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STRUCTURAL ADJUSTMENTS IN KOREAN AGRICULTURE

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I. Introduction

The rapidly changing environments such as trade liberalization and local autonomy have made significant influence on Korean agriculture and have also led to the structual adjustment in agriculture. Since the finalization of the Uruguay Round Agreement (URA) at the end of 1993, the Korean government has accepted the trading rules determined by the World Trade Organization(WTO) system, which has forced the Korean government to transform its agricultural administrative system from a "closed-protection" system to an "open-competition" one.

In the past, Korean people thought that agriculture should be protected in the aspects of food security and agriculture's nontradable value. Since the WTO system began, however, their perspectives of agriculture have changed. Korean farmers think not only that the agricultural sector should be as strongly competitive as the manufacturing sector or the service sector in an open economy, but also that subsistence agriculture in a "closed protected economy" should be transformed into commercial agriculture in a competitive "open-economy".

The local autonomy, another important environment, was started since the direct election for local government officials was exercised in the middle of 1995. This implies that decentralization should be carried out to meet the needs of the local community. The era of local autonomy has forced the agricultural management system

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to be operated by more democratic fashion.

In order for Korean agriculture to adjust to the rapidly changing environment, a wide variety of agricultural policy reforms have been enacted. These include provisions of new funds, institutional reforms, and changes in the agricultural management system. Furthermore, the principal objective of Korean agricultural policy also changed from the maintenance food production at a constant level to the increase of the competitiveness of the agricultural industry by altering agricultural structure.

Many studies have been conducted in several fields: the processes of agricultural structure transformation(Chung, Young-Il); the productivity estimation(Hwang, Su-Cheol), and the changes and prospects for agricultural structure(Lee, Jung-Hwan). In the light of comprehensive insights, however, there are very few studies to investigate the processes of structural adjustments in Korean agriculture.

This study focuses on evaluating the performances of structural adjustments in Korean agriculture with the macro economic indicators such as economic growth rate, productivity, income, production and consumption patterns, and on-drawing policy issues and policy directions to solve difficulties which arise in the processes of structural adjustments.

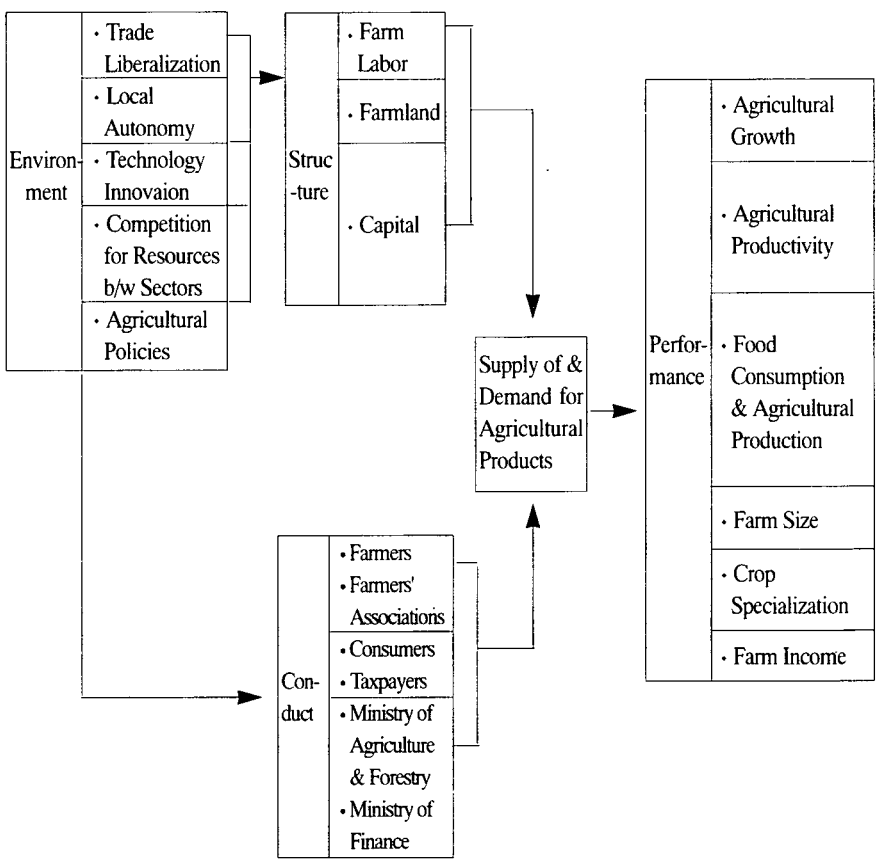
There are many approaches, such as estimations of partial and total productivity and methodologies developed in industrial economics, to investigate changes in economic or market structures. In this paper, the structure-conduct-performance(SCP) paradigm is applied to explain the current situations and to investigate problems occurred in the processes of structural adjustments in Korean agriculture. Economic theory stresses the structure of market(or economy) as being a key factor influencing the conduct and performance of firms, markets, and economy. It is stressed that changes in the agricultural structure should be figured out within the market and economy. Therefore, the SCP paradigm can be one of good analytical systems to understand structural adjustments in agriculture. Although the SCP paradigm cannot possibly be tested by real world data and can often have an unclear theoretical foundation leading to results that are open to more than one interpretation, it provides a good theoretical framework for what has been a descriptive and non-analytical field. The interrelation

of factors in the SCP paradigm is illustrated in Figure 1.

The time series data from 1970 to 1995 in this paper were used for analysis. In order to represent recent changes in agricultural structure specifically, the data after 1990 will be analyzed.

If the policy goal is to improve the agricultural structure, we must understand current situations of the agricultural structure and the directions of structural adjustments in agriculture, investigate the policy issues occurred during these adjustments, and find out policy directions to solve current bottlenecks faced in the processes of the structural adjustments.

FIGURE 1 Structure-Conduct-Performance(SCP) Paradigm for Structural Adjustments in Korean Agriculture



The purposes of this study are, therefore, to identify the current situations and problems arising in the processes of structural adjustments in agriculture and to suggest future policy directions to improve the agricultural structure so that it meets the requirements of a competitive agricultural industry under the WTO system.

II. Current Situations of Structural Adjustments in Korean Agriculture

Because the agricultural structure is defined in several dimensions, the ranges which discuss the agricultural structure are so wide. Some studies focus on the macro sides such as the effects of exchange rate and interest rate on the agricultural structure, and others focus on the micro sides such as the effects of changes in labor, land, and capital on the agricultural structure. Therefore, before we examine how the agricultural structure is changed, the agricultural structure should be first defined appropriately.

The agricultural structure is, in this paper, defined as how farm households combine resources(production factors) such as land and labor available to them. Therefore, the overall transformation of the agricultural structure as an industry will be investigated in terms of production factors' changes composing of the agricultural structure.

Agriculture has traditionally played a fundamental role in Korea's economy. As Korean economy has recently expanded and developed however, the importance of agriculture in the national economy has decreased. The agriculture's share, both in production and employment, has decreased according to the rapid economic growth. Agriculture's contribution to the GDP fell from 28.4 percent in 1970 to 6.6 percent in 1995. The labor force employed in the agricultural sector also declined from 50.0 to 12.0 percent during the same period. The tendency of decline will be continued by the rapid industrial development.

TABLE 1 Position of Agricultural Sector in the National Economy

Unit: %

GDP & Employment in the Sectors	1970	1975	1980	1985	1990	1995
A. Gross Domestic Product	100	100	100	100	100	100
○ Agriculture	26.6	24.9	14.7	12.5	8.7	6.5
○ Manufacturing	22.5	27.5	29.7	30.5	29.7	29.1
○ Construction	6.6	5.9	10.1	10.6	13.7	16.2
○ Services	44.3	41.7	45.5	46.5	47.9	49.4
B. Employment	100	100	100	100	100	100
○ Agriculture	50.0	46.0	34.0	25.0	18.0	12.0
○ Mining & Quarrying	15.0	19.0	23.0	24.0	27.0	24.0
○ SOC & Others	35.0	35.0	43.0	51.0	55.0	64.0

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

1. Changes in Farm Land Use and Farm Size

The average farm size increased slowly, even if cultivated land deceased sharply. The average amount of cultivated farm land per farm household declined from 1.11 hectares in 1985 to 1.32 hectares in 1995 while the total cultivated land declined from 2,144 to 1,985 thousand hectares during the same period. The total farm land for rice paddies declined from 1,325 to 1,206 thousand hectares during the same period. A sharp decline in the market value of rice, the enlargement of farm land's conversion to non-agricultural use, and the dramatic abolishment of marginal farm land explain why land for rice paddies has rapidly decreased.

Table 2 shows that a polarizing tendency in the distribution of farms has been noticed since 1990. From 1990 to 1995, the

proportion of farms which are larger than 2.0 hectares and smaller than 0.5 hectare increased from 37.6 to 42.4 percent while the proportion of mid-size farms(0.5 ~ 2.0 ha) decreased from 62.4 to 57.6 percent. The distribution of farm size has changed in accordance with the direction of farm land transfer activated largely by leasing. The limited opportunity for off-farm employment and the high prices of farm lands have led to an increase in land leasings and a corresponding decrease in land purchases.

TABLE 2 Number of Farm Households by Land Size (Selected Years)

Unit: 1,000 households

Year	below 0.5 ha	0.5 - 1.0 ha	1.0 - 2.0 ha	Above 2.0ha	Total[1]
1970	787(32.6)	824(34.2)	639(26.5)	161(6.7)	2,411(100.0)
1975	691(30.2)	828(36.2)	618(27.0)	148(6.5)	2,285(100.0)
1980	612(28.8)	748(35.2)	629(29.6)	139(6.5)	2,128(100.0)
1985	534(28.4)	686(36.5)	550(29.3)	110(5.8)	1,880(100.0)
1990	483(27.7)	544(31.2)	543(31.2)	173(9.9)	1,743(100.0)
1995	433(29.3)	432(29.3)	418(28.3)	193(13.1)	1,475(100.0)

Note 1: Farm households not producing grains are excluded.
Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

Table 3 shows changes in the number of farm households by crop cultivation. The number of farm households for rice declined from 1,232 to 823 thousands while the number of farm households for fruit and vegetables increased from 107 and 172 to 144 and 247 thousands respectively. The change in the structure of the farm land use has resulted from changes in the agricultural production structure prompted by changes in the food consumption structure.

TABLE 3 The Number of Farm Households by Land Size and Crops

Crops		Land Size					Total
		Under 1.0ha	1.0~2.0 ha	2.0~3.0 ha	Over 3.0ha	No Land	
Rice	1990	692,169 (56.19)*	409,419 (33.24)	99,079 (8.04)	31,172 (2.53)	0 (0.00)	1,231,839 (100.00)
	1995	461,223 (56.01)	241,092 (29.28)	74,361 (9.03)	46,781 (5.68)	1 (0.00)	823,458 (100.00)
Furits	1990	54,765 (51.06)	38,693 (36.07)	9,668 (9.01)	4,133 (3.85)	3 (0.00)	107,262 (100.00)
	1995	76,314 (53.14)	48,113 (33.50)	13,083 (9.11)	6,090 (4.24)	0 (0.00)	143,600 (100.00)
Vegetables	1990	117,460 (68.15)	43,394 (25.18)	8,046 (4.67)	3,421 (1.98)	29 (0.02)	172,350 (100.00)
	1995	157,374 (63.81)	65,536 (26.57)	16,210 (6.57)	7,527 (3.05)	1 (0.00)	246,648 (100.00)
Special Crops	1990	16,941 (43.91)	15,981 (41.42)	4,469 (11.58)	1,174 (3.04)	20 (0.05)	38,585 (100.00)
	1995	18,607 (40.72)	16,562 (36.25)	7,310 (16.00)	3,213 (7.03)	1 (0.00)	45,691 (100.00)
Horticulture	1990	5,451 (85.12)	679 (10.60)	114 (1.78)	113 (1.76)	47 (0.73)	6,404 (100.00)
	1995	7,780 (77.32)	1,547 (15.37)	402 (4.00)	332 (3.30)	1 (0.01)	10,062 (100.00)

* ( ) implies the proportion of the total farms.
Source : MAFF, Statistics in Agricultural Census, 1990, 1995

2. Changes in The Agricultural Labor Force

Farm population has decreased since the late 1960s due mainly to migration to urban areas. As shown in Table 4, the share of farm population decreased from 45.9% in 1970 to 10.8% in 1995. The share of agricultural employment decreased from 50.4% in 1970 to

12.5% in 1995. Many farmers voluntarily left for better opportunities in non-agricultural sectors. The farm population has become smaller, but the percentage of older farmers has rapidly increased. About 36 percent of agricultural employee were over 60 years of age in 1995, compared to 6.3 percent in 1970. The proportion of agricultural employees between the age of 20 and 30 decreased from 47.5 percent in 1970 to 16.1 percent in 1995.

The sharp decrease in young farmers resulted in a shortage of young managers in farming, a high rise in farm wages, and an increase in production costs. In 1990, for example, the male farm wage was 6,500 won per day. However, in 1995, it was 33,237 won per day.

The decline in the farm population has created strong pressures moving away from subsistence production and the commercialization of farm households. It has also suggested the need for an increase in farm size and for labor-saving mechanization, as the age of labor supply has increased and farm wages risen.

Recently, the size of large full-time farms has been increasing; new farmers have increased in those regions having high farm incomes. For the period from 1990 to 1995, 203 thousands new

TABLE 4 Farm Population and Agricultural Employment

Unit: Thousand, %

Classification	1970	1975	1980	1985	1990	1994	1995	'95/'90
Farm Population	14,431	13,244	10,827	5,821	6,661	5,167	4,838	0.726
	(45.9)	(38.2)	(28.4)	(20.8)	(15.5)	(11.6)	(10.8)	
Agriculture Employment	4,916	5,425	4,654	3,733	3,237	2,699	2,541	0.785
	(50.4)	(45.8)	(34.0)	(24.9)	(17.9)	(13.6)	(12.5)	
Ages(%)								
14 ~ 19	14.4	12.9	4.9	1.8	0.6	0.3	0.2	-
20 ~ 29	21.9	17.4	15.5	13.4	6.2	3.7	3.3	-
30 ~ 39	25.6	21.7	19.3	18.2	15.3	14.0	12.8	-
40 ~ 49	21.5	21.7	28.1	26.7	21.6	19.1	19.8	-
50 ~ 59	13.9	17.7	21.0	24.7	32.6	29.6	27.9	-
Over 60	6.3	8.5	11.2	15.2	23.7	33.3	36.1	-

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

farmers were entered from non-agricultural sectors. The 41.4 percent of them are younger than 40 years old.

Table 5, which classifies farm population by crops, indicates that the proportion of population for rice farms declined from 69.6 percent in 1990 to 53.6 percent in 1995, while the proportion of population for vegetables, fruit, and livestock farms increased.

TABLE 5 Farm Population by Crops

Unit: Thousand, %

Crops	1990	1995
Rice	4,637 (69.6)	2,601 (53.6)
Fruits	432 (6.5)	492 (10.1)
Vegetables	646 (10.0)	804 (16.6)
Special Crops	144 (2.2)	148 (3.1)
Flowers	26 (0.4)	38 (0.8)
Upland Crops	387 (5.8)	197 (4.1)
Livestock	359 (5.4)	552 (11.4)
Other	29 (0.2)	17 (0.4)
Total	6,661 (100.0)	4,851 (100.0)

Source, MAFF, Statistics in Agricultural Census, Each Year

3. Agricultural Capital

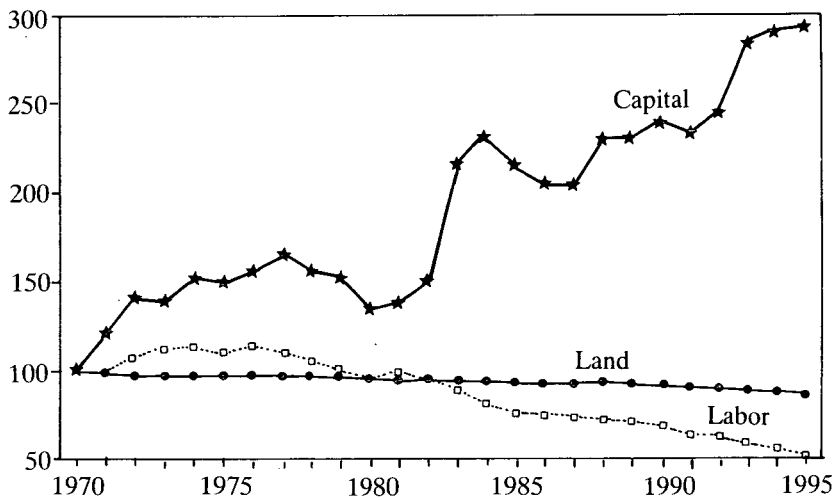
The agricultural capital base in Korea includes so many things, such as breeding herds for producing meats, orchards, agricultural buildings, and so forth. The most important source of agricultural capital is fixed capital such as farm machinery and farm facilities.

The total fixed capital in the agricultural sector increased from about 1.6 trillion won in 1985 to 6.9 trillion won in 1995. The changes in total fixed capital caused changes in the productivity of production factors such as land, labor, and capital.

Farm mechanization has remarkably progressed during the past five years. To meet changing and diverse farming conditions, such as differences in farm size and crop cultivation, rapid progress on farm

mechanization has been under way. In particular, the government policies for farm mechanization account for the rapid spread in the use of sophisticated farm machinery, such as tractors, rice planters, and combine harvesters. The number of farm households per rice planter, for example, decreased from eight farm households in 1990 to five farm households in 1995. As the average age of farmers has increased and farm mechanization has progressed, the farming pattern of rice cultivation has shifted into contract farming for planting and harvesting.

FIGURE 2 Changes in Factor Inputs (Index, 1970=100)



Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

III. Performances of Structure Adjustments in Korean

1. Growth of Agricultural Production

Table 6 shows the growth of agricultural output in Korea since 1970. For the past two decades, the annual growth rate of agriculture has

kept 2 or 3 percent steadity. The agricultural growth rate has slightly declined by 1.9 percent since 1990.

TABLE 6 Values of Agricultural Output and Agricultural Growth Rates (Constant Price in 1990)

Unit: Billion Won

	1970	1975	1980	1985	1990	1995	Rate of Change(%)		
							1975/95	1985/95	1990/95
· Index of Agri. Prod.	63.1	77.2	68.9	93.8	100.0	114.6	2.0	2.0	2.7
· Total Amount of Agri. Output	11,525	14,108	12,581	17,138	18,267	20,927			
· Total Amount of Agri. Output (3 years average)	11,687	14,270	14,219	17,284	18,726	20,658			

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

Figure 3 illustrates changes in values of agricultural output. A cyclical pattern of agricultural growth is indicated with high growth rates in some years and low growth rates in others. Factors causing a cyclical growth are (1) the weather conditions, and (2) shifts in agricultural production from grain to income elastic crops such as livestock, vegetables, and fruits. For example, the annual agricultural growth rate substantially dropped in 1980 because of bad weather.

Looking at the contribution of agricultural commodities to agricultural growth, the trend of rice production has closely related to agricultural growth. The high rate of growth during the 1970s can be attributed to the rapid increase of rice and vegetable production. The drop in the agricultural growth rate in the 1980s is ascribed mainly to the slowdown in rice and vegetable production. This slowdown in rice and vegetable production resulted from cold weather and low profitability of rice production. After the late 1980s, the rapid growth of fruit, vegetable, and livestock production contributed to a slow increase in agricultural growth(Jung- Hwan Lee, 1993).

FIGURE 3 Changes in Agricultural Growth

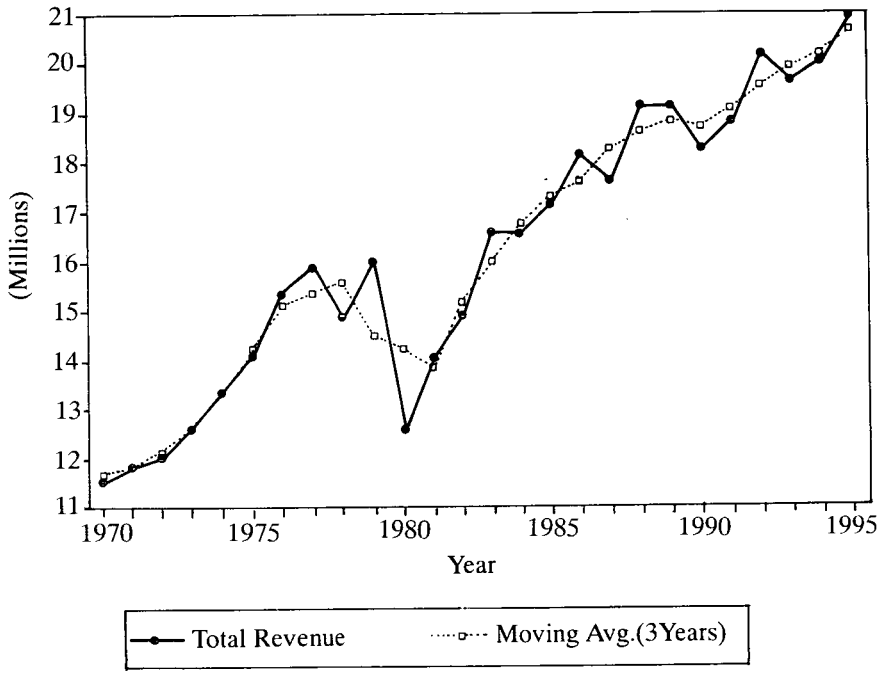


TABLE 7 The Annual Growth Rates by Sectors (Constant price at 1990)

Unit: %

	1971 - 80	1981 - 90	1991 - 95
Total	7.6	13.9	7.0
Agriculture	0.8	6.6	1.8
Manufacture	14.4	13.8	7.6
Service	7.3	13.7	7.8

Source: Bank of Korea, Statistics of Korean Economy, Each Year

Table 7 shows the annual growth rate of agricultural and non-agricultural sectors. The annual growth rate of agriculture was 1.8

percent while that of manufacture and service sectors were 7.6 and 7.8 percent respectively over the last five years.

2. Agricultural Productivity

As shown in Figure 4, labor and land productivity have been continuously increasing during the period from 1975 to 1995. The rapid progress in farm mechanization and modernization of farm facilities has led to a high increase in labor productivity since 1990. Because labor has been rapidly decreasing since the late 1980s, the increase in labor productivity has come about mainly from changes in the land-labor ratios. Labor productivity in 1995 calculated by a constant price was two times higher than that in 1985.

Although the gap in labor productivity between the non-agricultural sector and the agricultural sector has lessened, there still exists big difference between the two sectors. In 1996, the ratio of agricultural labor productivity to non-agricultural labor productivity was 44 percent.

The high yield of rice per hectare due to the utilization of fertilizers and chemicals was an important factor in the striking rise in land productivity before 1977. In other words, the increase in per hectare yield through the development of bio-chemical technology initiated the increase in land productivity in the 1970s. Similarly, increases in livestock and fruit production have influenced land productivity since the early 1980s. Since 1987 the land productivity has been lower due to the low ratio of land utilization. There was an 250 percent increase in land productivity between 1985 and 1995.

TABLE 8 Comparison of Labor Productivity between Agricultural and Non-agricultural Sectors(1990 Constant Price)

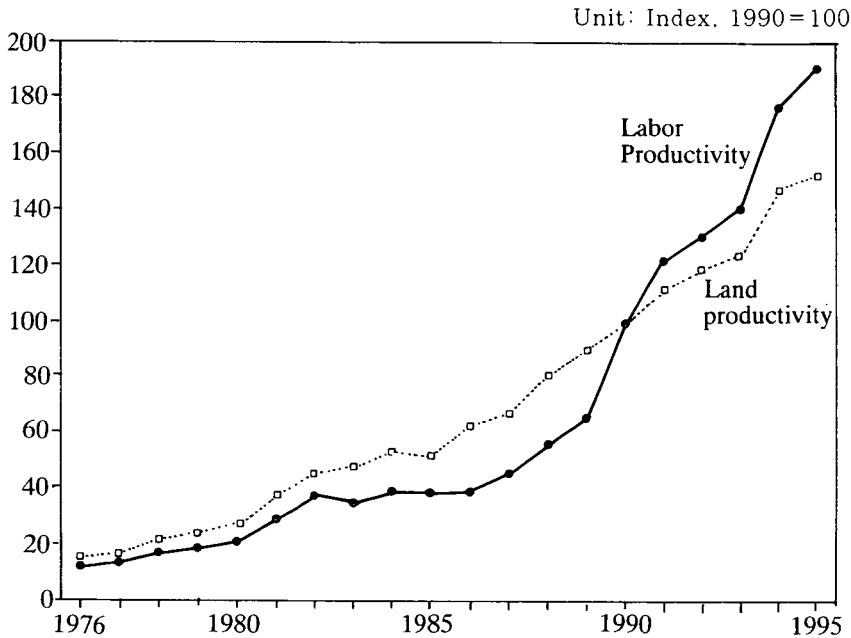
Unit: 10,000 Won

	1972	1982	1992	1996
· Labor productivity in Agri. Sector(A)	187	275	479	594
· Labor productivity in Non-agri. Sector(B)	573	754	1,208	1,351
· A/B	0.33	0.36	0.40	0.44

Source: Bank of Korea, Statistics of Korean Economy, Each Year

The growth rate of labor productivity has exceeded that of land productivity since 1990 because of the rapid progress in farm mechanization and modernization of farm facilities.

FIGURE 4 Changes in Agricultural Productivity

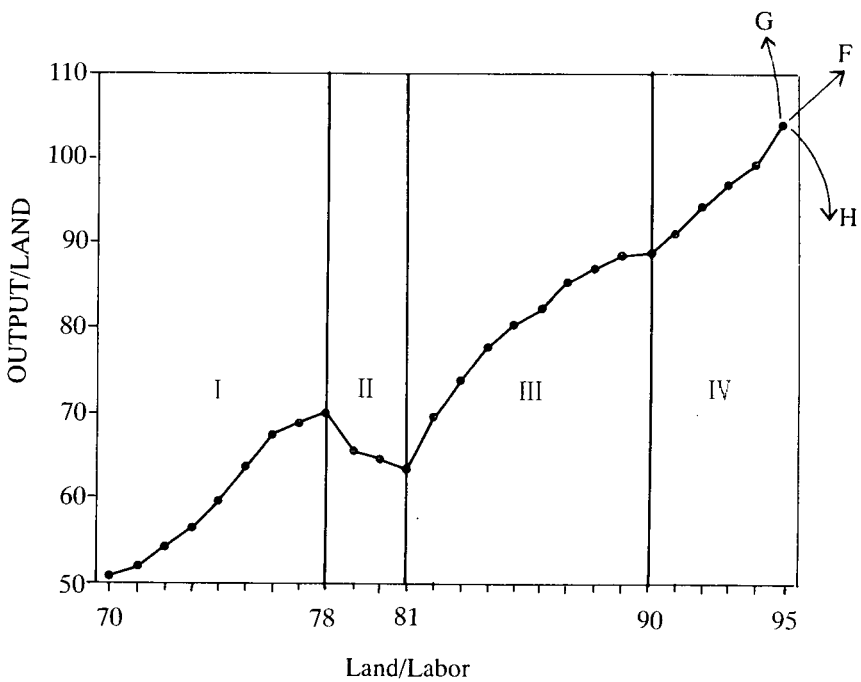


The pattern of productivity growth in Korean agriculture is shown in Figure 5. In order to investigate differences in agricultural productivity among countries, Hayami and Ruttan(1971) reviewed the patterns of productivity growth of many countries in the world. They insisted that the differnet patterns of productivity growth in agriculture are associated with the different patterns of inputs of factors supplied from the nonagricultural sectors relative to the endowments of land and labor. Similarly, Yamada(1975) attempted to figure out the charateristics of productivity growth in Asian countries. Figure 5 was drawn by the same method in which Yamada was applied to investigate the growth patterns of agricultural productivity. Yamada called the path of productivity growth in Asian agriculture as the "S-type".

The x axis in the Figure 5 is the ratio of land to labor which represents the different endowments of resources. The y axis is the land productivity. This diagram attempts to emphasize the importance of resource endowments(the land-labor ratio) in determining productivity growth.

The productivity growth in Korean agriculture can be divided into 4 stages as shown in Figure 5. The first and second stage range from 1970 to 1978 and from 1979 to 1981 respectively while the third and fourth stage cover from 1982 to 1990 from 1991 to 1995 respectively. Except the period of the second stage from 1979 to 1981 when agricultural output was suddenly dropped due to bad weather, the pattern of productivity growth have a similar trend since 1970. The trend shows that the decreasing rate of labor has been

FIGURE 5 The Pattern of Productivity Growth in Korean Agriculture



higher than that of land. It implies that labor productivity growth has been primarily brought about the labor saving technology stimulated by the decrease of labor. A rapid growth of labor productivity in recent years was due to the progress of mechanization.

Depending on the structural adjustment policy, the productivity growth in Korean agriculture may take different path. If the decreasing rate of land is higher than that of labor, the path of productivity growth will choose the G direction in Figure 5. If agricultural output per land is lessened because of bas weather or unsuitable structural policies, the path of productivity growth will take the Hdirection. The same trend will be appeared in the F direction as before.

As a result, the emphasis in agricultural productivity has shifted from land use to increased labor efficiency. The policy issues in relation to the improvement of agricultural productivity are, therefore, how to make rapid progress in farm mechanization and modernization of farm facilities, how to expand the scale of farm operations, and how to enhance quality of farm labor.

3. Food Consumption and Agricultural Production Pattern

Korean dietary patterns have changed significantly throughout the period of high economic growth. As income grows, the consumption of livestock products, fruit, and vegetables has increased. The per capita consumption of cereal decreased from 216kg in 1970 to 171kg in 1995, while the per capita consumption of vegetables and livestock

TABLE 9 Per Capita Consumption by Commodities

Unit: kg

Year	Cereal		Livestock (Meat)	Vegetables	Fruit
	Total	Rice			
1970	216.1	133.8	8.4	65.6	12.0
1975	193.0	120.0	9.3	62.5	14.0
1980	185.0	132.9	13.9	120.6	16.2
1985	185.4	128.0	16.5	98.6	26.6
1990	175.4	120.8	23.6	132.6	29.0

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

increased from 65.6kg and 8.4kg to 158.5kg and 31.5kg, respectively.

Despite these changes, however, the traditional dietary dependence on rice, major Korean staple crop, has sustained. Although per capita consumption of rice has recently declined, this trend is not expected to continue at the same pace as before.

Changes in the pattern of food consumption have led to changes in the agricultural production structure. Grain production decreased from 7,559 thousand m/t in 1970 to 5,450 thousand m/t in 1995, while the production of vegetables and livestock increased from 2,433 thousand m/t and 268 m/t in 1970 to 10,696 thousand m/t and 1,437 thousand m/t, respectively, in 1995.

TABLE 10 Production by Crops

Unit: 1,000 M/T

Year	Cereal		Livestock (Meat)	Vegetables	Fruit
	Total	Rice			
1970	7,559	3,939	268	2,433	428
1975	7,720	4,445	328	2,892	665
1980	7,614	5,136	516	7,298	833
1985	6,414	5,682	689	7,106	1,461
1990	6,448	5,898	1,054	8,752	1,766

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

4. Farm Size and Regional Crop Specialization

The expansions in farm size and modernization of farm facilities have appeared with income elastic crops such as livestock, horticulture, and special crops. The scale of business in the livestock and horticulture industries has progressed while the size of rice farms has increased slowly. The livestock industry has especially shown a rapid expansion of business scale. The industries of subsidiary livestock like hogs, chickens, and dairy cattles have developed towards more commercialized industries while the raising of Korean native cattles has remained a semi-commercialized industry.

As commercially specialized farming has progressed, farming

types have become specialized in accordance with the specific features of various regions. For example, Kyung-gi province has been specializing in livestock and horticulture while Kang-won province has been specializing in vegetables.

TABLE 11 Farm Size of Specialized Farm Households by Crops

Unit: 1,000

Year	Total Farm Household	General[1] Farm Household	Upper Level of Business Scale[2]						
			Sub -Total	Grain	Cattle	Dairy	Hog	Chicken	Vegetable
1975	2,379 (100.0)	2339.1 (98.3)	39.9 (1.7)	36	0.3	2.5	-	0.2	0.9
1980	2,156 (100.0)	2116.2 (98.2)	39.8 (1.8)	31	1.1	5.7	-	0.7	1.3
1985	1,926 (100.0)	1880.2 (97.6)	45.8 (2.4)	23	5.0	12.8	0.2	1.9	2.9
1990	1,767 (100.0)	1689.5 (95.6)	77.5 (4.4)	44	5.5	20.4	0.4	2.2	5.0[3]
1995	1,499 (100.0)	1369.5 (91.4)	129.5 (8.6)	70	20.7	20.0	1.1	2.7	15.0[4]

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

Note: 1 A farm household which produces mutiproducts.

2 The upper level is defined as a farm household which has its major income from one commodity. The size criteria are as follows : for grain, more than 3.0ha : for cattle, more than 20 heads : for dairy, more than 10 heads : for hog, more than 1,000 heads : chicken, more than 10,000 heads : Vegetable, more than 0.5 ha.

5. Farm Income

The average farm income rose 13.6 percent annually during the period from 1990 to 1995. Farm income rose by 190 percent, from 13,105 thousand won in 1990 to 21,803 thousand won in 1995. Although grain crops represent one of the most important sources of income for farmers in Korea, the recent increase of agricultural farm income was mainly due to the expansion of gross revenues in the vegetable, special crops, livestock and fruit sectors and a relatively

slower growth of farm costs due to farm mechanization.

Non-agricultural income increased to 11,334 thousand won in 1995, which is 52.0 percent of the total farm income. The ratio of non-agricultural income to total farm income was 46.3 percent in 1991, while it stood at 50.2 percent in 1993 and 52.0 percent in 1995, remaining at about 50 percent of the total farm income over the past few years.

The relatively high percentage increase of off-farm income in 1995 was due to the significant increase in wage and salary earnings from secondary jobs. However, non-agricultural income in neighboring countries, for example, in Japan and Taiwan, was considerably higher.

TABLE 12 Changes in Farm Income

Unit: 1,000 Won, %

	1991	1992	1993	1994	1995	95/90	Growth Rate(%)
Farm Income	13,105 (100.0)	14,505 (100.0)	16,928 (100.0)	20,316 (100.0)	21,803 (100.0)	1.9	13.6
Agricultural Income	7,035 (53.8)	7,356 (50.7)	8,427 (49.8)	10,325 (50.8)	10,469 (48.0)	1.7	10.5
Off-Farm Income	3,662 (27.9)	4,423 (30.5)	5,040 (29.8)	6,184 (30.4)	6,931 (31.8)	2.4	17.3
Transfer Income	2,408 (18.4)	2,726 (18.8)	3,461 (20.4)	3,807 (18.8)	4,403 (20.2)	2.3	16.3

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

IV. Agricultural Policies for Improving Structural Adjustments

In general, government intervention in agriculture is justified in the aspects of mitigating market failure, of preserving stable agricultural production, of enhancing agricultural productivity, and of improving welfare of farmers. Many agricultural policies are financed by government subsidies because of market failure, externality, and low profitability appeared in the agricultural sector. The most common types

of government intervention in Korean agriculture have been price and income supports through various farm credit policies. Korean farmers have been extensively assisted by various agricultural policies such as farm credit polices, input subsidy policies, and import restriction policies. Especially, price support policies, farm credit policies, and import restrictions were the important agricultural policies.

Since the launch of the WTO system, however, the rules of operating farm programs have changed. The price supports for agricultural products which placed their emphasis on securing agricultural income will be abolished and be transformed into the direct payment programs for the group of farmers with the low level of farm income. It is expected that this revised policy will serve to minimize the market distortion and to maximize the policy effects on farmers' welfare and agricultural productivities.

With this movement of changing policy measures, agricultural policies for structural adjustments in Korean agriculture are emphasized in enhancing the competitiveness of agriculture in the era of the open agricultural market, in reducing the productivity differences between the agricultural and non-agricultural sectors, and in reducing income disparity between the two sectors.

The major agricultural policies for structural adjustments in Korea are (1) land base development policies which include irrigation and drainage system development, and farm land expansion, (2) policies providing farm households to expand their farm size and the scale of farm operations with favorable credit conditions, (3) policies to foster specialized full-time farmers and young farmers, (4) policies to promote farm mechanization, and (5) policies to develop agricultural corporations which are established to overcome the weaknesses of individual farming.

V. Policy Issues Raised in the Processes of Structural Adjustments in Korean Agriculture

The changes occurred in the overall structure of the economy and environments surrounding Korean agriculture have resulted in a number of policy issues in relation to structural adjustments in agriculture. In particular, the following issues should be listed to

improve agricultural structure in the future.

1. Low Agricultural Productivity

Although the productivity of agriculture has improved considerably, a large discrepancy still remains when compared to other industries. labor productivity in agriculture increased over the years from 1.9 million won in 1972 to 5.9 million won in 1996, the ratio of labor productivity in the agricultural sector to that in the nonagricultural sector slowly lessened from 0.33 in 1972 to 0.44 in 1996.

The productivity disparity between agricultural and non-agricultural sectors is due mainly to competition for resources, low prices of agricultural products, relatively slow development of technology, mechanization, and automation in agriculture.

The disparity of income between farm households and non-farm households has been lessened since 1990. As already described in previous chapter, the rate of agricultural income out of the total farm income still stands at about 50 percent, which is relatively high compared to neighboring countries as Japan and Taiwan.

In summary, the disparity in productivity between agricultural and non agricultural sectors still remains, but the gap in farm household's income lessens by the similar level.

The main objective of agricultural policy is to improve the productivity of agriculture and to balance the income of farmers with that of workers in other industries.

2. Declining the Self-Sufficiency Rate and Increasing Import of Food

As shown in Table 13, the total self-sufficiency rate of grains dropped from 80.5 percent in 1970 to 26.7 percent in 1996. Compared to other developed countries such as the United States, Canada, France and so forth, the level of self-sufficiency rate in Korea is low. The self-sufficiency rate of grains in Japan is 33 percent which is a little higher level than that in Korea.

The self-sufficiency rate of meats and vegetables in Korea are 89 and 99 percent, respectively, which are higher than that of Japan and England. It implies that Korea has higher self-sufficiency in

vegetables and fruits while most developed countries are concerned about the self-sufficiency of grains and meats.

The self-sufficiency rate of grains except rice has dramatically declined, and the amount of grain import has increased. The total amount of imported agricultural products amounted to 4,398 million dollars in 1991, and increased to 8,152 million dollars in 1996.

Thus, the policy concern is how to secure a stable supply of foodstuff to the public. In selecting agricultural policies, it is important to consider an appropriate combination of domestic production, imported agricultural products, and the amount of reserved stocks.

TABLE 13 The Trend of the Self-Sufficiency Rate of Cereal

Unit: %

	Total	Rice	Barley	Wheat	Corn	Bean	Potato	Others
1970	80.5	93.1	106.3	15.4	18.9	86.1	100.0	96.9
1975	73.1	94.6	92.0	5.7	8.3	85.8	100.0	100.0
1980	56.0	95.1	57.6	4.8	5.9	35.1	100.0	89.8
1985	48.4	100.3	63.7	0.4	4.1	22.5	100.0	11.6
1990	43.1	108.3	97.4	0.05	1.9	20.1	95.6	13.9
1995	29.1	91.4	67.0	0.3	1.1	9.9	98.4	3.8

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

3. Competition for Land Use between Agricultural and Non-Agricultural Sectors and Increasing Idle Land

The rapid economic development has caused a competition for land use between the agricultural and the non-agricultural sectors. The high return of land for non-agricultural use prevents land being used for agricultural production. Since the land for agricultural production has decreased and the paddy field for rice gave way to non-agricultural use, the land for agricultural production is not enough to secure food at the stable level. The self-sufficiency rate of cereal dropped from 56.0 percent in 1980 to 29.1 percent in 1995.

TABLE 14 The Decline of Cultivating Land

Unit: 1,000 hectares, %

	Cultivated Land	Increase or Decrease			Non-agri. Use	Idle Land	Land Utilization Ratio
		Increase	Decrease	Net Decrease			
1980	2,197	3.2	14.5	11.2	9.8	-	125.3
1985	2,144	5.7	13.6	7.9	2.1	20.2	120.4
1990	2,109	3.9	21.8	17.9	10.6	40.4	113.3
1995	1,985	15.6	63.1	47.5	16.3	64.6	108.1

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

There has been lots of speculation for acquiring farm land, especially land in the non-agricultural promotion zones. Speculation on farm lands have led to uprising of farm land price. The rapid rising of farm land price has resulted in increasing land lease for farming rather than land owonership.

The structural policy of government intervention in the land market to effectively mobilize farm land resulted adversely in a rise in land prices. As farm land values rose, the rent on farm land also increased.

In spite of rising price of farm land, the area of idle land are expanding due to labor shortage, high labor wage, and low prices of agricultural products. There has not been any suitable plans or policies to curb the expansion of idle land.

4. Limited Expansion of Farm Size in the Land-Intensive Farming

The scale of business in the livestock and horticulture industries has developed while the size of rice farms has increased slowly. The reasons for comparatively slow increase in the average size of rice farms are due to the fact that most rice farmers prefer to subcontract for their labor than to lease their farm lands. The reasons can be divided basically into two categories of (1) political or economic factors and (2) personal factors relating to the farm household. First, the political or economic factors are as follows :

a) expectation of high profit from farm land,
b) increasing demand for farm land because of government policies which provide favorable conditions in purchasing farm land to enlarge farm size, and that the price of farm land is always increasing, and
c) widespread subcontracting rice farm operations such as planting and harvesting are more profitable to rice farmers than leasing their lands.

Second, the personal factors of the farm household are associated with the rising numbers of farmers who prefer to subcontract for labor they are unable or unwilling to do themselves. If they can not afford necessary labor, they prefer leasing rather than selling of their lands, which will be bequeathed to their heirs.

As the contributions of livestock and labor-saving techniques to the agricultural growth increase, the importance of land utilization in agricultural growth can be reduced. This implies that structural adjustments focusing on land utilization will not have huge impact on agricultural growth. Although the structural policies to expand the scale of farm operations and farm size through mobilization of farm land have been set in higher priority, the performance in the expansion of farm size for rice farming has not been better.

Another evidence of showing performance in expanding farm size in the land-intensive farming is the number of part-time farmers. As farm size expands, it is expected that the number of full-time farmers will increase. As shown in Table 14, however, the number of part-time farmers with small size farm increased due to the oversupply of farm machinery, the high price of farm land, increasing opportunities of obtaining non-agricultural income, and the seasonal characteristics of rice farming.

Japan also has similar experience in expanding the scale of farm operations. The average farm land per farm household increased only 0.26 hectares for two decades(from 0.88 hectares in 1960 to 1.14 hectares in 1990). The high price of farm land prevent them from expanding the size.

TABLE 15 The Trend of Full-Time and Part-Time Farmers

Unit: 1,000, %

Year	Total	Full-Time Farmers	Part-Time Farmers
1970	2,488	1,681(67.6)	802(32.4)
1975	2,379	1,917(80.6)	462(19.4)
1980	2,155	1,642(76.2)	513(23.8)
1985	1,926	1,518(78.8)	408(21.2)
1990	1,767	1,052(59.6)	715(40.4)
1995	1,499	853(56.9)	646(43.1)

Source: MAFF, Statistics for Agriculture, Forestry, and Fishery, Each Year.

5. Shortage of Farm Labor with Good Management Skills

The continuing outflow of labor force to non-agricultural sectors drawn by better terms and working conditions has further exacerbated the problem in the agricultural sector. That is, the persistent labor shortage and high wages have pushed up the production cost and weakened the competitiveness of domestic agricultural products.

The problems of labor force in agriculture can be divided into two categories. One is to foster well-trained farm managers. Since the agricultural sector does not have enough labor force with good management and farming skills, fostering professional young farmers is an important measure in developing agriculture.

The other is absolute labor shortage. The demand and supply of agricultural labor depend substantially on cultivated crops, regions, and seasonal pattern. Although labor force in agriculture continues to shift to the non-agricultural sectors by the levels of developed countries, the labor shortage in rural areas is severe in cultivating specific crops, certain regions, and high-peak seasons. For example, the labor shortage exists in planting and harvesting seasons in rice farming. The labor shortage problem in the hilly and mountainous regions is severe. The largest difficulty in enlarging management scale of livestock industries is to attain labor.

The policy issues are, therefore, (1) how to foster professional

young managers with good management skills, and (2) how to alleviate labor shortage problem prevalent in cultivating specific crops, certain regions, and seasons.

IV. Policy Directions to Improve Structural Adjustments in Agriculture

The changing environment such as trade liberalization and local autonomy requires various agricultural plans or policies to be changed. Before devising agricultural plans or programs to be changed, it would be necessary to prepare policy directions to improve agricultural structure.

Despite declining share of GDP and the total employment, the agricultural sector still contributes significantly to the national economy. Under the new international scheme, agriculture should be a more competitive and stable industry through improving agricultural structure, which can provide a safe and stable supply of farm products at resonable prices.

With respect to improving the agricultural structure, there are at least six policy directions to be considered.

1. Improving Agricultural Productivity and Farm Income

Am major task of structural adjustment policy in agriculture is to improve agricultural productivity and to increase farm income. In order to increase farm income and to maintain the same level of productivity as developed countries, it is essential to improve agricultural productivity especially through increasing labor efficiency. For example, the ways to improve agricultural productivity are to make rapid progress in farm mechanization and modernization of farm facilities, to expand the scale of farm operations, and to enhance quality of farm labor.

2. Stabilizing Food Supply

Food production should be stabilized by ensuring specific level of food self-sufficiency. In order to secure a stable supply of food at

resonable prices, policymakers should decide the optimal combination of domestic production, import, and reserved stocks with mid and long-term forecasting of food supply and demand. The declining self-sufficiency rate for food should at least be ended. Particular programs should be developed for domestic production to be expanded.

It is a very sensitive political and economic issue whether we should maintain the self-sufficiency of rice, the basic staple crop, solely with domestic production or not. However, the self-sufficiency of rice except MMA should be the basic direction of the policy. Distribution control is also needed to secure the stable supply of rice and other agricultural products. The introduction of market principle turned out to be more efficient than the previous direct control on the rice market.

3. Activating Land Mobilization for Farm Size Expansion

In order to improve productivity through a more effective and efficient use of resources, it is essential to expand farm management scale. At the production stage, production should be achieved in large scale while value added products should be marketed at the distribution stage. Small farms should be consolidated into larger farms through alleviation of restrictions regarding farm land transfer. The examples of restrictions include upper limit of land holding and requirements for agricultural corporations.

In the past, the structural policy of government intervention in the land market resulted in a rise of land prices. As farm land values rose, the rent on farm also increased. Since those who want to be full time farmers could have favorable loans to purchase farm lands, the price of farm land became higher than before. Therefore, in order to actualize farm land mobilization, land suppliers on the other end should be emphasized. For example, a deduction of the transfer income tax for land can be offered to land owners who will participate in the long-term lease of farm lands.

Idle land should be also utilized through the active implementation of land base development program. An institutional mechanism should be devised for the private sector being able to use idle land through joint venture projects or land lord in trust schemes.

4. Fostering Professional Young Farmers and New Entry Farmers

The agricultural sector played the role of supplying labor to non-agricultural sectors such as manufacturing and service industries. Since the number of farm households and those employed in agriculture will be continuously decreased to the level of developed countries due to ongoing economic development, special plans should be prepared to secure young farmers working in rural areas.

The practical training programs for young farmers should be enacted to make them learn advanced farming techniques, to provide favorable loans with low interests, and to learn new technical know-how, and management skills.

Since the size of large full-time farms has been increasing and new farmers have increased in those regions having high farm income, the well-devised programs should be developed for those who have already entered into the agricultural sector and who want to settle down in rural areas.

5. Adjusting Agricultural Production Reflecting Consumer Taste

As we already discussed in the previous chapter, the production structure is followed by changes in the pattern of food consumption. The production structure should be more flexible to reflect changes in consumers' taste. It implies that the market mechanism should be well functioned because changes in consumers' taste are closely linked to changes in production structure by the price signal.

6. Vitalizing Agro-based Industries

As the economy grows, the interrelationship between agricultural and non agricultural sectors becomes more active. It is expected that the share of food industries, backward and forward industries, will be higher than that of production. If agriculture is recognized as an industry producing agricultural commodities, the role of agriculture in national economy would be underestimated. If agriculture as an industry includes the agro-based industries, argriculture's contribution to the GDP and total employment will be 22.5 and 19.2 percent in 1995, respectively.

Although the portion of agriculture both in production and employment has decreased, the role of agro-based industries relating to production, processing, and service industries for agricultural products based on the rapid growth of food industries have been increased in the economy.

As a result, there is a necessity to develop the backward and forward linkages of the sectors.

IV. Concluding Remarks

In order to deal with the rapidly changing environment such as trade liberalization and the problem of local autonomy, the Korean government has implemented a comprehensive master policy entitled, "Agricultural Development Plans", which especially focuses on improving the agricultural structure and enhancing the farmers' living standard.

The basis of the plan is the belief that only structural reform can solve the present agricultural problems. Special emphasis has been given to policies aimed at increasing farm size limits, relaxing regulations on the land use, expanding the scale of farm operations, sustaining agricultural production, and transfering land to young full-time farmers.

The purposes of this study are to identify the current situations and problems arising in the processes of structural adjustments in agriculture, to suggest future policy directions in managing structural adjustment programs in agriculture, and to recommend ways of improving the agricultural structure so that it meets the requirements of competitive agricultural industry under the WTO system.

The structural adjustment programs can be explained to achieve economies of scale including offering special long-term credits, a relaxation of limits on maximum farm size, and infrastructural development.

There will be major agricultural policies for structural adjustments focused on land base development, to expand farm size, to foster specialized full-time farmers and young farmers, to promote farm mechanization, and to develop agricultural corporations.

One of the conflicts faced in implementing agricultural policies

for structural adjustments is that it is difficult to put farm land to use by intervening in the land market. Fostering specialized full-time farming is also not easy. The land and labor markets in the agricultural sector are not controlled by only the government policies. Rather, these two markets are greatly affected by general economic situations. Even though the structural adjustment policies have been implemented, part-time farmers with small size farm have increased more than full-time farmers with large size farm.

Japan has already had similar experiences in structural adjustments. Many experts agree that Korea will continue to have results similar to Japan's because of comparable conditions surrounding agriculture such as the drastic shortage of labor, high price of land, the decrease of farm land, and so forth.

Therefore, there is no doubt that agricultural policies for structural adjustments have some limitations. As the economy grows, land becomes a less important factor in agricultural production and capital, technology, as well as management become more important factors influencing the agricultural production. All agricultural commodities (such as rice and fruit) are much more affected by the industrial structure than by the farm production structure or land ownership. For example, structural adjustments had little effect on vertical integration problems in the livestock sector, the market power of small number of producers, and the market regulations concerning the exit and entry of farmers.

Structural adjustments focusing on land base development will be continued, but it is obvious that the policies to control important production factors - land and labor - have very limited functions in solving current rural problems. As the interrelationship between rural and urban economies grows deeper, the market force rather than a structural adjustment policy will be the greatest influence on the rural economy. An adequate combination of the two main factors, policies for structural adjustments and the market force, is necessary for steady agricultural growth and development.

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