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## **STRUCTURAL CHANGES AND FORECASTS OF AGRICULTURAL ECONOMY**

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**key words:** economic forecast, econometric model, agriculture income and value added

### **ABSTRACT**

The employed in the agriculture, forestry, and fishery sector at 2001 are projected to decline by 2.3 % compared to the previous year. The decreasing rate, however, is reduced due to increases in unemployment rate in the non-agricultural sectors. The cultivated area in 2001 is expected to decrease by 1.5 % compared to 2000. The agricultural value added in 2001 at 1995 prices would decline little and mark minus growth rate, -1.5 % because production in grain including rice, and livestock is projected to be stagnant or decreased. The agricultural income in 2001 is expected to decrease 5.1 % compared to that of 2000. The average farm household income, however, is projected to increase 0.5 % due to decreases in number of farm households.

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## **I. Introduction**

### **1. Situations and Forecasts in the World Economy**

#### *1.1. Economic Growth*

The world economy grew around 4.2 % in 2000 due to high growth of US and EU economy. The growth of the world economy had recorded 5% during the first half of 2000 compared to the same period of 1999. Because of the price increase in the crude oil and depression of the U.S. and the Japanese economy, however, the growth rate of the world economy was downward during the second half of 2000.

The US economy in 2000 continuously grew around 5.0% that was the highest boom since 1984 even though the growth rate was dampened in the second half of 2000. The growth rate of the Japan economy was around 1.7% on the annual average. In the first quarter, she recorded higher growth rate but recorded minus growth rate owing to decrease in exports and domestic investments in the second half. In the case of EU, trends of economic recovery have been continued since 1999 because of increases in export and household consumption. Her economic growth rate in 2000 was about 3.3% on the annual average. In the developing countries, China showed 8.0% at the annual average growth rate. Pacific rim countries grew from 6.2% in 1999 to 7.1% in 2000 on the annual average. Latin America, Eastern Europe, and former USSR showed the annual average growth rate, 3.1%, 3.8%, 7.5%, respectively, which was higher than that in the previous year.

The world economic growth rate in 2001 would be projected 2.6~3.8% on the annual average. The risk of a US recession and the uncertain recovery of Asian economy owing to the depression in the information and telecommunication sector would stir pessimistic expectations. The slow growth rate of EU economy stirred by worrying about the inflation, foot and mouth

disease (FMD) and mad cow disease is also projected. The Japanese economy would fall in a long-term recession with the dampening of domestic consumption expenditure and private equipment investment due to reduction of industrial productions and increase in inventory. The recession of the Latin America propelled by the financial crisis of Argentina would make the world economy not to be in positive aspects. In Asian countries, except the mainland China, slow economic growth is also projected.

The economic growth in US would be projected 1.7%, the EU would grow around the mid of 2%, Japan will grow less than 1%, on the annual average, in contrast that China could grow 7% on the annual average because of increases in exports, private consumption expenditure, and the equipment investment.

### *1.2. Price Level in Crude Oil, World Trade Volume and Foreign Exchange Rates*

The world trade volume in 2001 is projected 5.7% increases compared to 11.9% increases in 2000 because of declines of the growth rate in the world economy. According to WEFA (the Second Quarter 2001), the growth rate of world trade volume of raw materials, fuel and energy, manufactured goods is projected 4~5% in this year.

The price levels of crude oil show the downward stability due to the rapid contraction of the world economy. In the first quarter of 2001, the price levels of crude oil were rapidly upward due to the deficiency of inventory in US and the instability of international financial markets, temporally. Reopening of crude oil exports in Iraq, increases in international inventory, and reduction of demand for crude oil induced by depression of the world economy project the price level of crude oil remaining US\$ 24~25 per barrel on the annual average in this year.

The trend of strong US dollar would be continued in this year due to inflow of foreign capital with the instability of other economy even though decline of US economy and the expansion of fiscal deficit are projected. Japanese Yen / US Dollar is

forecast around 120. Euro is forecast appreciation a little bit in the process of value adjustment between Euro and US dollar.

## **II. Situations and Forecast in Domestic Economy**

### **1. Situations of Economy in 2000**

The Korea economy in 2000 grew 8.8% on the annual average in comparison with 10.9% in 1999. In the first half, the growth rate was 11.1%, but since the last quarter the growth rate was declined 4.8% because the price level of semi conductor has been decreased, the growth rate of exports was declined, and the tightness of credit propelled by the unsatisfied structural adjustment. Therefore, the domestic consumption and investment expenditure has shrunken.

Overall industry grew 9.2% whereas grew 11.0% in 1999. By industry wise, the growth rate of manufacturing sector was 15.4%, service sector was 9.0%, and the agricultural sector was 0.1%. The agricultural sector grew 1.8%, 2.1% at the second and third quarter compared to the same quarter in 1999. The competing reason of lower performances of the agricultural sector would be from the FMD and the unusual climate changes. The growth rate of the last quarter, however, was 2.0% showing the recovering trend.

The overall growth rate of domestic consumption expenditures was 6.2% due to the growth of private consumption expenditure, 11.0%, while the government consumption expenditure grew only 1.3%. The private consumption expenditure in the last half has been shrunken because of the deteriorated real purchasing power due to declines in terms of trade, the psychological impacts with the plausible recession, which brought the decrease in consumption expenditures on the durable goods.

The consumer price level increased 2.3% in comparison with 0.8% in 1999 due to the increase in the international crude oil price, medical insurance cost, and public utilities charges transportation fee, electric power charges, etc.

In the agricultural sector, the price level increased 2.0% on the annual average. The price level of agricultural products in the first quarter increased 1.4% due to the seasonal factors the New Year celebration, those of the second quarter decreased 2.1% by declines in meat demands due to FMD. In the third quarter, the supply shock by the monsoon impacts and the recovering demands for livestock products brought the price level 7.5% in comparison with the same quarter of previous year. In the last quarter, however, the price level of agricultural products showed 7.3% because of the stable supply and demand condition, and harvesting.

The unemployment rate reduced to 4.1% in 2000 from 6.3% in 1999 on the annual average, as results the unemployment reduced to 889 thousands person from 1,353 thousands person. In the agricultural sector, however, the employed reduced by 2.7% whereas the overall employed increased by 3.8% in comparison with the previous year. The structure of employment was worsened, the portion of temporary employed increased from 31.9% in 1999 to 32.7% in 2000. The increase of the temporary employed meant the worse of income distribution as well as the deteriorated employment structure.

The total volume of exports was 175 billion US dollars in 2000. The export increased 19.9% in comparison with that of 1999 in terms of US dollar. The electrics and electronics increased by 35.4%. Especially the information and telecommunication products led the total exports increased by 68.0% during 2000. Therefore, the portion of the information and telecommunication sector among the total exports increased from 5.9% to 7.9% during 2000.

The imports volume in 2000 was 159 billion US dollars It increased 34.0% with respect to those of 1999. Until the third quarter, the imports had increased due to the increase in the international crude oil price and the domestic demand caused by booming of national economy. The products related to the information and telecommunication sector increased by 76.9%, and the crude oil increased by 70.6%. Among imports, the

portion of amounts for export purposes decreased from 46.7% in 1999 to 45.0% in 2000. Therefore, the trade balance recorded the surplus by 16.6 billion US dollars.

The capital balance in 2000 showed the rapid increasing surpluses from 2 billion US dollars to 1.7 billion US dollars due to the foreign capital inflow foreigners' stock purchasing, and foreign direct investment (FDI) even though the reimburse of foreign debts and domestic firms' direct investment on foreign countries increased.

The foreign exchange rate in terms of US dollar was depreciated in the fourth quarter due to the instability of financial system and the dampness of exports whereas it had been strong by the third quarter. As result, the foreign exchange rate, Korea Won/US Dollar, was 1,264.5/US \$ in the late of 2000. It was depreciated by 10% in comparison with those of 1999.

## **2. Forecasts in 2001**

The economic growth rate in 2001 is projected 3~3.5% on the annual average, which is lower than that of 2000. The economic instability and the domestic expenditure are projected to persist and dampen in a long time. The price level of semiconductors is decreasing, and the prospects of exports are gloomy because the economic condition of US is tough. The external environment is not favorable for the Korean economy even though the price level of crude oil is stable.

The recession could be strong and persist in a long time with collapse of domestic expenditures following the tightness of money unless the structural adjustment is well pursued. Under the assumption that the unsettled economic factors are demolished companied by the smooth progress in structural adjustments, the economic growth rate of 2001 is projected 5% compared to 8.8% in 2000.

The industry activity is also projected shrunk; the investment in plants and equipments is projected a small increase due to the dullness of consumption expenditures and exports, and restructuring of company, etc. The growth rate of private

consumption expenditures is projected 4% on the annual average due to the unstable employment status by the restructuring, the dullness of increase in real income, increasing uncertainty in economy, psychological impacts of economic risk emerging at the bottom of 2000. According to the recent survey by the NSO (National Statistical Office), the declining trend of consumer expectation index is dwindling. We might project the intention of consumption expenditures will be vital after the mid of 2001.

The consumer price is projected 3~3.5% increasing on the annual average due to increases in the production cost and public utilities charges stirred by increases in crude oil price. It is also probable that consumer price is increasing by the increases in import price owing to the depreciation of Korean won.

The unemployment rate is projected 0.2~0.3% increasing compared to 2000. The higher unemployment rate, however, is probable due to the acceleration of economic recession unless the current financial crisis is settled.

TABLE 1. Economic Forecast in 2001

Institute	Economic growth rate(%)		Consumer price increase rate (%)		Unemployment rate (%)		Current account surplus (10mil.\$)	
	2000	2001	2000	2001	2000	2001	2000	2001
LGRI	9.4	5.8	2.2	3.0	4.0	4.3	120.0	107.0
KIF	9.0	6.2	2.5	3.5	4.1	4.1	90.2	55.2
BOK	9.3	5.3	2.3	2.7	-	-	100.0	45.0
SERI	9.0	5.7	2.4	3.4	4.1	4.3	102.0	63.6
KIET	9.2	5.9	2.2	3.5	-	-	117.0	87.0
KDI	9.2	5.1	2.3	3.4	-	-	103.0	92.0
OECD	8.9	5.8	2.5	3.5	4	3.7	-	-

note: LGRI (LG Economic Research Institute), KIF (Korea Institute of Finance), BOK (Bank of Korea) SERI (Samsung Economic Research Institute), KIET (Korea Institute for Industrial Economics and Trade), KDI (Korea Development Institute)  
 KDI 2000 4/4 KDI Economic Outlook, 2000.12  
 KIET "Current Trend and Outlook" e-KIET Industrial Economy Information, vol19, 2000.12  
 BOK 2001 Economic Outlook, 2000.12  
 LGRI "2001 Domestic Economic Outlook", Weekly Economy, vol.602. 2000.12

### **III. Changes in the Environment of Agricultural Production and the Growth of Agriculture**

#### **1. Trends and Outlook: Agricultural Production Environment**

##### *1.1. The Factor Price Level of Agricultural Production*

The real factor price level of farming excluding agricultural wages has shown a low downtrend during the last decade and continued in 2000.

Rental costs of farmland have increased since the mid of 1990s and continued recently. It reversed from the downtrends in the early of 1990s to the up trends in 1995. In the early of 1990s, the rental cost of farmlands declined because the rent supply of farmlands was increasing with the restructuring project of farmlands, and the production cost of rice padding was decreasing. Since the mid of 1990s, however, the rental cost of farmlands has increased because the price of rice has been increasing and demands for farmland has been increasing.

During 1990~97, the agricultural input price had been decreasing by 5.3% on the annual average. In 1998, however, it increased 27.5% owing to the rapid depreciation of Korean Won. After readjustment of foreign exchange markets in 1999, the agricultural input price declined by 2.4% compared to the last year, 1998. In 2000, the agricultural input price decreased 0.8% with respect to those of 1999 because the current input price-the soaring lights and fuel cost-for farming rapidly increased due to the rapidly increasing international crude oil price in the late of 2000.

Feeds price levels were unstable; up 18.3% in 1998 and down 16.6% in 1999 depending on the foreign exchange rate. In 2000, however, it became stable. The agricultural wage, during the last decade, was increasing continuously. It is estimated that the agricultural wage in 2000 was up 10.7% with respect to those of 1999 owing to the economic boom in the first half of 2000.



**TABLE 2.** Trends in the Agricultural Production Factor Price(1995 constant prices)  
1995=100, (%)

Year	1990	1997	1998	1999	2000 <sup>1)</sup> (estimated)	Increase rate (% , annual average)		
						1990/97	1998/99	1999/00
Input <sup>2)</sup>	147.4	100.4	128.0	124.4	123.8	-5.3	-2.4	-0.9
Current good <sup>3)</sup>	12.5	102.8	121.4	113.7	114.6	-2.9	-6.3	0.8
Farm machinery	185.4	97.2	136.2	138.8	135.9	-8.8	1.9	-2.1
Feed	129.8	115.3	136.3	113.7	111.3	-1.7	-16.6	-2.1
Wage	82.0	108.7	98.1	112.1	124.1	4.1	14.2	10.7
Rent	165.8	108.2	111.6	121.0	123.3	-5.9	8.4	1.9

Note: 1) data to Nov. 2000

2) input is moving average of current good and farm machinery

3) current good include cost of seed, fertilizer, pesticides, electric power and fuels and agricultural implements

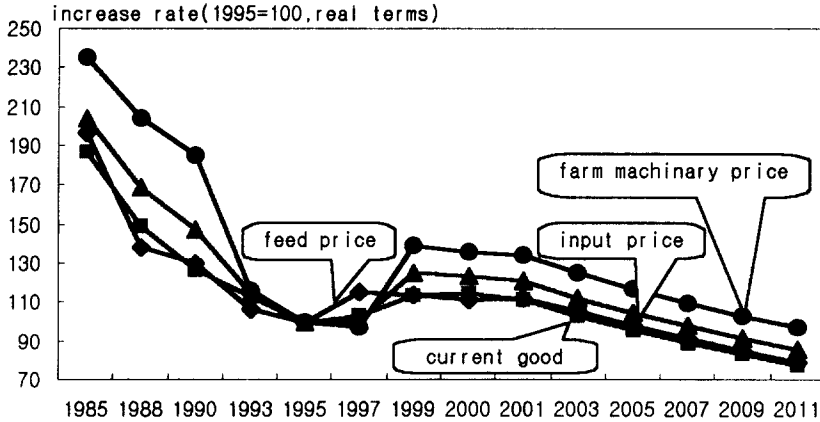
Data Sources: NACF (National Agricultural Cooperative Federation) monthly research

**TABLE 3.** Agricultural Production Factor Price (real terms, forecast)  
1995=100, (%)

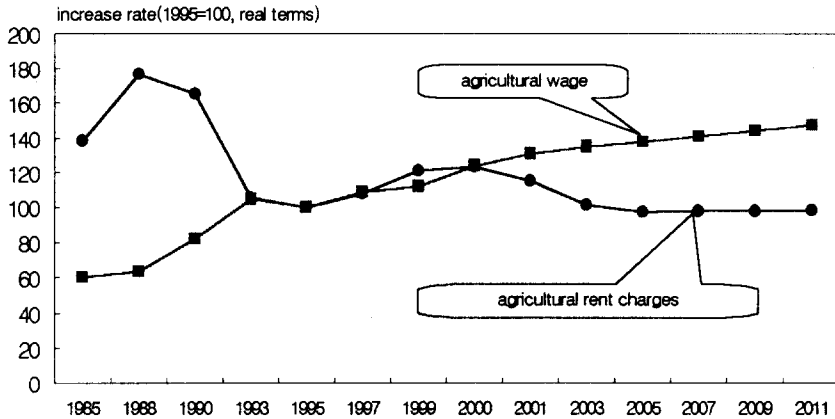
Year	2000 (estimated)	2001 (forecast)	2004	2001	Increase rate (% , annual average)		
					2000/2001	2000/2004	2004/2011
Input	123.8	120.7	108.4	85.7	-2.5	-2.7	-3.3
Current good	114.6	111.0	99.4	77.5	-3.1	-2.7	-3.5
Farm machinery	135.9	134.5	1208	96.8	-1.1	-2.6	-3.1
Feed	111.3	112.2	101.6	79.4	0.8	-2.4	-3.5
Wage	124.1	131.2	136.2	147.8	5.7	0.9	1.2
Rent	123.3	115.1	98.5	98.4	-6.6	-3.8	-0.1

The most of all real factor price of agricultural production in 2001 is expected downwards excluding agricultural wage and feeds price as like those of 2000. The price level of input materials is projected down 2.5% compared to the last year. It is also forecasted that rental charges on farmlands with decreasing rice price are down 6.6% compared to the last year. Afterwards 2004, rental charges on farmlands are estimated to stagnate and weaken downtrend continuously.

**FIGURE 1.** Agricultural Input Price Forecast



**FIGURE 2.** Agricultural Wage and Rent Price Forecast



The agricultural wage is projected 5.7% increase in 2001 even though the up trend of it is dampened. Afterwards it is projected increasing slowly unlike the rapid up- rends of the last decades. Up to till 2011, the real factor price level of agricultural production is forecasted sluggish downtrend unless the agricultural environment such as the price level of international crude oil and foreign exchange rates is changed rapidly.

### 1.2. Agricultural Employed and Cultivated Area

The employed in the agriculture, forestry and fishery sector temporarily increased due to the impacts of foreign exchange reserve crisis in 1998. Since 1999, however, the employed in the agriculture, forestry and fishery sector has turned down due to economic recoveries, which decreased by 5.3% compared to those of 1998. This trend continued in 2000 and the employed was 2,288 thousands person. It was decreasing 2.6% compared to 1999. The decreasing rates of the employed in 2000, however, were lower than those of 1999 owing to the sluggish economy in the late of 2000.

During last decades, the area of cultivated farmlands had been decreased due to converting farmlands to off-farm purpose. The foreign exchange crisis in 1998~99 reduced demands for farmlands converted owing to the contraction of construction businesses. As result, decreasing rate of cultivated farmlands was reduced. After the economic recovery, however, the area of cultivated farmlands in 2000 is estimated 1.88 million hectors, which was reduced 0.7% compared to 1999, because of increases in demands for farmlands converted.

The employed in the agriculture, forestry, and fishery sector at 2001 are projected 2.23 million persons, which is

**ABLE 4.** Area of Cultivated and Agriculture Forestry and Fisheries Employed Persons

Unit: 1,000person, 1,000ha

Year	1990	1997	1998	1999	2000 (estimated)	Increase rate (% annual average)			
						90/97	98/97	98/99	99/00
agriculture forestry and fisheries employed persons	3,237	2,385	2,480	2,349	2,288	-4.3	-4.0	-5.3	-2.6
area of cultivated land	2,109	1,924	1,910	1,899	1,880	-1.3	-0.7	-0.6	-0.7

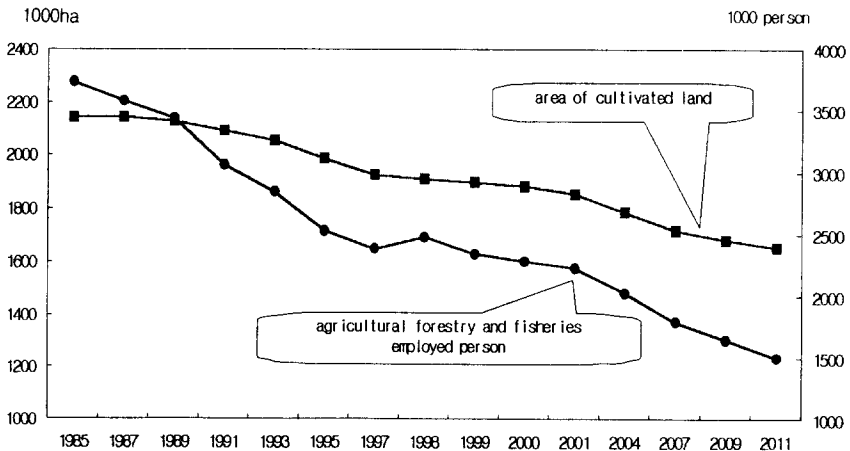
reduced by 2.3% compared to the 2000. The decreasing rate, however, is reduced due to increases in unemployment rates in the non-agricultural sectors. Up to till 2004, the decreasing rate of the employed is expected 3% on the annual average, which is lower than the last decade. During 2004~2011, which the agricultural product market is expected to be more liberalized, the decreasing rate of the employed in the agriculture, forestry, and fishery will be more serious and the employed in 2011 is projected 1.5 million persons.

TABLE 5. Forecast of Area of Cultivated and Agriculture Forestry and Fisheries Employed Persons

Unit: 1,000person, 1,000ha

Year	2000 (estimated)	2001	2004	2011	Increase rate (% annual average)		
					2000/01	2000/04	2004/11
agriculture forestry and fisheries employed persons	2,288.0	2,236.0	2,029.0	1,504.0	-2.3	-3.2	-4.2
area of cultivated land	1,880.0	1,852.0	1,783.0	1,653.0	-1.5	-1.2	-1.1

FIGURE 3. Area of Cultivated Land and agricultural Forestry and Fisheries Employed Person Forecast



The cultivated area in 2001 is projected 1.85 million hectares; decreased by 1.5% compared to 2000, and projected 1.78 million hectares in 2004. The cultivated area in 2011 is projected 1.65 million hectares because the agricultural products market will be more liberalized and the converting demands for the non-agricultural purpose will be strong.

## **2. Trends and Outlook: the Growth of Agriculture, and Agricultural Income**

### *2.1. Agricultural Value Added*

Agricultural real value added in 1999 grew 5.8% after the foreign exchange crisis was partly resolved. But it is estimated to grow 0.5% in 2000, which is lower than the annual average growth rate, 3.8% during 1990~97. The lower growth rate in 2000 is due to a low growth in cultivation sector, 1.2% growth rate, - grain, fruit and vegetables as well as minus growth in livestock brought out by FMD (Food and Mouth Disease).

It is expected that agricultural value added in 2001 at 1995 prices will decline little and mark minus growth rates. Not only productions in grain including rice are projected to be stagnant or decreased but also production in livestock is expected to decrease. Therefore, the agricultural real value added will be amount to 21,300 billion won, which will mark 1.5% decreases in contrast with that in 2000. Up to till 2004, it is expected that the growth rate in cultivation sector mark 1% decrease and that in livestock mark 1.7% increase on the annual average. In sum, total growth in the agriculture will decrease 0.8% on the annual average.

After the year of 2004, the agricultural real value added will be dependent on the result of up-coming WTO negotiations. Rice production is projected to decrease, but house vegetables, some part of fruits, and livestock productions absorbing the shock of trade liberalization are projected to increase. As result, the agricultural real value added is projected to be stagnant or be increasing little.

**TABLE 6.** Agricultural Added Value (1995 constant prices)

Unit: billion won

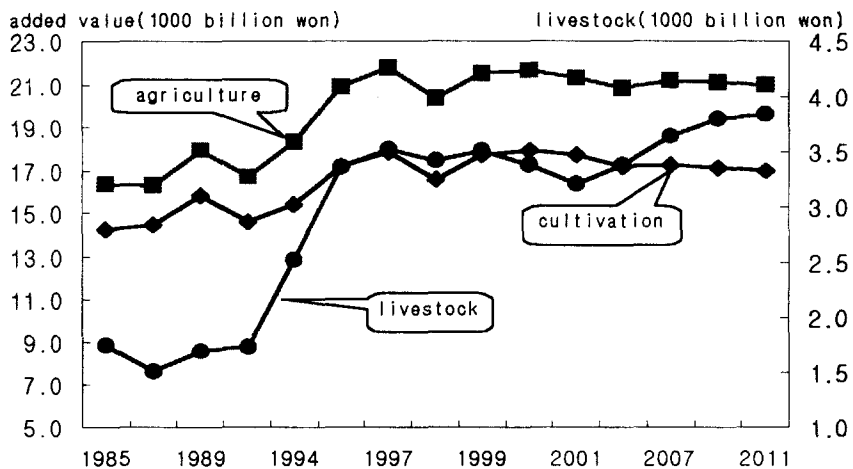
Year	1990	1997	1998	1999	2000 (estimated)	Increase rate (% annual average)			
						90/97	98/97	98/99	99/00
Agriculture	16,732	21,767	20,349	21,530	21,648	3.8	-6.5	5.8	0.5
Cultivation	14,631	17,883	16,581	17,733	17,938	2.9	-7.3	6.9	1.2
Livestock	1,743	3,527	3,421	3,512	3,378	10.6	-3.0	2.6	-3.8

**TABLE 7.** Agricultural Added Value Forecast (1995 constant prices)

Unit: billion won

Year	2000 (estimated)	2001 (forecast)	2004	2011	Increase rate (% annual average)		
					2000/2001	2000/2004	2004/2011
Agriculture	21,648	21,327	20,824	20,990	-1.5	-0.8	0.1
Cultivation	17,938	17,753	17,164	16,993	-1.0	-1.1	-0.1
Livestock	3,378	3,212	3,380	3,843	-4.9	1.7	1.9

**FIGURE 4.** Agricultural Added Value Forecast (1995 constant prices)



### 2.2. Farm Selling Price

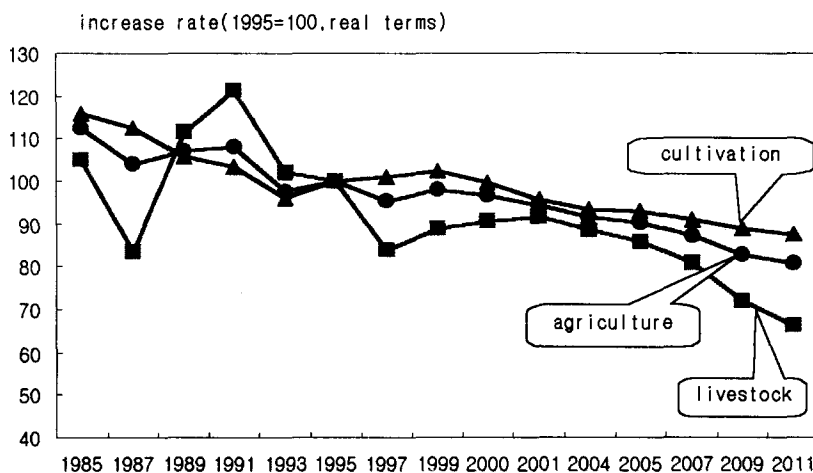
Farm selling price in real term is estimated to decrease 1.3% in 2000 contrast with 1999. Farm selling price of outdoors vegetables, garlic, and fruits is estimated to decrease sharply, and that of pork and chicken is also estimated to decrease. The total livestock price, however, is estimated to increase little because of high cattle prices.

TABLE 8. Farm Sale Price Forecast (1995=100, real terms)

Year	1999	2000 <sup>1)</sup>	2001	2004	2001	Increase rate (% annual average)			
						99/00	00/01	01/04	04/11
Agricultural production	97.9	96.6	94.7	91.5	80.8	-1.3	-2.0	-1.1	-1.8
Cultivation	102.3	99.7	97.4	93.2	87.6	-2.5	-2.3	-1.5	-0.9
Rice	118.6	121.9	119.2	109.0	101.8	2.8	-2.2	-3.0	-1.0
Fruit	92.1	73.2	71.5	69.3	73.6	-20.5	-2.3	-1.0	-0.8
Livestock	89.0	90.6	91.5	88.5	66.2	1.8	1.0	-1.1	-4.1

Note: Estimated with data from Jan. 2000 to Nov. 2000

FIGURE 5. Farm Sale Price Forecast



Farm selling price in 2001 is expected to decrease 2.5% due to the excess supply of rice. And it is forecasted that this trend would continue by 2011.

### *2.3. Farm Household Income*

Total agricultural real income in 2000 is estimated to be 15,018 billion won which decreased 5.5% in comparison with 1999. That is caused by falling prices in beans, fruits (especially apples and pears), garlic, and livestock products. The farm household real income in 2000, however, is estimated to increase 0.7% due to increase of non-agricultural income and decrease in number of farm households.

In 2001, the agricultural income is expected small increases contrasted with that in 2000 because of recovery of fruit and garlic price. But productions of outdoor and green house vegetables are expected to decrease because of price falling in 2000. The number of breed cattle is also expected to decrease. Overstock on rice will be a reason of income decreasing. As result, the agricultural real income in 2001 is expected to decrease 5.1% compared to that of 2000. The farm household income, however, is projected to increase 0.5%.

From 2001 to 2004, the total agricultural income is forecasted to decrease 2.5% on the annual average, but farm household income is forecasted to increase 1.1% annually due to increase in off-farm income and decrease in number of farm households. After 2004 year, it is expected that total agricultural real income would decrease 2.4% on the annual average, and farm household income would increase 0.9% on the annual average even though the agricultural real income is dependent on the up-coming WTO negotiation.

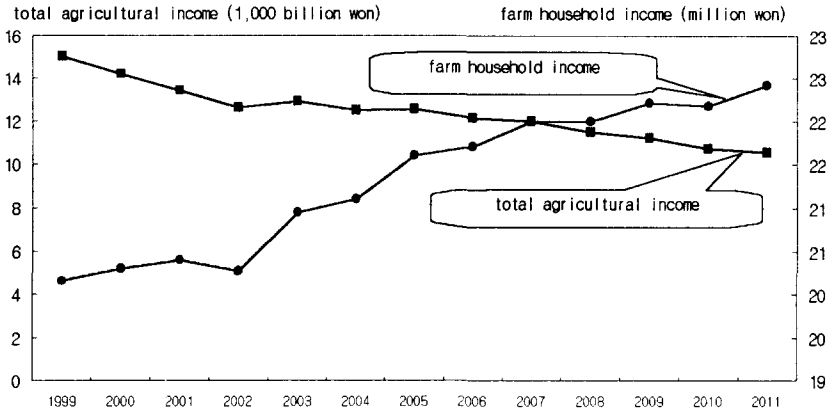


**TABLE 9.** Farm Household Income Forecast (1995=100, real terms)  
Unit: 1,000won/household

Year	1999	2000	2001	2004	2001	Increase rate (% , annual average)			
						99/00	00/01	01/04	04/11
Farm household income	20,147	20,293	20,392	21,092	22,491	0.7	0.5	1.1	0.9
Agricultural income	9,536	9,228	8,966	8,932	8,793	-3.4	-2.8	-0.1	-0.2
Non-agricultural income	10,611	11,065	11,426	12,160	13,638	4.3	3.3	2.1	1.7

Note: A non-agricultural income concludes a transferred income

**FIGURE 6.** Agricultural Income and Farm Household Income Forecast (1995 constant prices)



### 2.4. Policy Assignments

To solve farm household income problem, policy measures need to be executed. Policy measures including various stabilization systems of farm management, crops insurance system, and direct payment, etc, are important and deserve to be implemented for absorbing impacts of price falling in agricultural products. And to develop the off-farm income sources in the rural area is an

important policy target with stimulating the multi-functionality in the agriculture and the rural.

Furthermore, the agricultural restructuring policy is expected to be an urgent policy assignment to promote the over-owed farm household, the old-aged farm household, and the small-scaled farm household to exit smoothly and successfully.