatively diverse and abundant; including mineral used in energy production, metal, non-metals, and materials for construction.

Administrative units and population

RRD has 11 administrative units of Vinh Phuc, Ha Noi, Bac Ninh, Ha Nam, Hung Yen, Hai Duong, Hai Phong, Thai Binh, Nam Dinh, Ninh Binh and Quang Ninh. This region has 20.4 million people, accounting for 22.8% of total country population. The RRD has the highest density of 961 people/km² compared with other regions in Viet Nam. The below table shows that population lives concentratedly in big cities such as Ha Noi and Ha Phong. Quang Ninh Province has the largest natural area, but the population density is lowest in the region 194 people/km².

Table 3-1: Area, population and its density of Red River Delta in 2013

	Area (Km ²)	Population (1,000 people)	Population density (people/km ²)
Red River Delta	21,059.3	20,439.4	971
Ha Noi	3,324.3	6,936.9	2,087
Vinh Phuc	1,238.6	1,029.4	831
Bac Ninh	822.7	1,114.0	1,354
Quang Ninh	6,102.4	1,185.2	194
Hai Duong	1,656.0	1,747.5	1,055
Hai Phong	1,527.4	1,925.2	1,260
Hung Yen	926	1,151.6	1,244
Thai Binh	1,570.5	1,788.4	1,139
Ha Nam	860.5	794.3	923
Nam Dinh	1,652.8	1,839.9	1,113
Ninh Binh	1,378.1	927.0	673

Source: GSO 2013

2. Agriculture and land use of the Red River Delta

2.1. Agricultural production in the Red River Delta

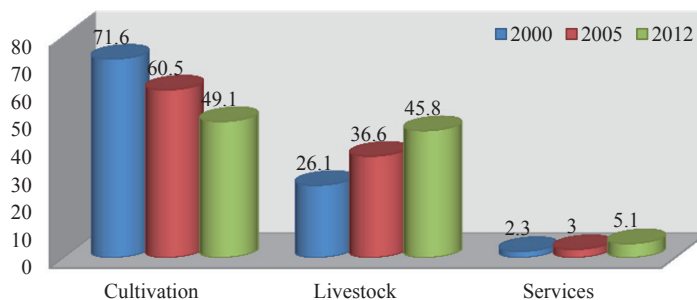
Agriculture of the RRD plays a very important role in economic development of the region, as well as of Viet Nam such as food supply, labor providing with high quality, creating environment for sustainable development of urban zones and industrial zones, etc. The RRD is located in good place for commodity exchange, agro-product consumption, and acquiring advanced technologies and techniques.

Agricultural production in the RRD developed relatively comprehensive with average growth speed of 5.7%/year in period of 2000-2010 and 4.41%/year in period of 2011-2012. In many years, the agricultural production still occupies proportion over 86% in agricultural sector. However,

there is change of structure of agricultural production. Value structure of cultivation reduced from 71.6% in 2000 to 49.1% in 2012, and one of livestock increased from 26.1% in 2000 to 45.8% in 2012. It means that livestock now becomes gradually the main production sector of agricultural production.

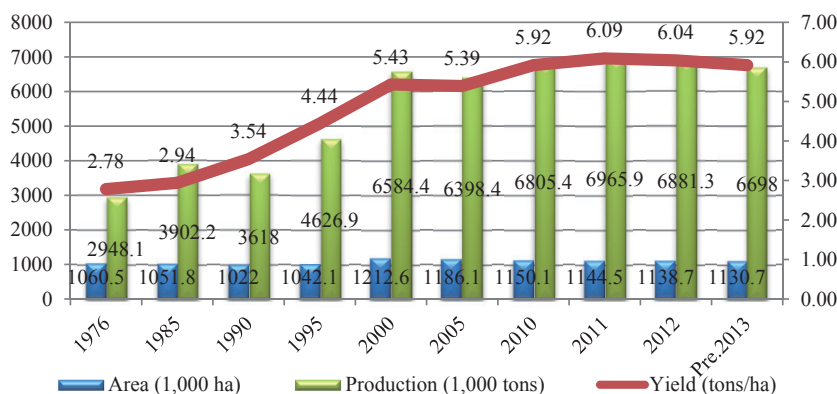
Figure 3-1: Change of structure in agricultural production

Source: GSO, 2012



The RRD is considered as one of two largest bowls of rice production in Viet Nam. The rice cultivated area does not change much from 1976 to 2013 of around 1 million hectare. Though the rice cultivating area is small compared with other crops in the region, but the most provinces in RRD has high intensive farming qualification, so that the average rice productivity has been improving and the rice production increased from 2.9 million tons in 1976 to about 6.7 million tons in 2013. These changes led to the increase of food consumption per capita per year from 255.3 kg in 1985 to 347.6 kg in 2013 in RRD. However, it was still lower two or three times compared with MRD (1,442.8 kg in 2013).

Table 3-2: Rice production in Red River Delta by years



Source: GSO, MARD, Truong Thi Tien. 1998. Renovation of structure on agricultural management in Viet Nam

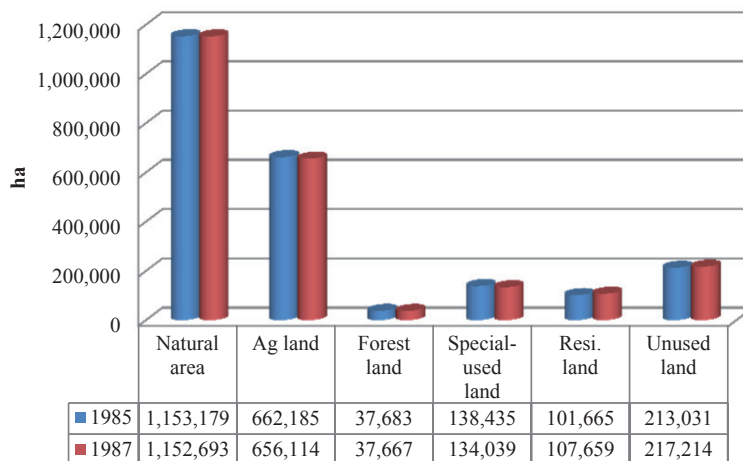
2.2. Farmland use in the Red River Delta

Agricultural production land use before Khoan 10 (1988)

As mention at the first part, since 1958, the whole North of Viet Nam was collectivized and under the management of agricultural cooperatives (AC). In 1980, total farmland in the North managed by the AC was 2,239,776 hectares, with average cultivated area per AC was 202 hectares, of which this number in RRD was 729,640 hectares and 340 hectares/AC, respectively (Khanh, 2012).

Until middle of 1980, though the *Khoan 100* has been implemented but there was no change substantially compared with the previous period. The land for agricultural cultivation decreased from 662,185 hectares in 1985 to 656,114 in 1987¹⁴. Compared with the other regions, the RRD has the lowest average size of farmland use of 3.488m²/household, in the MRD this number is 12.374m²/household (Truong Thi Tien. 1998)¹⁵. Most farmland was under control of the cooperatives, resulting to no positive change in agricultural development.

Figure 3-2: Situation of land use before Khoan 100 in Red River Delta



Source: GSO and General Office of Land Administration, 1985, 1987

This above figure showed that the cultivated area reduced 6,071 hectares within 2 years. Compared with other regions of the country, the RRD had the lowest average cultivated land per capita. In 1985, the average cultivated per farm household was 3,488 m², 360 m² lower than one in the MRD. The average cultivated per capita and per agricultural labor of RRD was also low compared with other regions.

¹⁴ Land use situation in 1985, 1987 of General Statistic Office

¹⁵ Truong Thi Tien. 1998. Renew mechanism of agricultural management in Viet Nam published by the National Politic Publishing House, page 8.

Table 3-3: Average cultivated area in RRD and MRD in 1985

	Average agricultural area per household (m2)	Average agricultural area per capita (m2)	Average agricultural area per labor (m2)
Whole country	8,325	1,678	4,390
Red River Delta	3,488	860	2,494
Mekong River Delta	12,374	2,190	5,014

Source: Truong Thi Tien. 1998. *Renovation of structure on agricultural management in Viet Nam*

In brief, before 1988, area, structure and farmland relationship in RRD did not change much; farmland still was under the management of AC, so that the agriculture in RRD did not develop well.

Agricultural production land use after Khoan 10

After 1986, under the policy on land reform of the State, farm households were allocated farmland for cultivation, so that the structure and area of land types in RRD had changed. It seems that the agricultural production land was increasing gradually from 653.23 thousand hectares in 1990 to 842.64 thousand hectares in 2000. The main reason was thanks to the implementation of policy on land reclamation of provinces in RRD. Nevertheless, due to the industrialization and urbanization in this area, the agricultural production area reduced from 71.78 thousand hectares from 2000 to 2012.

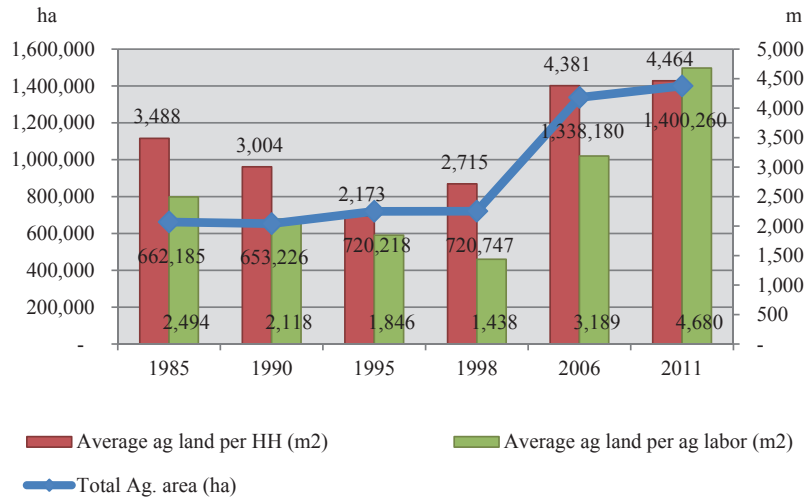
Table 3-4: Situation of farmland use after Khoan 10

Unit: 1,000 ha

Year	2000	2006	2010	2011	2012
Farmland	1263.59	1338.18	1406.39	1400.26	1397.1
Land for agricultural production	842.62	810.52	779.77	775.17	770.84
Land for annual crop	777.69	721.7	689.94	684.81	680.71
<i>Paddy land</i>	<i>663.83</i>	<i>653.24</i>	<i>619.22</i>	<i>615.35</i>	<i>610.99</i>
Land for perennial crop	25.25	88.83	89.83	90.35	90.12
Land for forest	347.78	430.06	519.22	518.53	498.94
Land for aquaculture	13.11	94.67	101.97	101.89	102.45
Land for making salt		1.38	1.27	1.27	1.22
Others farmland		1.41	3.16	3.4	3.49

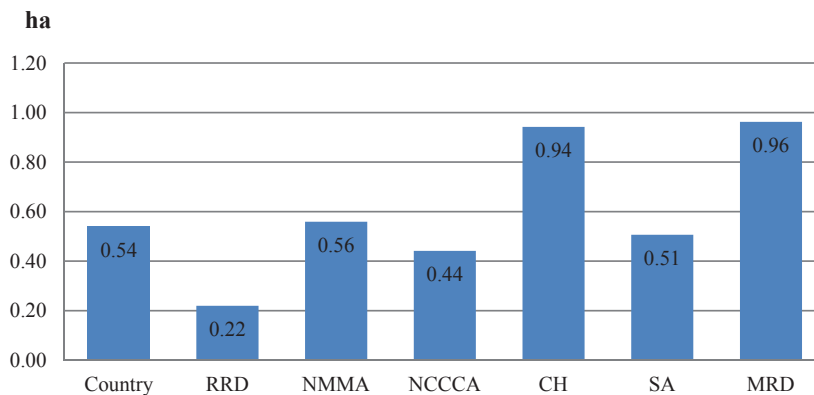
Source: GSO by years

The farmland in the RRD increased from 662,185 hectares in 1985 to 1,397,200 hectares in 2012 because in 2006, Quang Ninh Province was merged into the RRD. The average farmland per household and average farmland per agricultural labor is fluctuated in period from 1985 to 2011 because of the increase of population and reduction of agricultural labor in the rural areas.

Figure 3-3: Farmland use in the Red River Delta after Khoan 10

Source: General Statistics Office by years

According to GSO, 2011, average area of agricultural production land of one household in RRD was the lowest one of 0.22 hectare compared with other regions as in MRD by 0.96 hectare, and in Central Highlands by 0.94 hectare. And it also has the highest rate of household number cultivated in plot less than 0.2 hectare (59.51%) and the lowest rate of household number cultivated in plot over 2 hectares (0.08%) (see figure 3 - 4).

Figure 3-4: Average area of agricultural production land per household in 2011

Source: Survey on Rural, Agriculture and Fishery by GSO 2011

This figure is not different so much between the regions within RRD. Quang Ninh province has the highest number of 0.32 hectares/household, and then Ninh Binh of 0.3 hectares/household. Ha Noi is the capital of Viet Nam and has the biggest population, so that rate of farm household cultivating area under 0.2 hectares is also the highest one in the region.

Table 3-5: Situation of agricultural production land use of provinces in RRD in 2011

Regions	Area of ag. production land (1,000 ha)	No. of HH using Ag. land (hh)	Average ag. prod. land area per hh (ha/hh)	Average size used by farm households (%)			
				< 0.2ha	0.2ha ~ < 0.5ha	0.5ha ~ < 2ha	> = 2ha
RRD	689.94	3,136,734	0.22	59.51	37.23	3.18	0.08
Ha Noi	136.25	674,237	0.20	67.87	29.24	2.83	0.06
Vinh Phuc	41.58	188,274	0.22	55.96	40.07	3.92	0.05
Bac Ninh	42.5	177,786	0.24	63.12	34.35	2.50	0.03
Quang Ninh	35.66	109,881	0.32	43.20	44.95	11.57	0.28
Hai Duong	69.97	343,360	0.20	56.94	40.40	2.62	0.04
Hai Phong	47.12	236,967	0.20	64.96	33.39	1.62	0.03
Hung Yen	47.62	223,320	0.21	59.10	38.01	2.85	0.04
Thai Binh	90.17	427,628	0.21	58.79	40.21	0.99	0.01
Ha Nam	40.21	174,686	0.23	56.27	39.93	3.74	0.06
Nam Dinh	85.64	402,354	0.21	57.47	39.84	2.65	0.04
Ninh Binh	53.22	178,241	0.30	45.87	44.98	8.80	0.35

Source: Survey on Rural, Agriculture and Fishery by GSO 2011

These above figures also mean that the farmland fragmentation is very popular in this region. This is a challenge for the agricultural production of the RRD because land fragmentation can lead to increase of agricultural inputs such as production cost, labor-intensive use, or difficulties in access to the farmland, irrigation, and mechanization, etc.

3. Issues of farmland use

As mentioned at the first part, RRD is located in the North of Viet Nam and it was affected much by the land allocation policy of the North Government. Thus, the most issues of farmland use are land fragmentation and land reduction for conversion of constructing industrial and urban zones. And this part will focus only on these two main issues.

3.1. Land fragmentation

The analysis in the first part showed that land fragmentation is as the result of some reasons but most by policy on average land allocation for each household (Resolution 10). The RRD is located in the North and its agricultural production land is impacted seriously by the Resolution 10. According to the General Office of Land Administration (1997), the RRD is at the second

rank on large land fragmentation of 7-10 plots/households with average area of 317 m², especially some households cultivated in 25 plots such as in Tram Long Commune, Ung Hoa District, Ha Tay Province (now called Ha Noi), on average each household has to cultivate in 22 plots in different fields (Khanh, 2012). Additionally, the cultivated area of each plot is also small. e.g. some localities in Bac Ninh, the area of cultivated plot were not over 210 m² (Quynh, 1993). Area for rice cultivated area is 300 - 400 m and for vegetable or annual crops is event smaller a half. With such small cultivated area, somehow it surely obstructed the process of shifting from self-sufficient agricultural production to commodity-oriented one.

Table 3-6: Land fragmentation in RRD compared with other economic regions in Viet Nam in 1997

Areas	Total plot/household		Average area/plot (m ²)	
	Average	Special	Land for rice cultivation	Land for vegetable grow
Northern midlands and mountainous areas	10-20	150	150 – 300	100 - 150
Red River Delta	7-10	25	300 – 400	100 - 150
North central and coastal areas	7-10	25	300 – 500	200 - 300
South central and coastal areas	5-10	30	300 – 1,000	200 – 1,000
Central Highlands	5	25	200 – 500	1,000 – 5,000
Southeast areas	4	15	1,000 – 3,000	1,000 – 5,000
Mekong River Delta	3	10	3,000 – 5,000	500 – 1,000

Source: General Office of Land Administration. 1997

The land fragmentation is different between provinces in the RRD. According to NIAPP (2002), average plot number used by households is the lowest in Nam Dinh Province by 5.7 plots, and the highest in Hai Duong Province by 11 plots. The smallest plot is in Ninh Binh by 5m², while the largest plot is in Vinh Phuc Province by 5,868 m².

Table 3-7: Grade of land fragmentation of provinces in RRD

Province	Total plot/household			Average area per plot (m ²)		
	Fewest	Most	Average	Smallest	Largest	Average
Ha Tay			9.5	20	700	216.8
Hai Phong	5	18	7	20		
Hai Duong	9	17	11	10		
Vinh Phuc	7	47	9	10	5,868	228
Nam Dinh	3.1	19	5.7	10	1,000	288
Ha Nam	7	37	8.2	14	1,265	
Ninh Binh	3.3	24	8	5	4,224	

Source: NIAPP, 2002

Negative impacts of land fragmentation on agricultural production in RRD

Land fragmentation can have some negative impacts on agricultural production. Firstly, it limits the ability of mechanization in agriculture. Labor cost is reduced only when moving from the manual labor to machine using, so that the size of cultivated plot should be large enough to use machines. The mechanization in agriculture in RRD is mainly for rice cultivation such as land tillage, rice plucking, threshing or husking, rice transportation, etc. According to GSO (2009), there were 152,563 rice threshers in RRD, accounting for 25.97% of total ones of the country. In some provinces like Hai Duong, Hung Yen, Nam Dinh, some farmers use the in-line harvesting machines but most popular in RRD is sickle usage for harvesting because of the small and narrow plots, instead of using the harvesting-threshing machines like in MRD. The National Center of Agricultural Extension states that the whole country has 15,000 harvesting-threshing machines with high capacity and good quality but most of them used in the MRD.

Secondly, the fragmented and scattered land does not encourage farm household invest their capital or material for intensive farming or shifting crop structure oriented to crop diversification, especially limitation of applying advanced techniques in their field. Toan (2003) stated that the investment of farm household for small area is often lower because of unremarkable efficiency than one with larger plot.

Thirdly, land fragmentation makes man-day increase because the farm households have to spend much time for moving from this field to other field or transfer inputs and products from different fields to their house hence it surely increases the production cost per unit. Study of Dao The Anh (2004) stated that one household in Van Giang district, Hung Yen province, has 9 plots with total distance from his house to his fields of 6 kilometers and total distance between plots of 2,083 meters. so he has to go 137 kilometers for 17 times for one crop, excluding the time for transporting fertilizer and products.

Fourthly, farmland is reduced partly because of the land fragmentation. Due to making the boundary between plots of households, about 2.4-4% of total agricultural production land area in RRD, as well (Toan. 2003). If this situation is overcome, the agricultural production land in RRD may increase remarkably. In case of Hung Yen province, after implementing the land consolidation, the agricultural production area increased remarkably from 89,000 hectares to 92,309 hectares thanks to the clearance of field boundary.

Finally, land fragmentation obstructs planning on transportation, irrigation or infrastructure serving for agricultural production, as well as cause difficulties and cost in land management.

Land consolidation

After the implementation of Decree 64, many provinces in the RRD have mobilized the farm household to exchange their farmland each other. However, this process is taking place very slowly in the RRD with small scale and different process in each province of the RRD. After implementation of land consolidation, the average number of agricultural plot had reduced from 8.5 to 4.9 plots/household. And the average area/plot had increased from 294.1 m² to 579 m² in 2002¹⁶. However, the land consolidation in the RRD does not connect with reallocation of rural labor closely. Main labors of households, who owns land-area-limitation farm, are their family

¹⁶ Department of Agriculture and Rural Development of Provinces in the RRD, 2002

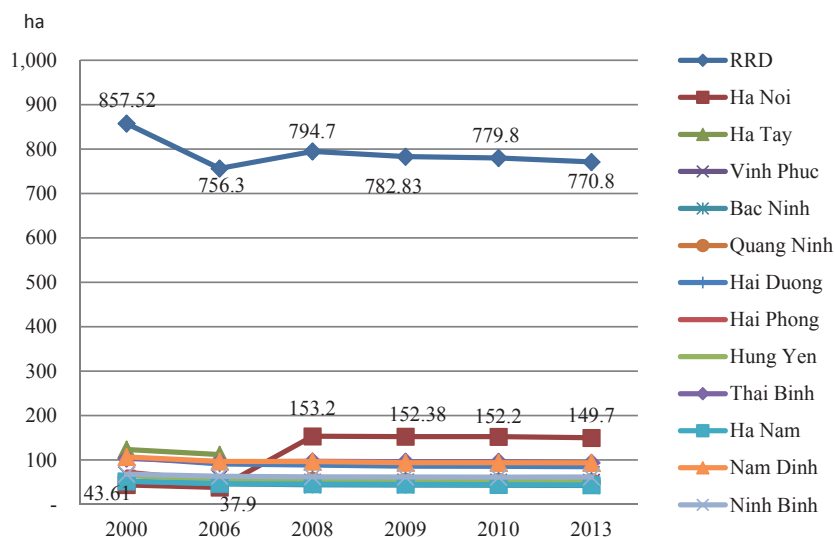
members or seasonal hired labor. Hence, it does not encourage large-scale production or investment in agriculture of the farmers.

3.2. Farmland reduction for conversion to other purposes

Farmland conversion reflects the change in land use system and relates closely to the land tenure and policies. According to Leblond (2008), this process happens as the results of socio-economic and political changes in the last centuries. As the result the decrease of farmland somehow affects food security of the regions, where the farmland conversion takes place.

In the RRD, agricultural production land is reduced sharply because of conversion of farmland for developing industrial and urban zones such as industrial zone along the side of highway no. 5A of Hai Duong, Hung Yen, Noi Bai, etc. Especially, the reduction of farmland is taking place strongly in Ha Noi due to expansion of new urban zone such as Bac Linh Dam, Dinh Cong, My Dinh, etc. Most converted agricultural production land is fertile land with favorite infrastructure for cultivation and high population density such as in Hai Duong, Hung Yen, Bac Ninh, Thai Binh, Vinh Phuc and Ha Noi. According to MARD in period from 2001-2005, rate of farmland conversion to non-agricultural purpose in RRD accounts for 4.4% of total converted farmland of the whole country.

This below figure shows the tendency of reducing agricultural production land of provinces in RRD. For the whole region, in period 2000-2006, the agricultural production land reduced more than 100 thousand hectares, of which Hai Phong had the largest reduced farmland by 20.3 thousand hectares, Hai Duong by 14.8 thousand hectares, Ha Tay by 11.6 thousand hectares, and Nam Dinh by 10.1 thousand hectares. In 2006, there is some change in regional structure. Quang Ninh Province was merged into RRD, and in 2008 Ha Tay Province was merged into Ha Noi, so that the farmland of these regions increased. From period 2008-2013, the continuous reduction of agricultural production land, especially in Hai Duong, Thai Binh, Ha Noi, and Quang Ninh. it means that process of conversion to non-agricultural purposes in this region is taking place. E.g. in Ha Noi, according to its land use plan for 2000 – 2010, 11,000 hectares of land-mostly annual crop land would be taken for 1,736 projects related to industrial and urban development (V.S. Nguyen. 2009). This farmland conversion would cause the loss of agricultural jobs of 150,000 farmers. Moreover, thousands of households have been anxious about a new plan for massive farmland acquisition for the expansion of Ha Noi to both banks of the Red River by 2020. This plan will induce about 12.000 households to relocate and nearly 6.700 farm households to be removed (Hoang. 2009). If one hectare of agricultural production land is converted to industrial zone, it would affect the livelihood at least 12-15 rural people (Magazine of Finance. 2012), and cause joblessness of 15.3 farmers (T. Nghi, 2009).

Figure 3-5: Farmland reduction in period 2000-2013

Source: MONRE by years

4. Climate change and its impact on agricultural production and farmland in RRD

Impact of CC on agricultural production in the RRD

The scenario B2 of MONRE (2012) states the change of temperature and rainfall caused by the CC, as follows:

- Increase of average temperature from 0.5 – 0.8°C in period of 2020 – 2030 will make the weather warmer and affect structure of crop season and cultivating area;
- The rainfall will increase from 0.4 – 4.4 %, especially in summer - autumn crop, but it reduces in the winter-spring crop from 0.4 – 0.9 % in period of 2020 – 2030, and 0.6 – 3.1% and 1.4 – 12.7% in 2100, respectively.
- On year-round average, dry indicator may be from 0.6 – 0.8 annually, especially in December, January and February, it is expected over 2.0, narrowing the cultivating area and reducing crop yield, unless water supplement measure is paid into attention.

According to the calculation of National Institute of Irrigation, heavy rain over 200 mm will cause inundated large area of hollow lander and affect to yield and production of rice winter crop, as follows:

- With rainfall from 100 – 200 mm, the inundated areas in provinces of the RRD will be about 140 – 145 thousand hectares;
- With rainfall from 200 – 300 mm, the inundated areas in provinces of the RRD will be about 260 – 270 thousand hectares;

- With rainfall over 300 mm, the inundated areas in provinces of the RRD will be about 370 – 380 thousand hectares;

So that if the rice winter crop is grown earlier than as usual, there would be less damages caused by floods and storms.

Impact of CC on irrigation

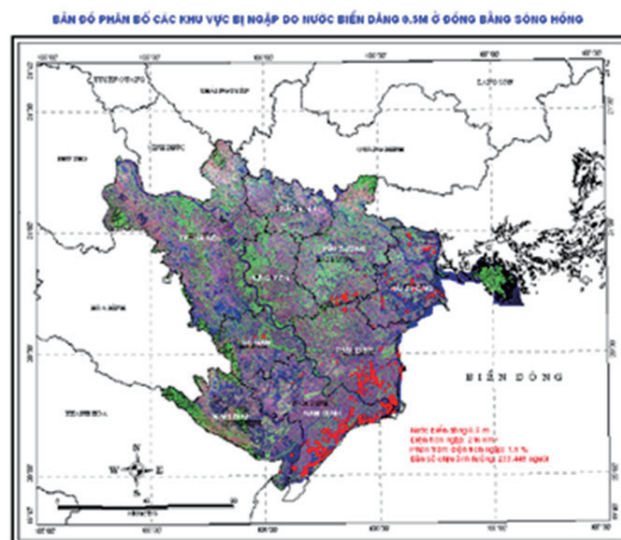
The CC makes the rainfall in the drainage season increase, leading to the increase of main water discharge in the canal due to the discharge from the upstream and drainage-needed discharge. Additionally, the change of social and economic conditions, urbanization process, and change of land use structure in tendency of increasing demand on drainage both in quantity and quality may somehow narrow area of flooded water adjusting area, and affect drainage works. In other hand, sea level rising may limit ability of the drainage to the sea through river estuaries and makes water level in river systems increase.

The study of National Institute of Irrigation shows that the CC may affect the drainage coefficient of irrigation works. In 2010, the drainage coefficient is from $6.48 \div 8.91$ l/s/ha; and it is expected to increase from $6.81 \div 9.09$ l/s/ha in 2020, $7.21 \div 10.00$ l/s/ha in 2030, and $9.38 \div 11.40$ l/s/ha in 2050.

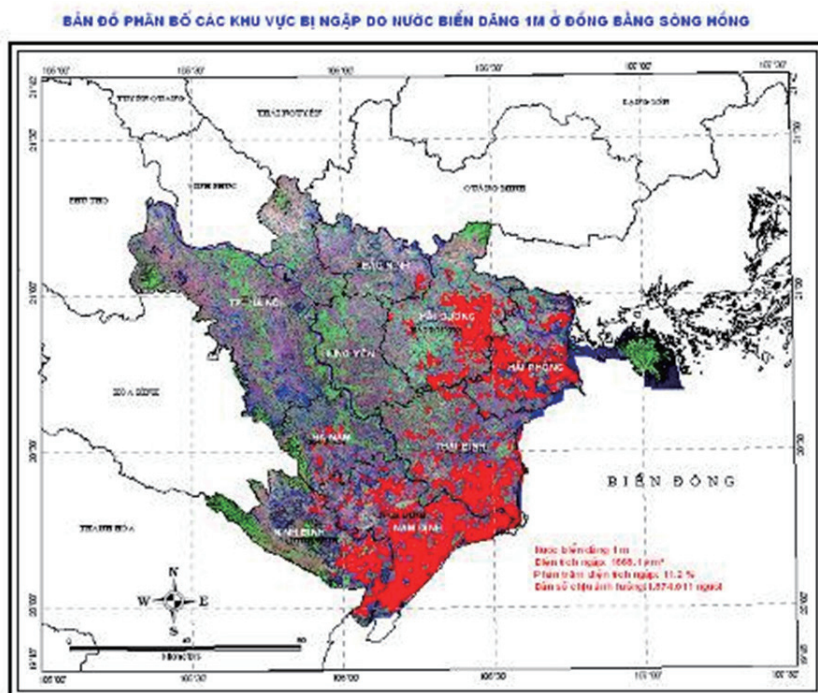
Impact of CC on farmland in the RRD

According to the B2 selected scenarios of MONRE on CC, it shows that farmland use will be affected by the sea level rising and salinity. The forecast says that the sea level rising at the end of 21st century will cause flooding and sea-water intrusion, affecting to socio-economic development and agricultural production of the RRD.

Figure 3-6: Map on distributing inundated areas cause by sea level rising 0.5 mm in RRD



Source: MONRE, 2012

Figure 3-7: Map on distributing inundated areas caused by sea level rising (SLR) 1m in RRD

Source: MONRE, 2012

Forecast of inundated area of the RRD equivalent with the SLR of B2 selected scenarios is as follows:

- With SLR of 0.25 m, the inundated area will be 10.5 thousand hectares
- With SLR of 0.50 m, the inundated area will be 21.6 thousand hectares
- With SLR of 1.0 m, the inundated area will be 166.8 thousand hectares
- With SLR of 1.50 m, the inundated area will be 298.3 thousand hectares
- With SLR of 2.0 m, the inundated area will be 469.3 thousand hectares

Table 3-8: Inundated rice area caused by SLR in the RRD

Unit: Ha

Items	In 2020 (12cm)		In 2030 (17cm)	
	Inundated area	Inundated rice area	Inundated area	Inundated rice area
Whole country	32,497	5,720	42,420	19,875
Red River Delta	1,042	290	1,506	620
1. Hai Phong	414	120	598	240
2. Thai Binh	140	40	203	80
3. Nam Dinh	346	90	500	210
4. Ninh Binh	142	40	205	90

Source: MONRE, 2012

Because majority of paddy land is in deeper inland, so in 2020, when the SLR of 12 cm, the whole RRD has 1,402 hectares of inundated area, of which 209 hectares of paddy land, and in 2030, this figure will be 1,506 hectares, and 620 hectares of paddy land, respectively.

The level of sea-water intrusion into the inland is shown in the table 3-9:

Table 3-9: Length of average sea-water intrusion in the river system in different cases of SLR in RRD

River	Distance of sea-water intrusion calculated from the sea estuary (km)				
	Scenarios of status	Scenarios of SLR			
		15cm	30cm	50cm	75cm
Day	15.2	18.0	39.4	43.2	48.8
Ninh Co	22.8	24.3	25.6	26.1	33.4
Hong	21.9	22.7	23.2	23.5	25.3
Tra Ly	16.5	17.9	19.1	22.6	25.2
Thai Binh	16.2	17.5	18.1	19.8	22.1
Van Uc	18.4	19.5		The whole length	
Lach Tray- Lai Vu	11.4	13.1	14.5	17.2	46.4
Cam-Kinh Thay	16.8	17.7	18.7	19.6	20.5
Kinh Mon	10.9	13.1	14.8	16.3	24.8
Da Bach	20,0	The whole length			

Source: MONRE, 2012

Up to 2050, due to CC and SLR the salinity will intrude about 3 km inland in the Red River and about 4 km in the Tra Ly River. As the above table, in 2030, the saline intrusion takes place equally in all rivers, with average annual intrusion is 40 meter. But after 2030, it has big change. Average annual intrusion of salinity is shown in the Thai Binh River system 20 m/year and 150 m/year by salinity boundary of 1‰ and 4‰, and in the Red River system is 120 m/year and 85m/year, respectively.

Table 3-10: Inundated area by provinces caused by sea-water intrusion with different levels, equivalent to the scenario B2

Unit: ha

Province	2030		2050		2100	
	1%	4%	1%	4%	1%	4%
Total	282,611	231,268	292,030	242,984	324,325	267,124
Nam Dinh	74,690	67,520	77,200	69,880	80,830	74,900
Thai Binh	72,860	55,190	75,620	57,610	78,670	60,840
Ninh Binh	25,860	17,970	27,750	20,520	32,850	28,790
Hai Phong	103,200	88,720	102,900	92,710	114,200	99,780
Hai Duong	6,001	1,868	8,560	2,264	17,775	2,814

Source: MONRE, 2012

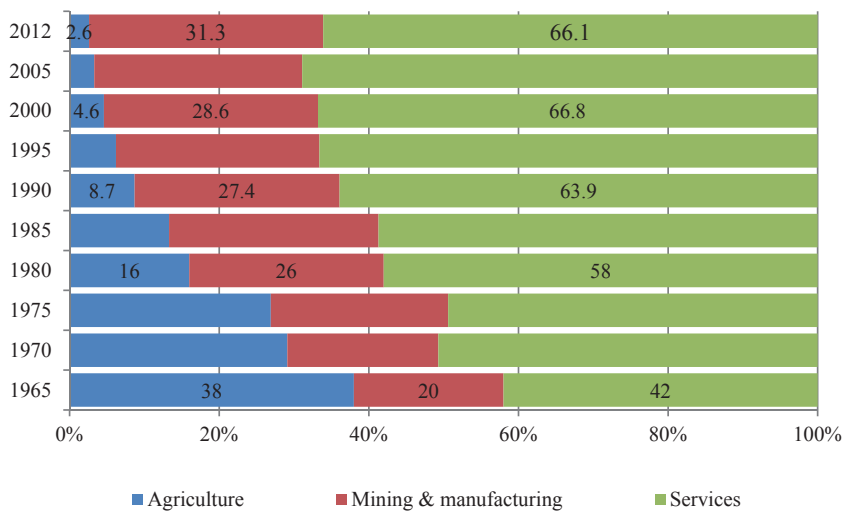
1. Agriculture in Korea

Korea is situated on the Korean Peninsula at the eastern end of the Asian continent, locating at $33^{\circ}\text{TM}\sim 43^{\circ}\text{TM}$ latitude and $124^{\circ}\text{TM}\sim 132^{\circ}\text{TM}$ longitude. In the early 20th century, Korean Peninsula had gone through colonial rule by imperialist Japan. After the World War II, the Korean Peninsula divided into 2 parts of North and South by the military stationing of the Soviet Union and United States.

The total of Korean Peninsula is 223,348 km², of which South Korea is 100,188 km². Korea has a temperate climate with four distinguishing seasons. The average annual temperature ranges from 6°C to 16°C. The annual amount of precipitation is 1,500 mm in the southern region and 1,300 mm in the central region. The humidity nationwide is from 80% to 90%, and the highest one in July.

Total population of South Korea is 50.22 million in 2013 with life expectancy of 81.2 years old. The Korea's GDP achieved USD 1,129 billion, and GNI per capita is USD 22,708 in 2012 (Seunghye Han, 2014). Korea had experienced changes in industrial structure two or five times quicker than those of advanced countries (KREI, 2010). Its industrial structure took place over 30 years whereas Great Britain by 120 years, United States by 95 years, Japan by 75 years.

Figure 4-1: Changes in industrial structure over time



Source: Seunghye Han, 2014. *Economic Dynamism and shared growth: Lessons from Korea's experience*. Lecture for KAPEX – Academic Visiting Program in 2014.

Agriculture in Korea plays very important roles in its economy as it i) produces and supplies food, ii) contributes to the development of other industries, iii) preserves the natural environment and the national territory, iv) promotes the preservation of genetic resources, and v) promotes economic and social stability. In 1965, the agricultural GDP accounted for 38% of total Korean GDP but it decreased quickly to 2.6% in 2012, whereas agricultural employment share fell from 52.4% in 1970 to 8.1% in 2010.

In 2012, total farm households was 1,151 thousand with total farm population of 2,912 thousand people. The farm population has rapidly declined from 44.7% in 1970 to 6.4% in 2010 as industrialization has proceeded and many young people left rural area to find job in urban areas. Therefore, the average cultivated area per household increased from 0.9 hectares in 1970 to 1.5 hectares in 2010.

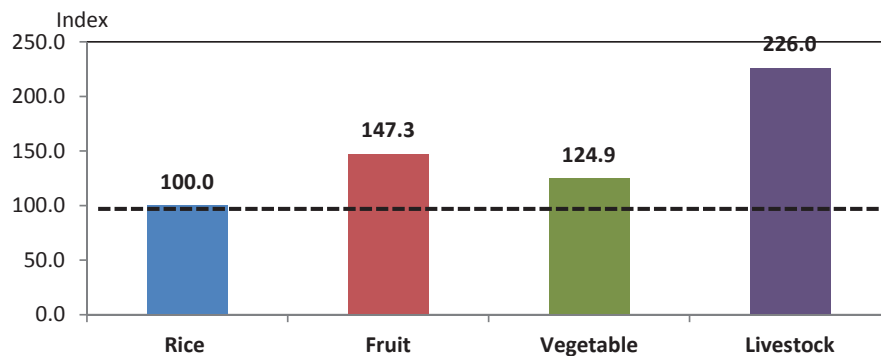
Table 4-1: Agricultural employment, farm population and farmland

	Share of Agricultural Employment (%)	Share of Farm Population (%)	Ave. Size of Farm HH (persons)	Farmland	
				Total (mil.ha)	Per Farm HH (ha)
1970	52.4	44.7	5.8	2.3	0.9
1980	37.3	28.4	5.0	2.2	1.0
1990	19.1	15.5	3.8	2.1	1.2
2000	11.8	8.6	2.9	1.9	1.4
2010	8.1	6.4	2.6	1.5	1.5

Source: Seunghee Han. 2014. *Economic Dynamism and shared growth: Lessons from Korea's experience. Lecture for KAPEX – Academic Visiting Program in 2014.*

Rice is the staple grain and dominant farming in Korea, so the agricultural policy focused much on rice cultivation, and farmland policies concentrated on rice farming, as well. Rice accounts for 42% of farming income, 51% of farmland, and 62.9% of total farm households (JoonKee Park, 2014). However, compared with other sources such as fruit, vegetable, and livestock, income from rice farming is the lowest one.

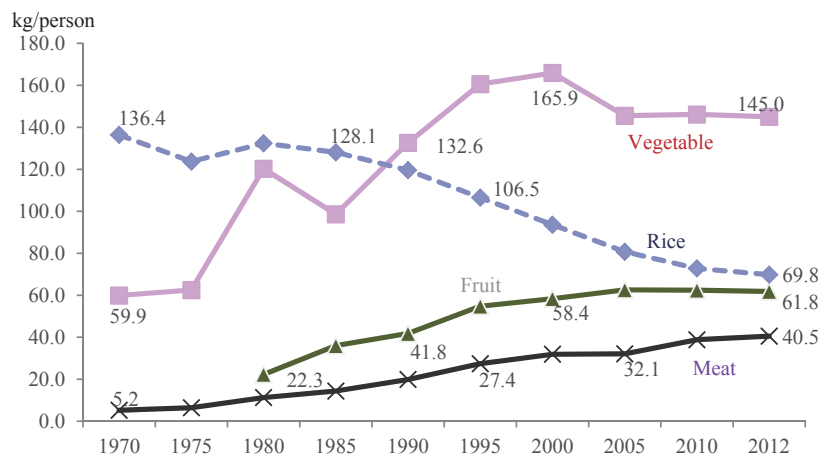
Figure 4-2: Comparison of farm income in 2013



Source: JoonKee Park. 2014. *The change of agricultural structure in Korea. Lecture for KAPEX – Academic Visiting Program in August, 2014 at KREI, Korea*

The food consumption structure is now changing in tendency of increasing fruits and meat and reducing rice. The average rice consumption reduced from 136.4 kg/person in 1970 to 69.8 kg/person in 2012, whereas consumption of other agricultural products per capita such as vegetable, fruit, and meat increased from 59.9 kg, 22.3 kg, and 5.2 kg in 1970 to 145 kg, 61.8 kg, and 40.5 kg in 2012, respectively. As result, number of rice farming household reduced from 1,525 thousand households in 1990 to 724 thousand household in 2012.

Table 4-2: Changing structure of food consumption



Source: JoonKee Park. 2014. *The agricultural policy reform and emerging issues in Korea*. Lecture for KAPEX – Academic Visiting Program in August, 2014 at KREI, Korea

The share of agro-product export value in total export value of Korea reduced from 26.7% in 1971 to 1% in 2012. The export value of agro-product achieved USD 5,645 million in 2012. Majority processed agro-products such as coffee mix, ramen, beverage, and so on are exported to Japan, China, United States, Hong Kong, Viet Nam, etc.

Table 4-3: Share of agro-products for export in total export value

Unit: USD million

	1971	1977	1995	2000	2005	2012
Total Exports	1,068	10,046	125,058	172,268	284,419	548,076
Agro-Food	285	1,592	1,747	1,532	2,222	5,645
Share (%)	26.7	15.8	1.4	0.9	0.8	1.0

Source: Eor-Myong Keun. 2014. *Korean agricultural export promotion policy*. Lecture for KAPEX – Academic Visiting Program in October, 2014 at KREI, Korea

2. Farmland management system in Korea

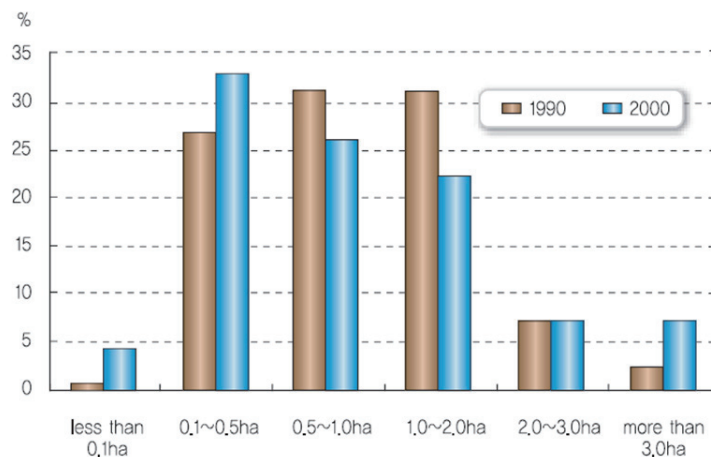
2.1. Farmland use situation

Total farmland acreage in Korea is 1.73 million hectares, accounting for 17.3% of the national total land area, of which 0.966 million hectares is paddy land and the remaining of 0.764 million hectares is for dry upland farm fields (Hong-Sang Kim, 2014). Total farmland size had been declining from 2.3 million hectares in 1970 to 2.1 million hectares in 1990 and 1.7 million hectares in 2012 (JoonKee Park, 2014).

In Korea, the farmland is classified into two types of farmland: agricultural promoted area and agricultural non-promoted area. As the end of 2011, the size of agricultural promoted area is 0.807 million hectares, accounting for 47.5% of total farmland (Jeongbin Im, 2013). The size of the agricultural promoted had decreased dramatically due to stopping the promotion of agricultural areas in 2004.

The average farmland per household in Korea is 1.5 hectares in 2010, smaller than other countries such as Japan by 1.56 hectares, Netherlands by 3.76 hectares, US by 5.9 hectares. Therefore, food sufficiency rate is very low by merely 23% in 2011. Although the self-sufficiency rate of rice is almost 100% because of the governmental investment in the production base and decline in rice consumption. The ratio of mid-size farms with a cultivated land of 0.5 to 2.0 hectares decreased, whereas farms with cultivated land of less than 0.5 hectares and over 2 hectares increased (KREI, 2010).

Figure 4-3: Composition of farms by farm size



Source: KREI, 2010. *Agriculture in Korea in 2010*

Since 1968, farmland of Korea was reduced from 2,298 thousand hectares to 1,730 thousand hectares in 2012 due to conversion of farmland for urbanization and industrialization. On average in period from 1990 - 2011, about 45,000 hectares of farmland have become idle annually, and much of the deserted land has turned into a land that is difficult to use again. Apart from the idling

of farmland of 14,000 hectares are converted to other uses every year. As a result, farmland continues to decrease despite various efforts to create and preserve farmland (KREI, 2010).

Table 4-4: Idling and conversion of farmland

Unit: 1,000 ha

	1990	1995	2000	2005	2010	2011
Cultivated land	2109	1985	1889	1824	1715	1689
Idled land	40	65	17	44	50	55
Converted land	11	16	10	16	19	13

Source: MAFRA, Major Statistics of Agricultural and Forestry, 2012

2.2. Farmland system related law

Farmland system in Korea is based on a variety of laws such as Farmland Act, Constitution, Basic Law on Agriculture and Rural Communities, Act on Planning and Utilization of National Territory, Rearrangement of Agricultural and Fishing Villages Act, and other laws. Each law deals with each specific field of farmland use and the direction of farmland use. E. g. the Constitution and Basic Law on Agriculture and Rural Communities deals with the use of management of the national territory, the Rearrangement of Agricultural and Fishing Villages Act, deals with development and maintenance of living environment, tourism and leisure resources, and low-productivity farmland, etc. Therefore, it is not only difficult to compile all farmland related laws into a single legal system but it is also inappropriate to simplify and interpret the multi-faceted nature of farmland based on one perspective.

Table 4-5: Coverage of farmland by major laws

	Farmland Act	Constitution	Basic Law on Agriculture and Rural Communities	Act on Planning and Utilization of National Territory	Rearrangement and Fishing Villages Act	Other Laws
Ownership	○	○	○			
Use	○	○	○			
Preservation	○	○	○	○		△
Conversion	○	○		○		△
Rearrangement	△		○		○	△
Creation					○	

○: Stipulated in detail, △: partial reference

Source: KREI, 2010, Agriculture in Korea

Briefly, the basic philosophy and principles on farmland in legal sense are clearly stated in the Constitution and the Basic Law on Agriculture and Rural Communities, and the methods of achieving this institutionally are stipulated in the Farmland Act.

Changes in the farmland system

The changes in the farmland system are shown in the following table:

Table 4-6: Changes in the farmland system

Year	Details
1949	The Farmland Reform Act was enacted, and the landed farmers system was established.
1972	The Farmland Preservation and Utilization Act (the Farmland Preservation Act) was enacted, and the conversion permit system was introduced.
1980	According to the revised constitution, tenant farming was prohibited, and the leasing of farmland and the consignment management of farmland to increase agricultural productivity and to ensure the rational utilization of farmland was allowed.
1986	The Farmland Lend-Lease Management Act was enacted (its enforcement was deferred, and its enforcement ordinance was enacted in 1990).
1987	The Constitution prescribed the land-to-tillers principle
1992	The charge for farmland conversion was introduced, and agricultural development regions were designated
1994	The Farmland Act was enacted by combining the existing laws related to farmland.

Source: Hong-Sang Kim. 2014. Korea agricultural development and farmland system. Lecture for KAPEX – Academic Visiting Program in October 2014 at KREI, Korea

Changes in farmland ownership

Korea was under the Japanese colony before 1945 and it had been under the Japanese rule on farmland possession. Hence, after liberating, the Korea tried to reform the farmland system through abolishing landlord-tenant relations and established a stable agrarian system. The principle “the land – to – tiller” has been used in land reform or in other word “Farmland shall be owned by a person who uses or will use it only for his or her own agricultural management” as stated in the Article 6 of the Korea Farmland Act. The Korea Government had created self-employed farmer by buying farmland of landlords¹⁷, and distributed to a maximum of 3 hectares to actual farmers¹⁸. These farmers had to repay to the Government 150% of “standard production” made by yearly installments spread over five years or payment in advance of the whole or part of the purchase price. They were received the qualification certification for acquisition of farmland issued by the Government.

After the opening of domestic agricultural market, the agricultural enterprise was allowed to own the farmland in 1990, and agricultural corporation (stock companies) was allowed to own farmland in 2002 that before was restricted by Farmland Reform Act of 1949. The Government eased restrictions on farmland use and conversion and raised the ownership ceiling to 10 hectares from 3 hectares to flexibly respond to agricultural imports. Because of numerous people leaving

¹⁷ Farmland owned by individuals farmland not owner-cultivated, farmland exceeding the upper ceiling of 3 ha, and land not cultivated for perennial plants beyond 3 ha

¹⁸ Farm households currently cultivating farmland subject to distribution, farm households cultivating extremely small areas in comparison to cultivating capacity, bereaved families of martyrs, agricultural laborers having a capability to farm, and farmers returned from abroad

the farming profession and inheritance, the Government also allowed non-farmers own farmland less than 1,000 m² for the purpose of using it to experience farming or as a weekend farm. In 2005, the farmland bank system was introduced. As a result, it became possible for non-farmers to own a limited amount of farmland if they lease it to the farmland bank on a long-term basis. Somehow, non-farmer's illegal ownership of farmland increased, and it broke the strict principle "land – to – tillers". However, it must say that the Korea's change in possession of farmland and farmland use has had a positive influence on its economic efficiency and environmental protection.

Changes in farmland preservation, conversion and management system

In Korea, farmland is preserved and managed through the Farmland Act and the National Land Planning Act. The conversion of prime farmland is restricted, excepting for installation and construction of agricultural facilities and social infrastructure to help preserve the farmland. But only 5% of converted farmland was used for the installation of facilities for agriculture and fisheries in 2011 (Jeongbin Im, 2013). When designated prime farmland is expected to convert for non-farming purpose, it requires the permission, registration and consultation. However, after Uruguay Round in the late 1980s, regulations on farmland conversion were relaxed to expand agricultural products import opening. The conversion reporting system was introduced to increase farmers' convenience. The local governments were allowed to approve the farmland conversion. With the converted area from 20 hectares for the outside of an agricultural promotion area and up to 3 hectares inside an agricultural promotion area will be approved by the regional local government, and up to 1 hectare and 0.3 hectare by the basic local government, respectively. In the future, the authority for permitting farmland conversion by the local government may be extended less than 20 hectares to less than 50 hectares.

Farmland preservation is the responsibility of the State; however, the authority to permit farmland conversion by the local governments surely will help to use the farmland and make the plan on farmland use properly.

2.3. Limitations and problems of the current farmland management system

There are some limitations and problems of the current farmland management system in Korea. Firstly, it is difficult to realize the principle on Land-to –the tiller because the Law allows non-farmers own the farmland as a result of leaving the agriculture of professional farmers and the inheritance. Therefore, the continuous tendency of farmland ownership of the non-farmers will make the farmland prices increase, leading the difficulties of farmers to own the farmland. Until now, there are no measures to dispose the farmland after deferring for a certain period of time. Additionally, the scope of "tillers" is unclear, so the land-to-the-tiller principle is hard to be obeyed. It is difficult to judge whether the person, who intends to do farming, actually does farming.

The second limitation is the farmland preservation system. Almost good farmland is the targeted area for the conversion because good farmland is favorable for non-agricultural development. The large-scale conversion of good farmland occurred based on laws other than the

Farmland Act and there is not clear standard to limit farmland conversion that uses individual laws. Moreover, the rice farming land is focused more than the dry-field farming, so that the improvement of rice field infrastructure is paid more attention than the dry-field though there was discussion on emphasizing the increase of the dry-field farming's competitiveness in Korea-China FTA. Beside it, measures on the increase of idle farmland management are insufficient due to lack of infrastructure improvement and labor.

Finally, it is the lack of improvements of the agricultural structure because of shortage of consideration for the new farmers, expansion of farm scale, and the delay of farmland collectivization.

3. Farmland bank program in Korea

Policy background for the introduction of Farmland Bank Program

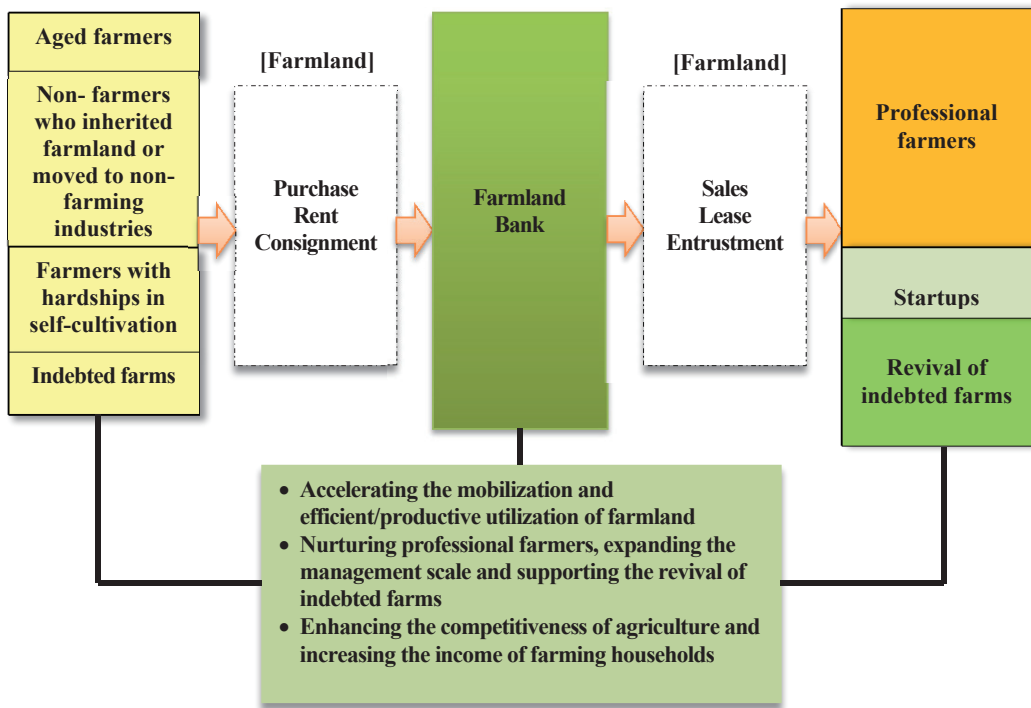
Farmland bank program was launched for preparation of expected instability in the farmland market promotion of efficient farmland use, and improvement of agricultural structure, including:

- Manage mid and long-term instability elements in farmland market such as reduction of rice consumption, change of consumption structure of agricultural products, increase of idle farmland due to the expansion of opening markets, and unbalance in farmland supply and demand;
- Manage farmland systematically and efficiently due to changes in farmland system;
- Stimulate the farmland mobilization and induce human resources in the city into farming areas by providing various online information on farmland;
- Need for a proactive support for business workout by purchasing, leasing, and repurchasing farmland of indebted farms.

Farmland bank program in Korea was put into operation since 2005 and run by Korea Rural Community Corporation (KRC). The Farmland bank program was launched to cope with changes in domestic and international agro-market environment, such as further opening of domestic agricultural market, reduction of farming population, and aging of farmers. The purposes of Farmland bank program are i) to improve the efficiency of resources (farmland, agricultural machineries, etc.), ii) optimize size for farmland scale, iii) improve the agricultural structure, iv) secure farmers' farmland resources and establish the foundation for the stabilization of the farm household economy, and v) stabilize the farmland market that is facing the opening of agricultural product imports. All activities of the Farmland bank program obey the Act on Korea Rural Community Corporation and Farmland Management Fund.

According to Article 10 of Law on Korea Rural Community Corporation and Farmland Management Fund, activities of Farmland bank program include: i) sales, lease, exchange, and separation and merger of farmland, ii) supply of information on farmland price and transaction trends, iii) farmland purchase to assist revival of farming, iv) leasing of entrusted farmland, and v) assistance to stabilize the income of retired farmers with farmland as collateral. However, the key function of Farmland bank program is farmland buying and stockpiling when farmland price is expected to fall because of rise amount of sold farmland that is a result from a sharp drop of farmer numbers.

Figure 4-4: Basic functions of farmland bank program



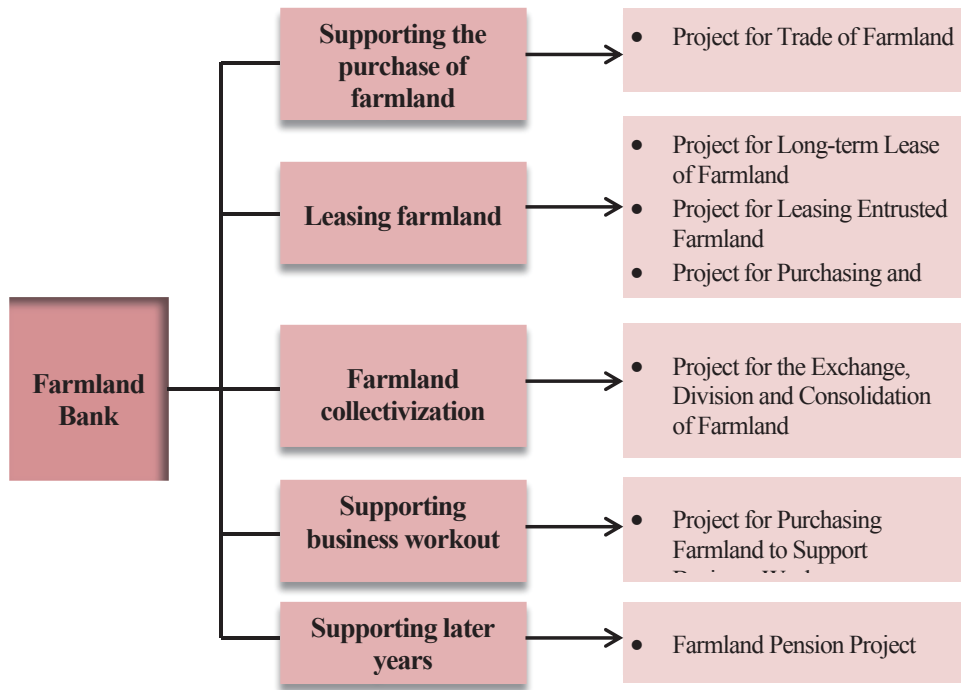
Source: Seok-Hwan Yun, 2014. Lecture on Farmland Bank System and Policy in Korea for KAPEX-Academic Visiting Program in November 2014, at KREI, Korea

The Farmland bank program includes 7 projects that were implemented in different period from 1990 to 2011. The progress of the program introduction and functions of each project areas shown in the following figures:

Figure 4-5: Progress of the introduction of program

1990	1997	2004	2005	2006	2010	2011
						Farmland Pension
					Purchasing and Reserving	
				Supporting business workout, Selling Entrusted Farmland		
			Leasing Entrusted Farmland			
		Orchard Scale Improvement				
	Direct Payment for the Transfer of Management					
Farmland Scale Improvement (Project for Trade of Farmland, Project for Farmland Lease, Project for Exchange, Division and Consolidation)						

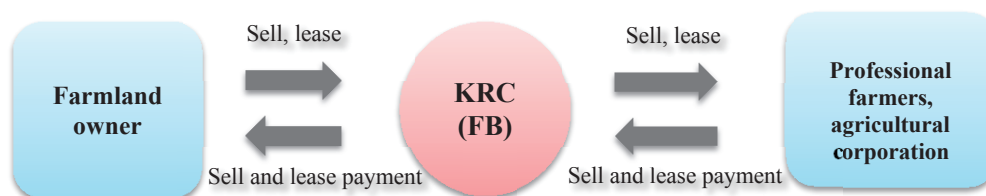
Source: Seok-Hwan Yun, 2014. Lecture on Farmland Bank System and Policy in Korea for KAPEX-Academic Visiting Program in November 2014, at KREI, Korea

Figure 4-6: Categorization of functions of farmland bank program

Source: Seok-Hwan Yun, 2014. Lecture on Farmland Bank System and Policy in Korea for KAPEX-Academic Visiting Program in November 2014, at KREI, Korea

3.1. Farmland scale improvement project

The Farmland scale-up project started in 1990 aimed to raise enlarged size and specialized farmers and to achieve “the land – to – the tiller” principle by farmland trading, long-term lease and exchange or division or consolidation, to increase farmers’ income and to secure a stabilized production base for the staple crops by expanding the farmland size of professional farmers and collectivizing farmland (see the project support in the annex 1).

Figure 4-7: Implementation system of farmland scale-up project

Source: Sung-Jae Chun, 2013. Farmland bank program of Korea Rural Community Corporation (KRC)

In 1997, when a direct payment project was launched to subsidize old retire farmers who transferred their farmland, the implementation of farmland scale-up was changed from farmland purchasing to farmland leasing. In 2005, the farmland scale-up project was consolidated into the Farmland bank program to support farming stability and adjustment of farmland supply and demand.

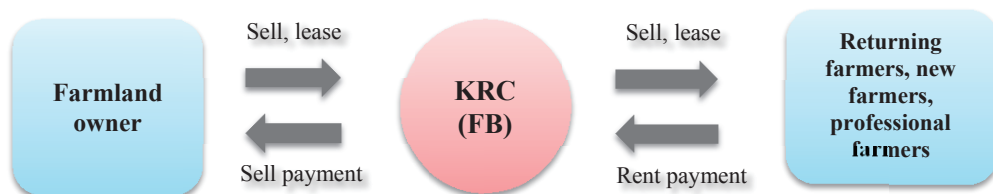
Major outcome of the project

- Enhance the supply base for the stable rice cultivation by increasing the management ratio of professional rice-cultivating farms from (297,000 ha/980,000 ha) 30% in 2005 to 50% (393,000 ha/847,000 ha) in 2013;
- Reduce production cost by expanding the average management scale of professional rice-cultivating farms. Increase of farm size from 2.5 hectares in 1995 to 5.94 hectares in 2013 helps to reduce 11.5% of production cost compared with farm size with less than 2.5 hectares;
- Maintain the proportion of farmers in their 50 years old or younger at 73% among professional rice-cultivating farmers by preventing the leaving of farmers from the agricultural industry, thereby contributing the management, development and vitalization of local communities.

3.2. Farmland purchase and reservation project

Farmland purchase and reservation project started in 2010 to improve structure of farming and contribute to stabilization of farmland market by FB's purchase of farmland, and to raise efficiency in the use of purchase farmland through various methods including long-term lease of farmland.

Figure 4-8: Implementation system of farmland purchase and reservation project



Source: Sung-Jae Chun, 2013. *Farmland bank program of Korea Rural Community Corporation (KRC)*

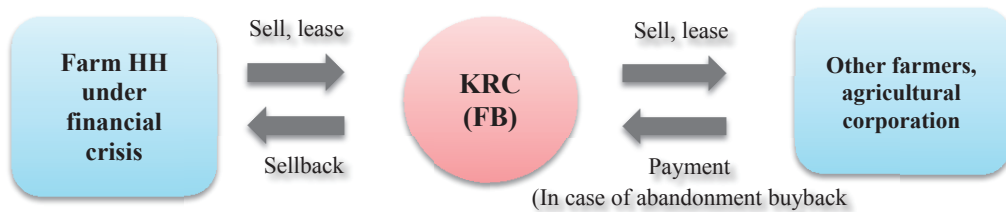
Major outcome of the project

- Support the farmland sales of retired farmers or those who left the agricultural sector by purchasing 2,651 hectares of farmland in the agricultural-promoted areas;
- Support to expand farming size by an average of 1 hectare per farm by leasing 2,630 hectares of farmland to 2,964 farms.

3.3. Farmland purchase for the support of business workout project

Farmland purchase for the support of business workout aims to support the management normalization of farmlands, whose owners are in crisis due to natural disasters and debt by purchasing their farmland, for helping them settle the debt with proceeds from farmland sale.

Figure 4-9: Structure of activity of revival program



Source: Sung-Jae Chun, 2013. Farmland bank program of Korea Rural Community Corporation (KRC)

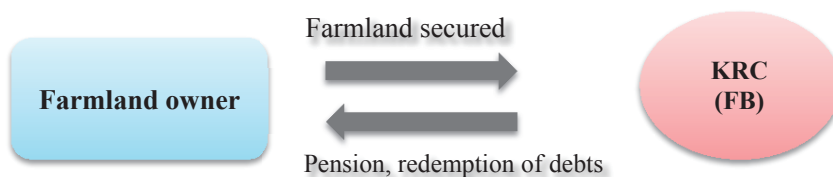
Major outcome of the project

- Provide opportunities for revival by offering a total of KRW 1.4235 trillion by 2013 to 5,908 farms in management crisis due to debts and damages from natural disasters;
- Prevent the reduction in assets of farms due to auctions or other factor, and lighten the burden of farmers by offering low rent fees rather than high interest on debt:
 - + Prevent the loss of assets worth KRW 469.8 billion (KRW 80 million per farm) by protecting assets against auctions and other factors;
 - + Cut down the cost of interest worth KRW 170.9 billion (KRW 29 million per farm) by offering low rent fees rather than high interest rate.

3.4. Farmland pension project

Farmland pension project started in 2011 to secure farmlands owned by aged farmers and provide them monthly pension for their living support, and to extend and maintain the social safety in rural areas.

Figure 4-10: Implementation system of farmland pension project



Source: Sung-Jae Chun, 2013. Farmland bank program of Korea Rural Community Corporation (KRC)

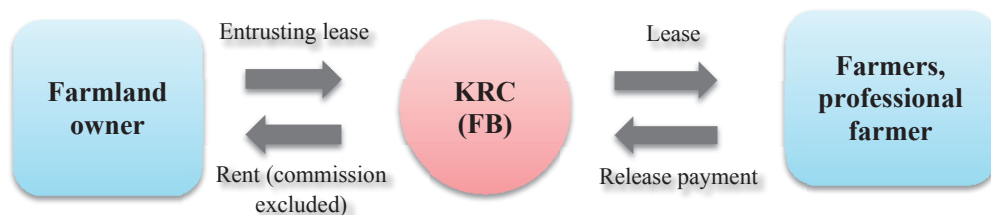
Major outcome of the project

- Stabilize post-retirement lives of aged farmers by providing monthly farmland pension (on average KRW 810,000/farms) to a total of 2,927 farms on security of their farmland by 2013.

3.5. Entrusted farmland leasing project

The entrusted farmland lease project is to promote effective use and stable management of farmland and expediting the scale expansion of professional farms by leasing entrusted farmland to professional farmers.

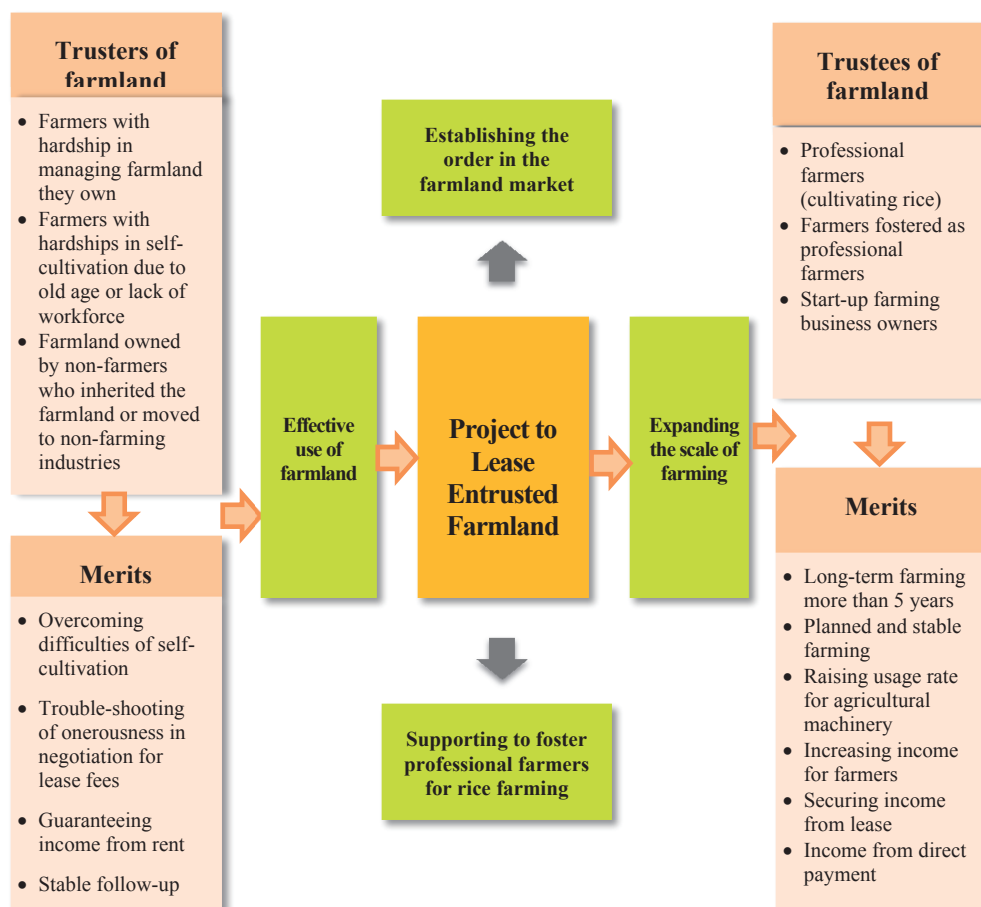
Figure 4-11: Structure of activity of entrusted farmland lease project



Source: Sung-Jae Chun, 2013. Farmland bank program of Korea Rural Community Corporation (KRC)

Major outcome of the project

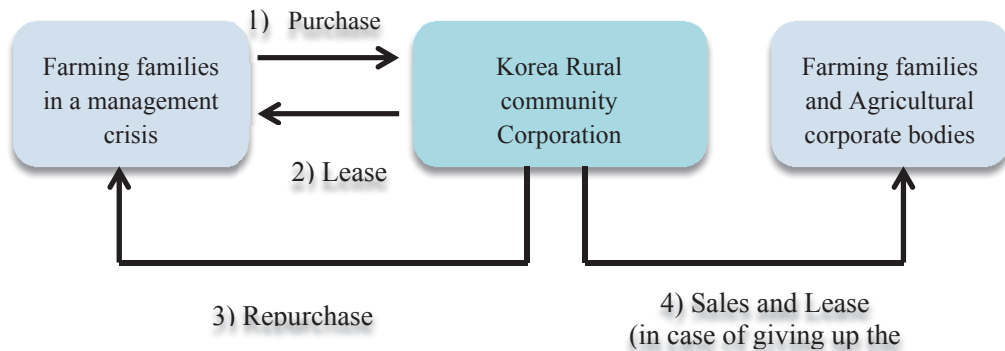
- Lease total of 67,597 hectares of farmland to 39,796 professional rice-cultivating farmers (34%) and 75,516 general farmers (66%) and expand the farming size of farms by 0.79 hectares for professional rice-cultivating farmers and 0.48 hectares for general farmers;
- Secure stable and systematic farming management for farmers by leasing farmland to them for the 5 year long-term period;
- Promote lawful rent and efficient utilization of farmland for land owners.

Figure 4-12: Merits of entrusted farmland leasing project

Source: Seok-Hwan Yun, 2014. Lecture on Farmland Bank System and Policy in Korea for KAPEX-Academic Visiting Program in November 2014, at KREI, Korea

3.6. Direct payment for transfer of management project

Direct payment project for transfer of management project aims to promote stabilization of income of senior farmers who retire from farming and transfer the farming management, and to expedite the scale expansion of farming size by extending support for professional farmers. The project has supported USD 341.8 million to 97,613 farmers in 2013.

Figure 4-13: Implementation system of direct payment for transfer of management project

Source: Seok-Hwan Yun, 2014. Lecture on Farmland Bank System and Policy in Korea for KAPEX-Academic Visiting Program in November 2014, at KREI, Korea

4. Farmland consolidation program in Korea

Farmland consolidation program in Korea was implemented in Geongsangbuk-do in 1964 with 247 districts (5,806 hectares), expanded nationwide in 1965 by the Central Government, and ended up in 2004 (see the history of farmland consolidation program in the table 4 - 7). The objectives of the farmland consolidation program are to improve agricultural productivity and reduce production cost, so that the program not only includes the merging fragmented and irregular shape of farmland into larger plot but also rearrangement of farmland for the improvement of agricultural infrastructure improvement in order to increase agricultural productivity and reduce production cost. Its activities include i) standardization and scaling of traditional plots that have been fragmented or in irregular shape, ii) enlargement of farm size to a scale for using agricultural machinery, iii) modification of irrigation and drainage canals to improve efficient water management, iv) construction, expansion and modification of farm road to access easily by agricultural machinery, v) improvement of soil layers for securing the plow layer, and vi) site renovation of public agricultural facilities.

Table 4-7: History of farmland consolidation program

	Before 1945	1960's	1970's	1980's	After 1990's
Main agent of program	Irrigation association, individual	Local Government	Government	Government	Government
Related laws and regulations	Land Improvement Project Act	Land Improvement Project Act	Agricultural Community Modernization Promotion Act	Agricultural Community Modernization Promotion Act	Agricultural Community Modernization Promotion Act
Financial resource	Government funding	PL480 grain	Government funding 50%	Government funding 60-70%	Government funding 80%
		Municipal government	Municipal government 30%	Municipal government 20%	Municipal government 20%
	Farmer	Farmer	Farmer 20%	Farmer 10 - 20%	
Implementation area		84,153 ha	201,732 ha	188,249 ha	248,776 ha
Section	20-30a	Mountain areas 20-30a	Mountain areas 20-30a	Mountain areas 20-30a	Mountain areas 20-30a
		Field areas 20 - 40a	Field areas 30-50a	Field areas 30-50a	Field areas 100-200a
Irrigation and drainage canal	Earthwork	Earthwork	Earthwork and construction	Earthwork and construction	Earthwork and construction
Farm road	2-2.5m	2-3m	3-6m	4-7m	4-7m
Replotting	Replotting in the original position	Replotting in the original position	Original position and compromised replotting	Original position and compromised replotting	Original position and compromised replotting
					The replotting of multiple ownership lands
Construction	Human resource	Human resource	Human resource and machinery	Human resource and machinery	Human resource and machinery

Source: Korea Rural Community Corporation (KRC), Rural Agricultural Water Resource Information System (RAWRIS)

4.1. Development process of farmland consolidation program

The development process of farmland consolidation program at first in Korea was implemented for the sake of increased yield of rice-plan in 1940 by Japan. After independence, it was initially implemented by Gyeongsangbuk-do in 1964 with 247 districts (5,806 hectares), and expanded nationwide in 1965 by the central government. In 1964, the plan on Advance Gyeongsangbuk-do Fundamental was established with the goals of strengthening of agricultural technology education, hydraulic facility expansion, erosion control works, road maintenance, repair and development, expansion of port facilities, and improvement of social life. At that time, there was no accumulated knowledge about farmland consolidation technology or any re-plotting experience. All program costs were paid by farmers and a small part from local government. The program was conducted within a very short time under fierce opposition from the farmers. Nevertheless, after the construction, the farmers reacted to the program in a positive way. As the

result, the reduction rate was 84.3 Jeongbo¹⁹. The rice cultivation became more convenient because of the readjusted farmland division. And double cropping was possible because the farm road, irrigation and drainage canals were constructed (see the result in the table 4 - 8).

Table 4-8: Size comparison of area in Geumreung-gun, Gyeongsangbuk-do before and after the Farmland consolidation program in 1964

	Total	Farmland			Rural road	Furrow	Irrigation/ drainage canal
		Subtotal	Single cropping	Double cropping			
Before	761.5	728.2	597.1	131.1	6.3	27	
After	761.5	709	105.3	603.7	20.4		32.1
Increment		19.2	491.8	-472.6	-14.1	27	-32.1

Source: Woo, Hacheon, 1965, *Experience on farmland consolidation, Daehann Local Administration Mutual Aid Association, Local Administration, Vol. 14, 137, 1965, pp.83.*

After some achievements in 1964, the program was expanded nationwide in 1965 with the help of budget from the central government. At that time, rice production accounted for 62% of total agricultural outputs, while 9% was barley production, so that rice production was very important to Korea. Since the beginning of farmland consolidation project, rice production in Korea was very low at 300 kg/1,000m². The distribution rate of agricultural machinery was extremely low about 2.5 million nationwide. Total farm household accounted for 52% of total households and the agricultural population accounted for 55% of total population, so there was no demand on farmland consolidation (KREI, 2013). The rice production is very important for national food security after the civil war, though there was no demand on the farmland consolidation of farm household, but the Korea Government still forced the people into conducting it. During the implementation of farmland consolidation project, the Korean Government was opposed by farm household because the Governmental subsidies for the project were low²⁰ and depended much of the effort of farmers. In addition, farm household thought that the farmland consolidation caused the adverse effect such as decreasing size of farming area and changing location of farmland. Despite this opposition, the Government had to put every effort into the project implementation, and then they can change the perception of farmers on farmland consolidation in a positive way.

The farmer's perception of the farmland consolidation program began to change, so that a stable funding platform to support the program was established with ratio of 50% from the central government, 30% from the municipal government, and 20% from the farmers. As farmland consolidation became the core project for agricultural production infrastructure improvement in 1980s, the total expense and scale of the program was expanded. Initially, scale of the farmland consolidation project was 12,000 hectares but it has increased up to 25,000 hectares. In 1980s, the project became the core project for agricultural production infrastructure improvement. Its scale was expanded more than 20,000 hectares in 1970s, 19,000 hectares in 1980s, 29,000 hectares in

¹⁹ 1 Jeongbo = 9,917.4 square meter

²⁰ At the Japanese colonial era, the subsidy of the central Government was very low by 30%, and after that it increased by 40% in 1960s-early 1970s. The contribution rate of the central government, municipal government, and beneficiaries had changed by 50:30:20 in late 1970s-early 1980s and by 60:20:20 in the late 1980s-early 1990s. However, in late 1990s, this rate was 80:20:0 and it means that the beneficiary charge was waived (KREI, 2013).

1990s, and 8,000 hectares in 2000s. At the same time, the farmland consolidation was diversified and its range was expanded such as the targeted area of farmland consolidation was expanded from paddy land to upland by upland improvement project, the size was expanded from small block to large block by farmland rearrangement project, and the expansion and pavement of farm road was added by on-farm road improvement project. For the assistance system, the rate of governmental subsidy increased from 30% in the Japanese colonial era, to 40% in period 1960s-early 1970s, to 50% in period late 1970s to early 1980s. From the late 1980s to the early 1990s, ratio of financial contribution is 60% from the Government, 20% from the municipal government, and 20% from beneficiaries. However, in period late 1980s to early 1990 there was only the financial subsidy from the central government and municipal government with ratio 80:20, it meant that the beneficiary charge was waived (KREI, 2013).

4.2. Relevant legislation for the implementation of the farmland consolidation program

The relevant legislation for the implementation of the farmland consolidation program includes ordinances that define the overall agricultural infrastructure project, as follows:

- Land Improvement Project Law;
- Agricultural Community Modernization Promotion Act;
- Rearrangement of Agricultural and Fishing Villages Act;
- Regulations of Land Improvement Project Subsidy;
- Regulations of Agricultural Modernization Promotion Project Subsidy;
- Act on the Budgeting and Management of Subsidies.

4.3. Results of the farmland consolidation program

Since 1964, the Farmland Consolidation Program had become substantially reinforced with institutional changes such as increase of central government support, reduction of beneficiary's burden, and readjustment of large arable land. With the financial increase, the annual average of more than 20,000 ha was carried out in 1980 and it increased to more than 27,000 ha in 1990 to prepare for the Uruguay Round negotiations.

Table 4-9: Output of Farmland consolidation program by year

Unit: place, ha, million won

Year	Divisions	Area	Financial resources			
			Total	National funding	Municipal government	Landowner
Total	9,539	722,910	6,636,660	4,418,034	1,452,532	266,094
1960s	1,286	84,153	8,349	3,630	1,711	3,008
1964	214	4,378	224	16	43	165
1965	209	10,362	602	283	87	232
1966	297	18,621	1,344	518	269	557
1967	228	18,067	1,714	603	471	640

Year	Divisions	Area	Financial resources			
			Total	National funding	Municipal government	Landowner
1968	174	17,056	2,198	1,117	390	691
1969	164	15,669	2,267	1,093	451	723
1970s	1,749	201,732	103,055	49,507	31,182	22,366
1970	149	13,423	2,231	859	698	674
1971	149	16,327	3,043	1,520	822	701
1972	230	24,662	5,672	2,678	1,439	1,555
1973	201	21,247	5,367	2,489	1,600	1,278
1974	234	30,920	8,196	3,770	2,503	1,923
1975	203	22,289	10,004	4,797	2,976	2,231
1976	161	20,745	10,988	5,411	3,274	2,303
1977	149	23,077	15,099	7,593	4,408	3,098
1978	146	15,874	17,976	8,913	5,410	3,653
1979	127	13,168	24,479	11,477	8,052	4,950
1980s	2,042	188,249	934,790	571,382	206,026	157,382
1980	122	12,573	35,625	17,211	11,260	7,154
1981	121	14,475	45,700	22,803	13,536	9,361
1982	123	17,057	61,688	20,983	18,532	12,173
1983	102	14,994	63,167	35,475	15,017	12,675
1984	121	15,978	64,697	38,436	13,217	13,044
1985	137	18,014	73,689	43,868	15,194	14,627
1986	169	20,195	102,823	61,235	20,725	20,863
1987	219	20,990	126,174	76,501	25,274	24,399
1988	468	28,104	171,740	112,968	34,860	23,912
1989	460	25,869	189,487	131,902	38,411	19,174
1990s	4,462	248,776	5,590,466	3,793,515	1,213,613	83,338
1990	671	31,563	301,817	208,642	63,642	29,533
1991	473	20,899	241,698	170,075	48,285	23,338
1992	494	21,273	319,044	224,275	64,302	30,467
1993	416	19,211	351,249	276,904	74,345	-
1994	355	17,982	337,094	228,870	108,224	-
1995	557	29,881	620,807	461,198	159,609	-
1996	468	37,810	927,292	727,370	199,922	-
1997	510	37,590	1,028,319	795,398	232,291	-
1998	518	52,568	963,144	700,781	262,363	-

Source: Rural Development Corporation (RDC), Comprehensive bibliography on the agricultural infrastructure project, 1999, pp. 593

The farmland consolidation has brought some following effects:

- For direct effects, it helps to increase water supply, rate of arable land utilization, and profitability. Additionally, expansion of farm road for accessing by machinery makes

- labor force, production cost, as well as expenses relating to water loss and maintenance reduce;
- For indirect effects, it helps to enhancement of public interests like environmental conservation, prevention of natural disasters through the improvement of drainage systems and the improvement of transit facilities. It makes perspective of farmers, who wants to expand the scale of their farming and strengthen their settlement in rural areas change.

1. Conclusion

1.1. Farmland use in Viet Nam and in the Red River Delta

Farmland use in Viet Nam

In Viet Nam, GDP of agricultural sector accounts for only 20% in total GDP of the country but it plays very important role in the national economic growth, hunger and poverty reduction, and food security, as well. Hence, the efficient use of farmland has been paid attention of the policy makers and managers. Farmland area is quite large, accounting for nearly 80% of total natural area, of which land for agricultural production occupies 38.72%, but the average farmland per capita is very low by 0.3 hectares and divided into many small plots due to the policy on equitable farmland allocation in 1988. The cultivation in such small and fragmented plots somehow constraint agricultural production, drainage and irrigation, mechanization in agriculture, increase of production cost, loss of farmland due to the field boundaries. Whilst, the land consolidation is taking place slowly and does not receive much support from farm households because in Viet Nam, the farm household has only right of land use, not right of land possession. Farmland is considered as the valuable assets of farm households and as inheritance assets for their children, so that they do not want to transfer their LUR for others. Additionally, farm households are involved only in the assessment of farmland quality to determine the exchange coefficients between different classes of farmland than the whole process of land consolidation, because they thought that they do not have rights to be involved in the process of farmland reallocation or discussion about land use planning.

At the present, the agricultural production land is decreased rapidly due to the urbanization and industrialization, especially paddy land. Because the farmland occupies the large area in total natural area in Viet Nam, the conversion of this land to non-agricultural uses is unavoidable in economic development and population growth. However, the loss of one hectare of farmland will cause the jobless of 13 rural populations and loss of one hectare of paddy land will affect the livelihood of 12 to 25 rural populations that accounts for around 68% of total population. Surely it causes the instability in rural society and affects the national food security, unless there are measures to solve these problems.

The farmland market in Viet Nam is emerging and not strong because of the high risk of investment in agricultural production, farmland as the precious asset that is sold only farm household in crisis, and consideration of farmland as traditional inheritance of farm households. There are two types of farmland markets. The primary market, where the land transaction between the State and farmland users such as farmland allocation with or without payment, and with different farmland use tenure or farmland lease, etc. takes place, is controlled strictly by the State. The secondary market is for LUR transactions between farmland users. At this market, the State

only plays role as supplying necessary service on legislation for LUR transaction and tax collection. The State cannot manage all LUR transaction in rural areas. The land is owned by the State and farm households can only use their LUR to lease, transfer, exchange, mortgage, release or use as capital contribution for joint-venture arrangement. Thus, LUR transaction needs the record of the local government and somehow the transaction cost increase that the people involved in LUR transactions do not want, and of course the illegal transaction or transaction without record of local government happens, leading to difficulties in farmland management.

Farmland in the Red River Delta

The Red River Delta is considered as one of two largest bowls of agricultural production, especially rice production in Viet Nam. It is responsible for food supply to the Northern provinces and partly for rice export. The farmland here is affected much by land reform policy not only under the French colony since 1858 but also after Doi Moi. In the French colony, the farmland was divided into small-scale to avoid the farmer's leaving from the agriculture. And again, the farmland was divided into smaller areas to ensure the equality of farmland use between farm households.

The most issues in farmland use are the agricultural fragmentation and agricultural conversion for non-agricultural purposes. The land fragmentation in the RRD is reflected not only by number of plots used by one household but also the small farmland-used size. Number of plots that farm household is cultivated in this region from 7-8 plots in different fields. And average farmland area per household is 0.22 hectares that is lower than one of the nation. The land fragmentation in RRD affects the mechanization in agricultural production, increase the production cost (time for moving from this field to other field), constraint the irrigation and drainage serving for agricultural production, and does not stimulate farm household invest in such small agricultural size. Additionally, the land fragmentation reduced the farmland about 2.4-4% because of field boundary making.

The RED RIVER DELTA is the center of politics, culture, and economy of Viet Nam. It has convenient conditions of transportation, and commodity exchange. The urbanization and industrialization of this region is taking place very fast, so it makes the area of farmland reduce rapidly too. The farmland area reduced 101.22 thousand hectares in five year from 2000 to 2005, and 23.9 from 2008-2013 for construction of residential area and industrial area. And in the future this number surely keeps reducing for purpose of economic growth and population increase. As a result, the livelihood of farm household will be affected.

1.2. Lessons learnt from Korean experiences on farmland management and farmland consolidation

1.2.1. Lessons learnt from farmland management

The agricultural development is closely related to the farmland reform. Korea's agriculture has miraculous growth only 30 years partly thanks to the properly farmland management policy. From the poorest country in the world with severe food consumption after the civil war in 1950, Korea

has achieved rice self-sufficiency in 1978, because the Korea's agricultural policy of the Korea focused on appropriated paddy land management together with irrigation improvement, development of reclaimed land, and control of farmland diversion to farmland conservation. Additionally, policies on farmland use that focused much on rice farming and land reform also made contribution to this achievement.

Korea's land reform was implemented based on the combination of political, social and economic aspects. Only in very short term, Korea has abolished the landlordism and is acclaimed as the most successful case of land reform in the world. At the initial stage of land reform, the Korea had determined the farmland ownership of farmers by issued qualification certificate for farmland acquisition after allocated farmland to farmers. This determination of the farmland ownership had a positive influence on Korea's economy and environmental protection, creating independent farming and contributing to the stable and sustainable agriculture.

Farmland is very important because it can make contribution to stable food production and supply, and raw materials for food processing industry. Presently, farmland were converted into residential and industrial zones for rapid economic growth, so preservation of farmland, especially paddy land, from rapid process of industrialization and urbanization is necessary in the strategy for agricultural development of Korean Government. And empowerment for local government in approving farmland conversion is to help to use and preserve farmland, make farmland use plan properly, and increase the community's contribution in farmland preservation, as well.

1.2.2. Lesson learnt from Farmland bank program

The Farmland bank program was launched to cope with changes in domestic and international agro-market environment, such as further opening of domestic agricultural market, reduction of farming population, and aging of farmers. It is a good benchmark for efficient farmland use, expansion of farmland scale, improvement of agricultural structure, and stabilization of farmland market and farmers' income.

It can be seen that the cultivated area of farm households has been enlarged from 2.5 hectares to 5 hectares thanks to the farmland scale-up project. With such large farmland scale by 5 hectares, the farmers can save the production cost USD 43 compared to the farmland area by 2.5 hectares, contributing to provide material with cheap price, which Korea imported from other countries, for food processing industries that are strong point of Korean agro-product export. At the same time, the farmland scale-up can help to foster large-scale agricultural businesses.

With activities of Farmland bank program such as selling, buying or leasing farmland (paddy land, upland, and orchard field) can help full-time farm households have priority rights in farmland purchase or lease. The farmland buying and stockpiling of the Farmland bank program helps to stable the farmland market and for emergency demand of the State for necessary projects when the farmland price is expected to fall.

A foundation to foster farmland conservation and rice farming is set up through projects of direct payment for early retirement of aged farmers and reserving farming purchase. The farmland purchasing of the Farmland bank program from the farmland in the agricultural promoted area and farmland owned by retiring or agricultural-leaving farmers, to lease long-term to professional farmers, new farmers, returning farmers, or agricultural corporation is to preserve farmland from the conversion to non-agricultural purposes.

When the farmers are too old or have problem of health and could not do the farming to generate income, surely it may become a serious problem of rural society. The providing of

monthly pension for living support to such farmers by farmland pension project can help to secure farmlands and stable society in the rural areas.

1.2.3. Lessons learnt from farmland consolidation

For agricultural development in Korea, farmland consolidation is very important. The consolidation of small and fragmented farmland area to larger plot size or combine and group the farmland into one area through an administrative give-and-take and a division-and-union of their re-plotted land can increase agricultural productivity, efficient farmland use, apply advanced technology, and use agricultural machinery that can be replaced to manpower at the region, where suffered from agricultural labor shortage like in Korea. Moreover, the enlarged area will reduce production cost, save labor force or expenses on water loss and maintenance of irrigation schemes.

The close linkage between relevant organizations, government at the central and local levels, as well as local people is essential for the success of farmland consolidation project in Korea. The involvement of local people's participation in the project helped local Government to solve problems and to carry out the project in the right way. Thanks to efforts of the local Government, the perception on farmland consolidation of farmers has been changed and the farmland consolidation project had got their support to its implementation, contributing to success of the project.

Finally, financial support is indispensable during the implementation of the project. The implementation of farmland consolidation program requires a lot of money, so the financial support of the Government to this program is necessary.

2. Recommendations for farmland use in Viet Nam

2.1. Farmland preservation and management

Farmland bank program in Korea is good model to learn about the farmland preservation and management. As mentioned in the previous part, farmland bank program was launched to promote the efficiently farmland use, improve the agricultural structure, and prepare expected instability in the farmland market.

In Viet Nam, the farmland is facing with the land fragmentation that limits the agricultural mechanization, irrigation, high production cost and less competitiveness of agricultural products, and the reduction of farmland due to the urbanization and industrialization. Therefore, it should implement a trial model as farmland bank program in Korea for the future farmland reform and adjustment of farmland policies. This model will bring some benefits as follows:

Firstly, activities of the farmland bank program can push agricultural scale-up area. The land fragmentation is one of issues in farmland use in Viet Nam. It limits the mechanization in agriculture, agricultural productivity, increase production cost, or cause loss of farmland. The land consolidation has been implementing in Viet Nam since 1998. However, this process is taking place slowly because farm households thought that farmland belongs to the State and they do not have rights to be involved in the process of land consolidation, and also the farm households do not want to give their LUR that is considered their precious assets to others. The farmland bank

that will be implemented and managed by the Government is as a representative of the State, so LUR transaction through farmland bank, it is easier for the State to merge agricultural plots into larger scale for the agricultural production, and then reallocate or lease these areas to other farm households or agricultural enterprises or agricultural cooperatives. The enlarged agricultural area may bring positive effects, as follows:

- With the enlarged area, it is easier to use agricultural machinery in agricultural production for reducing production cost, saving labor force, and increase land for agricultural production due to breaking field boundaries;
- LUR market can be developed. As said in the above, when agricultural area per plot is enlarged, the efficiency of cultivating in such large area can be recognized by agricultural investors, leading to demand on farmland increase, and of course supply on farmland increases also;
- Enlarged farmland can promote the development of agricultural farms;
- Change in agricultural structure: the increase of LUR transfer means that farm households want to leave farming activities to change their job, leading to agricultural structure changes.

And it is unavoidable during the process of economic development in Viet Nam in the future.

Secondly, the farmland bank can preserve the conversion of rice production land. At the present, the agricultural production land in Viet Nam is reduced because of the rapid process of urbanization and industrialization. In the future, this tendency of reduction of this area will continue happening for the unavoidable demand on economic development and population growth, of course, the area for rice production will also be affected. The Viet Nam's Government has set up a plan on protection of rice cultivation land by 3.8 million hectares up to 2020 for the national food security. And somehow this program may become as one of tools for the Government to preserve the rice cultivation land because its activities aim to preserve the agricultural-promoted area as in Korea.

Thirdly, in Viet Nam, the farmland private ownership is strictly limited; all land belongs to the State ownership. The farm households are given the land use right for long-term and can use the LUR to lease, transfer, exchange, inheritance, etc. The State manages farmland use through the Law, plan on farmland use, and farmland allocation. However, it is difficult for the State to manage transactions related to farmland that are taking place in the secondary market and without recording of the local government due to the high transaction cost. Additionally, the activities of the farmland bank program help farm household avoid the price squeeze on LUR transaction. In Viet Nam, farm households join the LUR market only when their family falls into the crisis. In that case, farm households need money to overcome their difficulties, so that they can transfer their LUR at any price that is surely lower many times than the actual price. And it also takes time for farm household to find the people who need the farmland for their farming. Moreover, the farm households may have to pay for the brokers and other fees related to having record of the local government on this transaction. If the LUR transaction is taken place through the farmland bank, it can ensure the price of LUR transfer, as well as to save time to find the people with demand on farmland for the farm households.

Finally, farmland bank can stabilize the living for retired farmers. In Viet Nam, only people who work for State government agencies, companies, or enterprises can have pension after they retire. For the farmers, they do their agricultural production by themselves and contribute a small

part for agricultural development but they do not have any pension when they age. The farmland pension project is good sample for Viet Nam to make such pension for aged farmers in Viet Nam.

In brief, to be able to application the farmland bank program in Viet Nam, it needs to think about either the farmland ownership of farm households or revision of some activities of the farmland bank program to be appropriated with the context of Viet Nam.

2.2. Farmland use in Red River Delta to respond to CC impacts

The Red River Delta plays a paramount importance in food supply and partly rice export of Viet Nam. However, this region is facing with the small and fragmented size of farming land and reduction of farmland by the rapid process of urbanization and industrialization, especially paddy land. In addition, in the future, it will also be affected by the CC on its farmland use and agricultural production. Hence, it is necessary to improve the efficiency of farmland use from now on, including some elements as follows:

- Consolidate the small and scattered cultivated land size into larger plots for increasing the agricultural productivity, applying agricultural machines, and reducing the production cost and labor cost. In the near future, the tendency of moving to non-agricultural sector of farm households that leads to reduction of farm population and lack agricultural labors is unavoidable for economic growth of Viet Nam. Thus, the process of agricultural mechanization needs to be push up to adapt with this situation;
- Expand the farm-road for transferring easily agricultural products from the field to storage and for the transportation of agricultural machines
- Improve the irrigation and drainage system serving for agricultural production. According to the forecast of the National Institute of Irrigation in Viet Nam, the drainage system of the RRD will be affected by increase of water volume in the main discharge by water from the upstream and existing drainage water volume in the main canals, narrowing area of flood water adjustment in both quality and quantity caused by change of land use structure, change of socio-economic conditions, and process of urbanization. Hence, strengthening and consolidation of irrigation and drainage system is necessary to response to the CC impacts.

To be able to implement these above, it needs to learn experiences from other countries that were very successful in farmland consolidation, especially Korea. Korea has gained positive achievements in its implementation of farmland consolidation that contributed to the miraculous development in agricultural sector. Thus, Korea's experiences can be a good model to be learnt by not only Viet Nam but also other developing countries.

2.3. State management in farmland development policy

The State plays a very important role in the implementation of the projects related to land reform, especially farmland. Without the efficient intervention of the State and proper conductive, the land reform cannot be achieved. The farmland management should be in close combination with the system of land law, directives, regulations, and relevant procedures in order to be able to implement efficiently, fairly and transparently. Moreover, the State should takes consideration into the farmland improvement project having a tide linkage with the farmland reform. To be

able to implement such kinds of these programs, the State needs to be involved both in the establishment, the implementation, and the financial support.

2.4. Involvement of farm households' participation

The role of farm households is very important in efficient farmland reform and farmland use because they are the crucial stakeholders and beneficiaries. In Viet Nam, more than 70% of population is living in the rural area, of which 68% of them are considered agricultural production as their livelihood. Farmland reform aims to use the farmland efficiently for the development of Viet Nam agriculture and increasing income for farm households. Hence, change farm household's awareness and perception on land consolidation or land reform is necessary. The farmland reform will obtain its achievement rapidly if it receives support and consensus of farmers, conversely, it will take time, human power, and expenses for long implementation of farmland reform, somehow affecting to the development of economy of the country.

REFERENCES

1. ADB. 2006. The Industrial and Commercial Land Market Processes and Their Impacts on the Poor.
2. ADB. 2007. Farmland conversion for industrial and commercial use: competing interests of the poor. In ADB (Ed.), *Markets and Development Bulletin* (pp. 85-93). Ha Noi: Asian Development Bank.
3. ANZDEC Limited. (2000). Viet Nam Agricultural Sector Program ADB TA 3223-VIE: Phase I Technical Report: International Food Policy Research Institute.
4. Blarel, B., Hazell, P., Place, F. & Guiggin, J. 1992. The economics of farm fragmentation: evidence from Ghana and Rwanda. *The World Bank Economic Review* 6(2), 233–254.
5. *Businesstimes*. 2014. Agricultural export sees value growth.
<<http://businesstimes.com.vn/agricultural-exports-see-value-growth>>.
6. Cuc, N.S. 1995. Agriculture of Viet Nam 1945–1995. Statistical Publishing House: Ha Noi, Viet Nam.
7. Cuc Nguyen Sinh. 2008. *What to Do for a Sustainable Development in Three Parts of Agriculture in the Coming Time*, Journey of the Centre Board of Propaganda and Education, <<http://tuyengiao.vn/Home/diendan/2008/7/74.aspx>>, quote at 13h23 in 18 July 2008.
8. Dao The Anh. 2004. Study on land consolidation practice in some provinces and propose solutions on encouraging land consolidation to improve the land use efficiency in Red River Delta.
9. Dang Kim Son and Nguyen Do Anh Tuan: Land policy for development in Viet Nam: Opportunities or challenges?
10. DANIDA. 2011. Survey on Rural in 12 provinces of Viet Nam from 7/2008-10/2010.
11. Do Kim Chung, 2008. *Theory of Dual Economy in Rural Development: Experiences of China for Viet Nam*, Economic Studies, # 371, pp. 46-50.
12. Do, Q.T. & Iyer, L. 2003. Land rights and economic development: evidence from Viet Nam. Working Paper 3120, World Bank: Washington D.C. [online]. Available at <http://econ.worldbank.org/files/29142_wps3120.pdf>, 24 September 2003.
13. Eor-Myong Keun. 2014. Korean agricultural export promotion policy. Lecture for KAPEX – Academic Visiting Program in October, 2014 at KREI, Korea.
14. FAO. 2011. Climate change impacts on agriculture in Viet Nam. UNJP/VIE/037/UNJ.
15. General Department of Taxation. 2006. New Decree on Land: Will the New Decree on Land Facilitate the Flow in Real Estate Market? , from <http://www.gdt.gov.vn/wps/wcm/connect/Web+Content/english/news/other/100244_127810?presentationTemplate=Web%20Content/pt_new_detail_print_english>.
16. General Office of Land Administration. 1985, 1987, 1997. Statistics on Land use in Viet Nam.
17. General Statistical Office (GSO). 1985, 1987, 1990, 2001, 2002.
18. General Statistical Office (GSO). 2011. Survey on Rural, Agriculture and Fishery in Viet Nam in 2011.
19. General Statistical Office (GSO). 2012. Census on Living Standards of Households in 2012.

20. Han, S. S., & Vu, K. T. 2008. Land acquisition in transitional Ha Noi, Viet Nam. *Urban Studies*, 45(5-6), 1097.
21. Hoang. (2009). Thousands of Red River Farmer in Fear of Relocation. *Viet Nam Investment News*, 2011. Retrieved from <http://www.VietNaminvestment.net/news>.
22. Hoang Viet. 1999. Issues of farmland ownership in multi-sector commodity economy in Viet Nam (Vietnamese version: Vấn đề sở hữu ruộng đất trong nền kinh tế hàng hóa nhiều thành phần ở Việt Nam). National public house of politic, Ha Noi, 1999.
23. Hong-Sang Kim. 2012. The management and utilization of farmland for green growth from book titled Green growth – agriculture published by National Research Council for Economics, Humanities and Social Science, Seoul, Korea in May 2012, pp. 211-259.
24. Hong-Sang Kim. 2014. Korean agriculture development and farmland system. Lecture for KAPEX – Academic Visiting Program in October, 2014 at KREI in Korea.
25. Hung, P.V., MacAulay, T.G. & Marsh, S.P. 2004. The economics of land fragmentation in the north of Viet Nam. Presented at the 48th Annual Conference of the Australian Agricultural and Resource Economics Society, Melbourne, 11–13 February 2004.
26. Kerkvliet, B.J.T. 2000. Governing farmland in Viet Nam: an overview. ACIAR Project ANRE 1/97/92 ‘Impacts of Alternative Policy Options on the Agricultural Sector in Viet Nam’, November 2000. Research School of Pacific and Asian Studies, The Australian National University: Canberra.
27. Khanh Nguyen Van. 2004. 20 years after renovation of land relationship and agricultural economy of Viet Nam – Achievements and issues. Magazine of historical study of Viet Nam Institute of Society and Science. ISSN.0866-7497. Volume 6 (377), 2004. P4.
28. Khanh Nguyen Van. 2012. Structure and situation of farmland use in the RRD during the renovation (Vietnamese version: Cơ cấu và tình hình sử dụng ruộng đất ở vùng châu thổ Sông Hồng trong thời kỳ đổi mới).
29. Khanh Nguyen Van. 2013. Land ownership in Viet Nam. Magazine of science of the National University, Volume 29, no. 1 (2013) 1-16.
30. Kirk, M., & Nguyen, D. A. T. 2009. *Land-Tenure Policy Reforms: De-collectivization and the Doi Moi System in Viet Nam* (IFPRI Discussion Paper). The International Food Policy Research Institute (IFPRI). Retrieved from <<http://www.ifpri.org/sites/default/files/publications/ifpridp00927.pdf>>.
31. Korea Rural Economic Institute (KREI). 2010. Agriculture in Korea.
32. Korea Rural Economic Institute (KREI). 2013. Farmland utilization and improvements for agricultural production infrastructure: Farmland consolidation.
33. Jeongbin IM. 2013. Farmland policies of Korea.
34. JoonKee Park. 2014. The agricultural policy reform and emerging issues in Korea. Lecture for KAPEX – Academic Visiting Program in August, 2014 at KREI, Korea.
35. JoonKee Park. 2014. The change of agricultural structure in Korea. Lecture for KAPEX – Academic Visiting Program in August, 2014 at KREI, Korea.
36. Lam Thanh Liem. 1995. Policy of land reform in Viet Nam (1954-1994), Southeast Public House, Paris 1995, p. 61.
37. Lan, L.M. 2001. Land fragmentation – a constraint for Viet Nam’s agriculture. Viet Nam’s Socio-Economic Development 26(summer), pp. 73–80.
38. Le, D.P. . 2007. Thu nhập, đời sống, việc làm của người có đất bị thu hồi để xây dựng các khu công nghiệp, khu đô thị, kết cấu hạ tầng kinh tế, xã hội, các công trình công cộng phục vụ lợi ích quốc gia [The income, living and employment farmers whose land ceded for urbanization

- and construction of industrial zones, infrastructures and for public demand and national benefit purposes]. Ha Noi: National Political Publisher.
39. Le Thi Anh. 2014. Fragmentation of agricultural production land in Viet Nam at the present. <http://www.trithucvaphattrien.vn/n1130_manh-mun-dat-dai-san-xuat-nong-nghiep-o-viet-nam-trong-giai-doan-hien-nay>.
 40. Leblond, J.P. (2008). The retreat of farmlands in Thailand. ChATSEA Working Papers. Montreal, Canadian Research Chair in Asian Studies.
 41. Magazine of Finance. 2012. Land policy for “Tam nong” development: set issues. 2012. <<http://www.tapchitaichinh.vn/Trao-doi-Binh-luan/Chinh-sach-dat-dai-phat-trien-tam-nong-Nhung-van-de-dat-ra/14637.tctc>>.
 42. Magazine on Trade and Fishery. 2013. Agriculture with Climate Change – Challenges and Opportunities. <<http://vietfish.org/20131025021116456p48c73t128/nong-nghiep-voi-bien-doi-khi-hau-co-hoi-va-thach-thuc.htm>>.
 43. MARD. 2000. The Legal Documents on Agriculture and Rural Development. Social-Labor Publishing House: Ha Noi, Viet Nam.
 44. MARD, 2009. Project on National Food Security to 2020, Ha Noi.
 45. Marsh, S.P. & MacAulay, T.G. 2002. Land reforms and the development of commercial agriculture in Viet Nam: policy and issues. Australasian Agribusiness Review 10. Available at <http://www.agrifood.info/Review/2002v10/2002_Index.htm>.
 46. MONRE. 2002. Current Situation of Land Resources. Ha Noi.
 47. MONRE. 2009. Scenarios on climate change and sea level rising, for Viet Nam (Vietnamese version: Kịch bản biến đổi khí hậu, nước biển dâng cho Việt Nam). Public house of Natural Resources, Environment, and Viet Nam Map. 2012.
 48. MONRE. 2010. Viet Nam’s second national communication to the United nations Framework Convention on Climate Change. Ministry of Natural Resources and Environment, Ha Noi.
 49. MONRE. 2014. Report no. 1809/BC-BTNMT dated on 15th May 2014 made by MONRE.
 50. Nakachi, S. 2001. Structure of land holding in rural areas and the Land Law. In Cho, K. & Yagi, H. (eds) ‘Viet Nam’s Agriculture under a Market-Oriented Economy’, pp.71–96. Agricultural publishing House: Ha Noi, Viet Nam.
 51. National Assembly of Viet Nam. (2003). *Law on Land* Ha Noi, Viet Nam: Retrieved from <<http://www.VietNamlaws.com/freelaws/Lw13na26Nov03Land%5BX2865%5D.pdf>>.
 52. National Institute of Agricultural Planning and Projection (NIAPP). 2002. Strategy for agricultural development up to 2010.
 53. Nghi T. (2009). Công nghiệp hóa không có lỗi [Industrialization has no fault]. Retrieved from <<http://www.toquoc.gov.vn>>.
 54. Nghia Ta Huu, 2009. Scientific report on tendency of land accumulation in the North area of Viet Nam.
 55. Nguyen Duc Kha, history of land management, pp. 247.
 56. Nguyen, Q. V., Nguyen, H. M., Nguyen, X. M., Pham, Q. H., & Nguyen, V. T. 2005. The impact of urbanization on agriculture in Ha Noi: Results of interviews with districts and municipality officials. Ha Noi.
 57. Nguyen, T. T. 2012. Land Reform and Farm Production in the Northern Uplands of Viet Nam. *Asian Economic Journal*, 26(1), 43-61.
 58. Nguyen, V.S. 2009. Farmland conversion and its effects on farmers in contemporary Viet Nam. *Focaal*, 2009 (54), 106-113.

59. Phien, Vu Dinh. 2001. Mechanization of rice production in Viet Nam. Presented at the International Workshop on Agricultural Mechanization - Issues of Priorities in the New Development Stage, Ha Noi, Viet Nam, December 2001.
60. Pingali, P.L. & Xuan, V.T. 1992. Viet Nam: de-collectivisation and rice productivity growth. *Economic Development and Cultural Change*. 40(4), pp. 697–718.
61. Phuong Hoang Xuan. 2014. Food security, training material of KAPEX program.
62. Quynh Truong Huu, 1993. Rural area in the North of Viet Nam from the farmland ownership view. (Vietnamese version: Mấy suy nghĩ về nông thôn đồng bằng Bắc Bộ từ góc độ sở hữu). *Magazine on History*, volume 4 1993, p. 4.
63. Rural Development corporation (RDC). 1993. Comprehensive bibliography on the agricultural infrastructure project, 1999, p. 593.
64. Sally P. Marsh et al. 2007. Agriculture development and land policy in Viet Nam.
65. Seok-Hwan Yun, 2014. Lecture on Farmland Bank System and Policy in Korea for KAPEX-Academic Visiting Program in November 2014, at KREI, Korea.
66. Sung-Jae Chun, 2013. Farmland bank project of Korea Rural Community Corporation (KRC)
67. Sunghee Han. 2014. Economic Dynamism and shared growth: Lessons from Korea's experience. Lecture for KAPEX – Academic Visiting Program in July, 2014 at KREI, Korea.
68. Tan, R., Beckmann, V., Van Den Berg, L., & Qu, F. 2009. Governing farmland conversion: Comparing China with the Netherlands and Germany. *Land Use Policy*, 26 (4), 961-974.
69. Thang Tran Cong and Dinh Thi Bao Linh, 2014. The Frame of Agricultural Policy and Recent Major Agricultural Policies in Viet Nam.
70. Thien Thu, T., & Perera, R. 2011. Consequences of the two-price system for land in the land and housing market in Ho Chi Minh City, Viet Nam. *Habitat International*, 35(1), 30-39.
71. Toan Nguyen Van. 2003. Study for solutions on farmland fragmentation in Red River Delta.
72. Truong Thi Tien. 1998. Renovation of structure on agricultural management in Viet Nam (Vietnamese version: Đổi mới cơ chế quản lý nông nghiệp Việt Nam). National Publishing House of Politics, Ha Noi, 1998, pp. 8.
73. United Nations (UN). 2012. Viet Nam: some good sustainable development practices, report at the United Nations Conference on Sustainable Development (Rio+20), 2012.
74. The Government of Viet Nam. 2009). *Decree 197/2004/ND-CP*. Ha Noi, Viet Nam: The Government of Viet Nam.
<http://moj.gov.vn/vbqp/en/Lists/Vn%20bn%20php%20lut/View_Detail.aspx?ItemID=7429>.
75. Viet NamNet/TN. 2009. Industrial boom hurts farmers, threatens food supply: seminar, *Viet NamNews.biz*. Retrieved <[http://www.Viet Namnews.biz/Industrial-boom-hurts-farmers-threatens-food-supplyseminar_470.html](http://www.VietNamnews.biz/Industrial-boom-hurts-farmers-threatens-food-supplyseminar_470.html)>.
76. VietTrade. 2013. Rice import and export of Viet Nam in 2013/2014 and some forecasts.
<<http://www.viettrade.gov.vn/go/3475-xut-nhp-khu-go-vit-nam-mua-v-201314-va-mt-s-d-bao.html>>.
77. World Bank (WB). 2001. Viet Nam Economic Monitor. World Bank: Viet Nam.
78. World Bank (WB). 2008. The Middle-term Consultative Group Meeting for Viet Nam. Sapa, Viet Nam: The World Bank.
79. World Bank (WB). 2011. Viet Nam Development Report (VDR), Natural Resources Management.
80. World Bank (WB). 2011a. Compulsory Land Acquisition and Voluntary Land Conversion in Viet Nam: the conceptual approach, land valuation and grievance redress mechanism. Ha Noi, Viet Nam: The World Bank.
81. Woo, Hacheon, 1965, Experience on farmland consolidation, Daehann Local Administration Mutual Aid Association, Local Administration, Vol. 14, 137, 1965, p.83.

ANNEXES

Annex 1: Contents farmland scale improvement project

Activity	Eligible for application	Targeted farmland	Targeted support	Project supports	Support ground
I. FARMLAND SCALE IMPROVEMENT PROJECT					
Farmland trade	Non-farmers, professional and retired farmers	Rice paddies, fields, or readjusted rice paddies and fields in the region of agricultural promotion	<ul style="list-style-type: none"> - Professional farmers under 64 years old with farmland size of over 1.5 ha in paddy land or over 1 ha of upland fields - Agricultural cooperatives with over 5 ha of paddy land or upland - Agricultural corporations with over 10 ha - People be fostered to be professional farmers 20 or 30 years old 	<ul style="list-style-type: none"> - Repayment within 15-30 year, interest rate of 1% in 2014 (previously 2%) - Support level: KRW 30,000/3.3 m² for paddy land - KRW 35,000/3.3 m² for upland field - 10 ha including owned areas, 20 ha for a corporation - Rate of cancellation charges reduced from 15% to 11% 	Article 18 of Korea Rural Community Corporation (KRC) and Farmland Management Fund Act
Farmland long-term lease	professional and retired farmers	Paddy land, fields in farming and fishing villages		<ul style="list-style-type: none"> - Leasing time: 5-10 years - Free interest 	Article 19 of Korea Rural Community Corporation (KRC) and Farmland Management Fund Act
Farmland exchange, division and consolidation	Providing the difference in liquidation money in case of collective land substitution		Providing the difference in exchange, division and consolidation and liquidation money in case of collective land substitution	<ul style="list-style-type: none"> - Repayment in 10 years with interest rate of 1% 	Article 22 of Korea Rural Community Corporation (KRC) and Farmland Management Fund Act
II. FARMLAND PURCHASE AND RESERVATION PROJECT					
	Retired farmers, farmers want to change the job	Paddy land, fields, and orchards inside the agricultural-promoted region	<ul style="list-style-type: none"> - Professional farmers - Startups of farming business - Returned farmers - Individuals and corporation want to 	<ul style="list-style-type: none"> - Purchase price: price of appraisal and assessment with cost KRW 25,000/m² (For Metropolitan city, Sejong Metropolitan Autonomous City, Gyeonggi-do, Gyeongsangnam-do city area: KRW 50,000/m², Chungcheongnam-do, Gyeongsangbuk- 	Article 24-2 of Korea Rural Community Corporation (KRC) and Farmland Management Fund Act

			engage in farming - Priority given to young farmers in age of 20s and 30s	do city area: KRW 35,000/m ² - Lease duration: 5 years (can extend after evaluation) - Rent cost decided between lessor and lessee based on the market price	
III. FARMLAND PURCHASE FOR THE SUPPORT OF BUSINESS WORKOUT					
- Farmers with more than 50% of damage of ratio after natural disasters, or more than 40% of debt to asset ratio - Ag. Coop with debt more than KRW 30 mil.	Farmland and ag. Facilities (immobile greenhouses, barns, mushroom cultivation facilities)	-		Purchase price: appraisal and assessment price (in case of facilities, applied residual appraisal price at the end of the lease), max limit for purchase price by KRW 60,000/m ² - Max limit for support: within the amount of debts (1 mil. USD for farmers, 1.5 mil. For ag. corp) - Rent cost: within 1% of the purchase price of farmland and facilities - Lease period: 7 years, can extend 3 years after evaluation - Buyback price: smaller amount between appraisal and assessment price and price with the 3% interest (farmland), originally purchased price (facilities)	Article 24-3 of Korea Rural Community Corporation (KRC) and Farmland Management Fund Act
IV. FARMLAND PENSION PROJECT					
- Both husband and wife above 65 years old with more than 5 years of farming experiences and own less than 3 ha of farmland	Paddy land, upland, orchards	-		Supported amount determined based on the farmland price and recipients' age - Farmland appraisal: publicly notified individual land price or appraisal and assessment price x assessment percentage x farmland area - Receipt method: 5, 10, 15 years or whole life type (payment as long as the recipient lives)	Article 24-5 of Korea Rural Community Corporation (KRC) and Farmland Management Fund Act

V. ENTRUSTED FARMLAND LEASE PROJECT				
	Farmers who own farmland and ag. facilities, with inability of cultivation due to aging or labor lack	Select lessees among those who applied for farmland lease to engage in farming by leasing farmland	<ul style="list-style-type: none"> - Entrustment period: 5 years (can extension after expiration) 	<ul style="list-style-type: none"> - Price of rental and lease determined by rental/lease price in surrounding area - Payment of rental fees: every year, 5% of the fee deducted as an entrustment fee
	VI. DIRECT PAYMENT FOR TRANSFER OF MANAGEMENT			Article 24-4 of Korea Rural Community and Farmland Management Fund Act Article 7 (maximum limit of farmland ownership) and Article 23 (lease or gratuitous lending of farmland) of the Farmland Act
	<ul style="list-style-type: none"> - Farmers aged bet. 65-70 with more than 10 years of ag. management - Grant will be paid when farmers sell or lease to public corporations, or to professional farmers aged under 60 or farmers aged under 45 with farming experience more than 3 years and with ownership of paddy land, upland fields, and orchards within agricultural-promoted region more than 3 years. 		<ul style="list-style-type: none"> - Payment cost KRW 300/m²/year (KRW 3 mil./ha/year) - Max granted area: 2 ha - Granted payment period: 6 years for farmers under 70 ages, and 10 years for farmers under 66 ages 	Article 11 of the Special Act on the Implementation of Agreement Establishing the WTO The 2 nd chapter of Regulation on Implementation of Direct Payment Program for Producers of Agricultural Products

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