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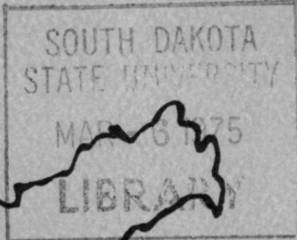
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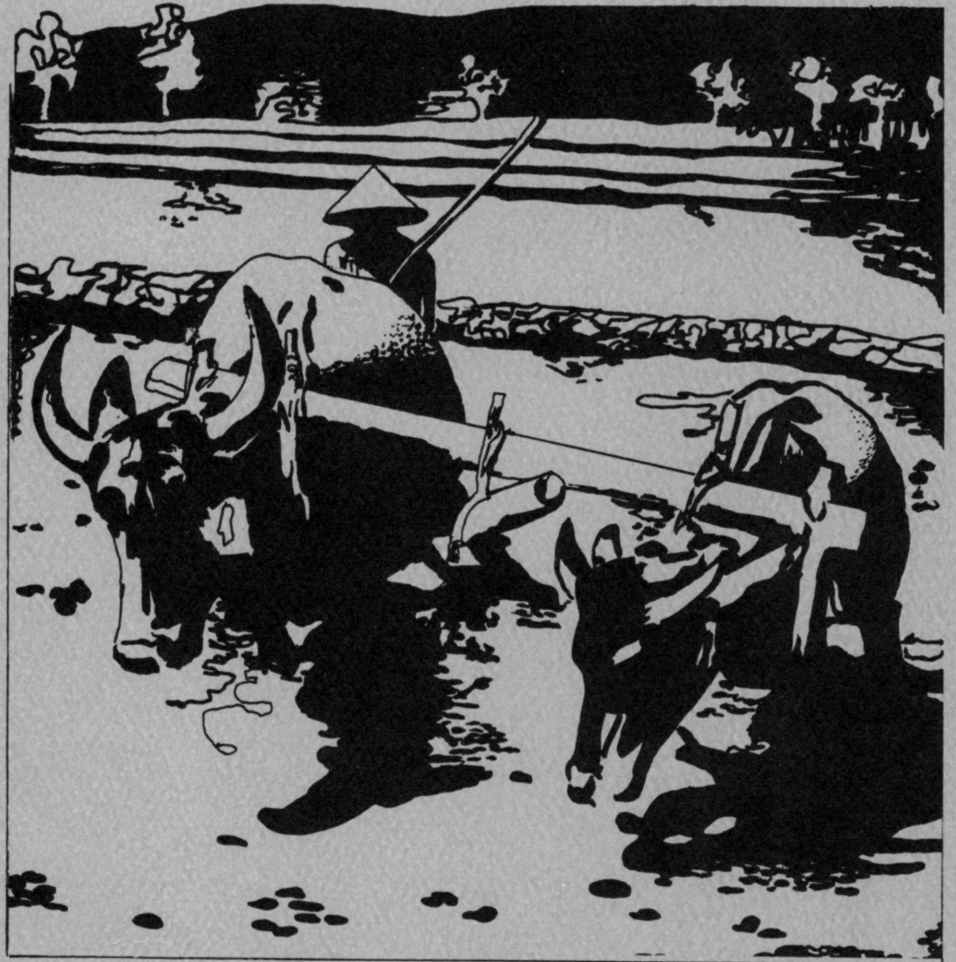
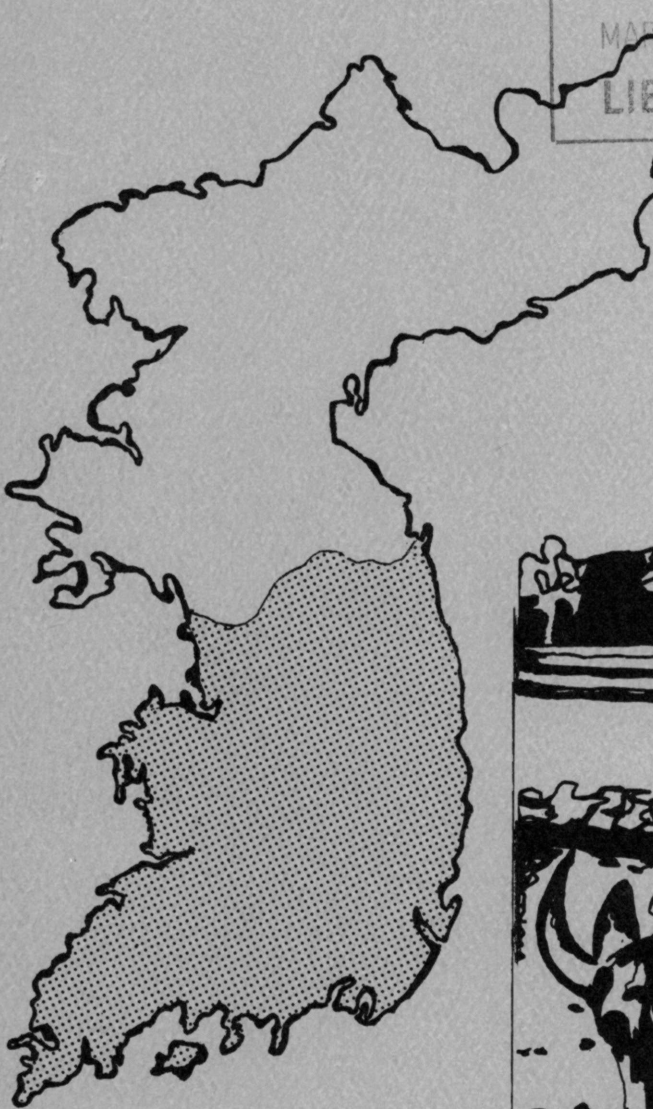
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July 1973



Analysis of the Republic of Korea Food Grain Situation



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Analysis of the Republic of Korea
Food Grain Situation

by

William F. Payne and Kyoo Il Jo¹

SUMMARY

Two problems for developing economies confronted with food shortages are (1) how to acquire sufficient food and still stabilize food prices in the short-run and (2) how to increase food production and realize food self-sufficiency in the long-run. Solving these two problems is often considered a precondition to achieving steady economic growth and industrialization.

This study was concerned with the Republic of Korea, where economic development plans have been initiated during the last two decades under the condition of annual food grain shortages. Efforts to overcome these shortages have resulted in South Korea becoming the fastest growing major market for U.S. farm products in the Far East. The main purpose of this study was to analyze the relationships between government food grain policy and the consumption and supply of food grains. Food grains under analysis were limited to rice, barley and wheat (major food grains) which are the main dietary items in Korea.

Major Targets and Instruments of Government Food Grain Policy

(1) Price policy has the target of helping stabilize the general price level through stabilization of food grain prices. In addition, price policy has the target of supporting farm prices to stimulate farm production and increase farm income.

1

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(2) To achieve price stabilization and farm income support, the Korean government uses the instrument of purchasing food grain from farmers during harvest season and selling to consumers during the food grain shortage period.

(3) In recent years, the government resale price system has attempted to conserve rice by differentiating resale price levels between food grains. Rice is being sold at a higher price than barley or wheat.

(4) Import policy attempts to balance quantities of food grains produced and needed, and to control food grain imports.

(5) Consumption policy has the target of changing consumption patterns from rice to a mixture of rice and other food grains.

Impacts of Government Food Grain Policies

Korea's major food grain production increased from 4,805 thousand metric tons in 1961 to 6,421 thousand metric tons in 1970. However, this increase in production has not kept pace with increases in consumption resulting from growing population, rising incomes, and urbanization. Barring dramatic technological advances, this indicates a widening gap between production and consumption.

Rice is the main food grain in Korea and is grown on 56 percent of the cropland. Primarily because of improved production techniques and agricultural extension services, rice production increased from 3,047 thousand tons in 1961 to 4,090 thousand tons in 1970. This compares with consumption of 3,188 thousand tons in 1961 and 4,193 thousand tons in 1970.

Barley is South Korea's second most important food grain, and production has increased from 1,478 thousand tons in 1961 to 2,084 thousand tons in 1968. Production for 1969 and 1970 was slightly lower. Consumption increased from 1,544 thousand tons in 1961 to 2,155 thousand tons in 1969. Consumption during 1970 declined to 1,841 thousand tons. Per capita consumption of

barley has been declining since 1967, and domestic production can probably keep up with the increase in total demand.

Wheat accounts for only 6 percent of major food grain production, but wheat production increased from 280 thousand tons in 1961 to 366 thousand tons in 1969. Production during 1970 declined to 357 thousand tons. Wheat consumption has posted a dramatic increase, from only 620 thousand tons in 1961 to 1,629 thousand tons in 1969. Consumption declined to 1,550 thousand tons during 1970.

Major food grain imports have increased 70 percent from 1961-1970, and now account for 28 percent of aggregate supply. Imports increased from 538 thousand tons in 1961 to 2,191 thousand tons in 1969, with 1970 registering a decline to 1,795 thousand tons. Wheat accounts for 70 percent of total imports, primarily because the Korean economy is not in a financial position to fill import requirements with rice. With government policy directed toward increasing the proportion of wheat in consumer diets, Korea should continue to import a substantial quantity of U.S. wheat.

Seasonal fluctuations of major food grain prices were reduced by government food grain policies. However, annual price levels of major food grains were increased rapidly because of higher resale prices and relative shortages in rice. This caused food grain prices and the general price level to increase.

Government procurement of major food grain was not very successful in raising farm income because the procurement prices were lower than commercial price levels at farm markets during harvest season. As a result, the volume of government procurement was less than 10 percent of total production

through the 1960's. However, the dual price system which was recently adopted for barley and wheat has contributed toward increasing farm income.

Major food grain programs are designed to provide government revenue from sale of domestic and imported rice. However, this revenue has been exceeded by government loss from reselling barley and wheat, plus government food grain handling costs and employee wages. Total budgetary balance was in deficit throughout the 1960's with the exception of 1963 and 1968. Increasing government support prices for wheat and barley plus loss of grain in government storage have contributed to the deficit. Thus, Korea's major food grain programs have not been self financing.

INTRODUCTION

The Republic of Korea has initiated economic development plans since 1962² under the restraint of annual food grain (rice, wheat, barley) shortages. In recent years the demand for food grain has been increasing rapidly as a result of economic development. During the period 1960-1970 food grain consumption increased 109 percent while production increased only 42 percent.³ To meet food grain shortages, imports have increased from 467,638 metric tons in 1960 to 2,000,000 metric tons in 1970.⁴

During 1970, U.S. exports to Korea totaled \$636,000,000. About 56 percent of these exports were through various U.S. government financed programs. Wheat, rice, and barley accounted for \$105,100,000 (48%) of the \$218,000,000 obtained from food, beverages and agricultural raw materials. U.S. government financed programs accounted for about 98 percent of rice sales and 61 percent of wheat sales. Sales of barley were all on a commercial basis.⁵

Korea is the fastest growing major market for U.S. farm products in the Far East, and in 1970 the U.S. supplied 49 percent of Korea's food, beverage and agricultural raw material imports. The U.S. is also a major source of Korean food grain imports. United States wheat sales to Korea increased from 358,000 metric tons (13,128,000 bu.) in 1960 to 1,236,000

² Year refers to Korean rice year, beginning November 1 of year stated.

³ Republic of Korea, Economic Planning Board, White Paper in Korean Economy (Seoul: Kwang Myong Printing Company, 1970), p. 327.

⁴ Republic of Korea, The Bank of Korea, Economic Statistics Yearbook (Seoul: Bo Jin Jae Printing Company, 1971), pp. 314-339.

⁵ U.S. Department of Agriculture. Foreign Agricultural Trade of the United States. Economic Research Service. May 1972, pp. 36,38.

metric tons (45,324,000 bu.) in 1970. Korean purchases averaged 3 percent of U.S. wheat exports during 1960-1966 and 7 percent during 1967-1970. Korea is also a major market for U.S. rice exports. From 1960-1966 Korea did not import U.S. rice, but in 1967 Korea imported 86,000 metric tons from the U.S. Total imports from the U.S. increased to 444,000 metric tons in 1969, and declined to 242,000 metric tons in 1970. During 1968-1970 Korea purchases averaged 17 percent of U.S. rice exports. Barley sales to Korea have also been variable, averaging 158,000 metric tons (7,243,000 bu.) per year during 1961-1964 but declining to 2,400 metric tons (110,000 bu.) during 1967. Sales during 1968 increased to 137,000 metric tons (6,271,000 bu.) and declined to 16,000 metric tons (733,000 bu.) during 1970.⁶

Although efforts have been made to alleviate Korean food grain shortages through imports, food grain prices have been rapidly increasing. In addition, to supplement domestic production through importation absorbs funds which could otherwise be used for economic development. Therefore, government agricultural policy involves attempts to stabilize food prices in the short-run and realize self-sufficiency in food production in the long-run.

Korea's agricultural policies center around food grains, which accounted for 80 percent of agricultural income during 1962-1970.⁷ Food grain is also an important consumer item presently accounting for 28 percent of total expenditures.⁸ This publication reports the findings of a study undertaken

⁶ U.S. Department of Agriculture. The 1971 Agricultural Data Book for the Far East and Oceania. Economic Research Service, September 1971.

⁷ Republic of Korea, Ministry of Agriculture and Forestry, Yearbook of Agriculture and Forestry Statistics, (Seoul: Seoul Printing Company, 1970), pp. 200-281.

⁸ Republic of Korea, The Bank of Korea, Economic Statistics Yearbook (Seoul: Bo Jin Jae Printing Company, 1971), pp. 314-339.

to review Korea's food grain (rice, wheat, barley) policies during the period 1960-1970 and analyzes the impacts of these policies upon (1) aggregate market supply, (2) price stabilization, (3) consumption, (4) farm income transfer and (5) government budgetary balance. The basic premise of this work is that a better understanding of the Korean food grain situation is necessary in order to anticipate how Korea might influence international food grain trade. This study might also provide some guidance to other developing countries anticipating the adoption of food grain policies similar to those of Korea.

KOREAN FOOD GRAIN POLICIES

The Korean government intervenes in food grain marketing for the following reasons:

1. To stabilize market prices of agricultural products by maintaining balance between the quantities demanded and supplied.
2. To improve farm income by protecting farm prices from falling during harvest season.
3. To increase agricultural productivity by giving price incentives to farmers.
4. To protect urban consumers from increasing food grain prices during food grain shortage periods.
5. To improve agricultural marketing functions and related services.

Simultaneous attainment of these objectives may be difficult. For example, giving price incentives to increase production and protecting farm prices from falling during harvest season could make it more difficult to protect urban consumers from increasing food grain prices.

To attain the above objectives the government purchases food grains from producers at an announced support price and re-sells to processors and distributors. Government procurement is categorized into general procurement, grain-fertilizer exchange, farm land tax in kind, loans on mortgage of rice, rice-barley exchange, advance purchase system and import.⁹

The government resale of food grain can be itemized into resale to consumers, supply to government organizations needing food grain, and export.¹⁰ Since the latter two items are not related directly to price

⁹ For detail, see United Nations, Food and Agriculture Organization, FAO Rice Report (Rome: Food and Agriculture Organization, 1967), pp. 98-105.

¹⁰ Korea's food grain exports during the 1960's amounted to only 151 thousand metric tons.

stabilization policy in the domestic market, this study concerns only the resale to consumers. The resale periods are variable, depending upon food grain shortage. However, main periods of resale are from February to May for wheat and barley and from July to October for rice. Main resale locations for 1971 were ten large cities, 22 medium cities, and 20 towns.

Because of inadequate credit and storage facilities Korean farmers market most of their production at harvest time to meet living expenses and debt obligations.¹¹ Therefore, food grain marketing results in a surplus period during harvest and a deficit period later in the year. There is no incentive for farmers to store grain past the surplus period because the cost associated with carrying a debt obligation is much greater than the extra revenue obtained by selling at a higher price during the shortage period. An important function of government food grain policy has been to provide farmers with a higher sale price during harvest. However, government purchase prices for rice have not always exceeded the prices received from private buyers. In addition, selling to the government often means a delay in payment. As a result, government procurement represents only a small percentage of total food grain sales. Rates of government procurement are shown in Tables 1 (rice), 2 (barley), and 3 (wheat).

Food grain prices in the farm and consumer markets are influenced by government procurement and resale prices of food grains. From 1961 through 1963 a bulk line method was used to determine government procurement price.

¹¹ About 70 percent of farmers debts are held by individual lenders, at an interest rate of three to five percent per month.

Table 1. Government Procurement of Domestic Rice Production, Korea
1961-1970

KRY ^a	Area of Production (1,000 hectares)	Production (1,000 metric tons)	Government Procurement (1,000 metric tons)	Rate of Government Procurement ^b (percent)
1961	1,030	3,047	n. a.	--
1962	1,137	3,463	309	8.9
1963	1,148	3,015	278	9.2
1964	1,165	3,758	224	6.0
1965	1,205	3,955	240	6.1
1966	1,238	3,501	302	8.6
1967	1,242	3,919	351	9.0
1968	1,246	3,603	279	7.7
1969	1,160	3,195	123	3.8
1970	1,230	4,090	320	7.8

^a Korean rice year beginning November 1 of year stated.

^b Government procurement rate is determined by dividing government procurement by production.

Source: Republic of Korea, Ministry of Agriculture and Forestry.

Table 2. Government Procurement of Domestic Barley Production, Korea, 1961-1970.

KRY ^a	Area of Production (1,000 hectares)	Production (1,000 metric tons)	Government Procurement (1,000 metric tons)	Rate of Government Procurement ^b (percent)
1961	810	1,478	61.8	4.2
1962	830	1,378	20.3	1.5
1963	895	918	0	--
1964	945	1,515	2.8	0.2
1965	1,031	1,807	76.2	4.2
1966	969	2,018	152.1	7.5
1967	979	1,916	88.7	4.6
1968	986	2,084	114.1	5.5
1969	949	2,066	188.4	4.3
1970	911	1,974	178.6	9.0

^aKorean rice year beginning November 1 of year stated.

^bGovernment procurement rate is determined by dividing government procurement by production.

Source: Republic of Korea, Ministry of Agriculture and Forestry.

Table 3. Government Procurement of Domestic Wheat Production, Korea, 1961-1970.

KRY ^a	Area of Production (1,000 hectares)	Production (1,000 metric tons)	Government Procurement (1,000 metric tons)	Rate of Government Procurement ^b (percent)
1961	125	280	0	-
1962	134	268	0	-
1963	138	228	0	-
1964	147	309	0	-
1965	153	300	1.0	0.3
1966	154	315	2.3	0.7
1967	153	310	1.2	0.4
1968	159	345	1.4	0.4
1969	154	366	16.1	4.3
1970	159	357	27.0	7.6

^a Korean rice year beginning November 1 of year stated.

^b Government procurement rate is determined by dividing government procurement by production.

Source: Republic of Korea, Ministry of Agriculture and Forestry.

By this method when 80 percent of the farm households had food grain production costs below a certain point, that determined procurement price. Theoretically, the least efficient 20 percent may not have production costs covered by the government procurement price. A parity ratio was chosen as the basis for determining procurement price during the period 1964-1967.

Price Policy: Rice

The Korean government purchases rice from farmers and re-sells at a higher price to cover handling and administrative costs. From 1961 through 1965, government procurement prices reflected annual increases rising from 15 percent to 46 percent. But from 1966 through 1968, annual increases averaged only seven percent. However, beginning with the 1968 rice crop, procurement prices have increased by 17 percent, 23 percent, and 36 percent, respectively, which exceeds the eight percent annual inflation rate. Table 4 indicates government procurement and re-sale prices, and farm price in the private market.

Price Policy: Wheat and Barley

Through 1969 wheat and barley policy was similar to rice, in that government re-sale price exceeded purchase price. But in 1970 wheat and barley policy was altered. Since 1970 the government has purchased wheat and barley during the harvest period at a price exceeding the private market price. Then the government resells during the shortage period at a lower price sometimes sustaining a loss. Tables 5 (wheat) and 6 (barley) indicate government procurement and re-sale prices, and farm prices in the private market.

Table 4. Government and Farm Rice Prices,^a Korea, 1961-1971.

KRY ^b	Government Price		Farm Price	
	Procurement	Resale	Harvest Season	Yearly Average
	\$/100 lbs.	\$/100 lbs.	\$/100 lbs.	\$/100 lbs.
1961	4.62	5.30	5.84	6.78
1962	6.76	7.81	6.11	7.26
1963	7.76	8.23	7.91	11.44
1964	4.57	5.14	5.86	7.45
1965	6.21	6.46	6.34	6.73
1966	6.61	7.14	6.25	7.05
1967	6.84	7.76	6.50	7.57
1968	7.24	8.26	7.33	8.45
1969	7.83	8.76	9.21	9.98
1970	9.36	10.41	9.73	10.52
1971	10.73	11.74	10.11	---

^aPrices based upon the following exchange rates:

Year	Korean Won	U.S. Dollars	Year	Korean Won	U.S. Dollars
1960	65	1	1967	274	1
1961	130	1	1968	281	1
1962	130	1	1969	304	1
1963	130	1	1970	312	1
1964	255	1	1971	370	1
1965	271	1			
1966	270	1			

Sources: Government Price: Republic of Korea, Bureau of Food Administration in the Ministry of Agriculture and Forestry, Food Administration Manual (Seoul: Seoul Printing Company, 1971).

Farm Price: Republic of Korea, National Agricultural Cooperative Federation, Agricultural Yearbook (Seoul: National Agricultural Cooperative Federation, 1971), pp. 76-77.

^bKorean rice year begins November 1 of year stated.

Table 5. Government and Farm Wheat Prices,^a Korea, 1961-1971.

KRY	Government Price		Farm
	Procurement	Resale	Average Price
	\$ per bu.	\$ per bu.	\$ per bu.
1961	---	1.51	1.45
1962	---	1.91	1.81
1963	---	1.86	2.72
1964	---	1.16	2.04
1965	1.70	1.77	1.63
1966	1.71	1.98	1.76
1967	1.83	2.04	1.84
1968	1.94	2.13	1.83
1969	1.97	2.11	1.64
1970	2.21	2.18	1.59
1971	2.33	1.84	---

^aSee footnote ^a, Table 4 for exchange rates used to calculate prices.

Sources: See Table 4.

Table 6. Government and Farm Barley Prices,^a Korea,
1961-1971.

KRY	Government Price		Farm Price	
	Procurement	Resale	Harvest Season	Yearly Average
	\$ per bu.	\$ per bu.	\$ per bu.	\$ per bu.
1961	1.34	1.60	1.96	2.32
1962	2.10	2.58	2.61	2.61
1963	---	2.91	5.63	4.51
1964	1.22	1.72	2.66	3.02
1965	1.69	2.47	1.97	2.14
1966	2.31	2.65	1.69	2.04
1967	2.28	2.72	2.09	2.33
1968	2.41	2.35	2.34	2.48
1969	2.73	2.82	2.43	2.66
1970	2.92	2.40	2.79	2.86
1971	2.83	2.02	---	---

^aSee footnote ^a, Table 4 for exchange rates used to calculate prices.

Sources: See Table 4.

Food Grain Import Policy

Because grain production is below domestic needs, the government imports large quantities of grains each year to meet national demand. However, government import policy has been changing, mainly because of: (1) changes in the United States aid policy, and (2) changes in the Korean economic situation.

In 1955 an agreement to import agricultural surplus was sealed between the government of Korea and the government of the United States.¹² Under the agreement, food grains were imported mainly on an aid basis during the period 1956-1960. But since 1961 United States aid policy has been shifting more toward a loan basis in accordance with economic development in Korea.

Because of changes in United States aid policy, the Korean government has been required to spend greater amounts of foreign exchange to import food grains necessary to supplement domestic production. Efforts to save foreign exchange have caused the government to import mainly barley and wheat which are cheaper than rice.

Food Grain Consumption Policy

The major objectives of the government food grain consumption policy can be categorized as: (1) to reduce rice consumption and (2) to cause the food consumption pattern to include more wheat and barley. To attain these objectives, the government has required all restaurants to (1) sell food in such a way that a quantity of food grain contains more than 25.0 percent barley and less than 75.0 percent rice, and (2) reduce rice sales where possible by promoting the use of wheat-based products such as noodles.

¹²"The Agricultural Surplus Pact Between the Government of Republic of Korea and the Government of the United States of America under Chapter I of The Agricultural Trade Development and Assistance Act" (Date of Seal: May 31, 1955).

SELECTED IMPACTS OF KOREAN FOOD GRAIN POLICIES

This section will contain an analysis of the impacts of Korean food grain policies on (1) supply, (2) price stabilization, (3) consumption, (4) farm income transfer, and (5) government budgetary balance.

IMPACT ON SUPPLY

Aggregate marketable supplies are determined by domestic production and imports. Based on data in Table 7, rice production during the 1961-1970 period was quite variable, fluctuating from 3,015,000 metric tons in 1963 to 4,090,000 metric tons in 1970. Barley production has been less variable, especially during the 1966-1970 period when production fluctuated between 1,916,000 metric tons and 2,085,000 metric tons. Wheat production ranged from 228,000 metric tons during 1963, to 366,000 metric tons during 1969.

Domestic food grain production has been supplemented by imports to obtain a substantial increase in marketable supply. The annual average growth rate of marketable supply is calculated as:

1. Trends of marketable supply:

$$\begin{aligned} \text{Rice: } S &= 3015.60 + 130.27t \quad (R^2 = 72.0) \\ \text{Barley: } S_r &= 1369.93 + 81.12t \quad (R^2 = 59.8) \\ \text{Wheat: } S_b &= 447.20 + 114.31t \quad (R^2 = 77.3) \\ \text{Major food grains: } S_m &= 4832.73 + 325.70t \quad (R^2 = 93.6) \end{aligned}$$

2. Annual increases in marketable supply:

$$\begin{aligned} \text{Rice: } R_r &= (130.27/3015.60) \cdot 100 = 4.3 \text{ percent} \\ \text{Barley: } R_b &= (81.12/1369.93) \cdot 100 = 5.9 \text{ percent} \\ \text{Wheat: } R_w &= (114.31/447.20) \cdot 100 = 25.6 \text{ percent} \\ \text{Major food grains: } R_m &= (325.70/4832.73) \cdot 100 = 6.7 \text{ percent} \end{aligned}$$

where t is the time variable ($t = 0$ in 1960) and production units are in 1,000 metric tons. Yearly increases in marketable food grain (rice, barley,

Table 7. Marketable Supplies of Major Food Grains, Korea,
1961-1970 (1,000 metric tons)

KRY ^a	Rice		Barley		Wheat		Aggregate				
	Production	Import Total	Production	Import Total	Production	Import Total	Production	Import Total			
1961	3,047	3,047	1,478	190	1,668	280	348	628	4,805	538	5,343
1962	3,463	3,463	1,378	47	1,425	268	398	666	5,109	445	5,554
1963	3,015	3,133	918	264	1,182	228	815	1,043	4,161	1,197	5,358
1964	3,758	3,758	1,515	226	1,741	309	607	916	5,582	333	6,415
1965	3,955	3,955	1,807	106	1,913	300	496	796	6,052	602	6,664
1966	3,501	3,533	2,018	106	2,018	315	458	773	5,834	450	6,324
1967	3,919	4,032	1,916	106	1,916	310	909	1,219	6,145	1,022	7,167
1968	3,603	3,819	2,085	106	2,191	345	1,027	1,372	6,033	1,349	7,382
1969	3,195	3,950	2,066	67	2,133	366	1,369	1,735	5,627	2,191	7,818
1970	4,090	4,631	1,974	106	1,974	357	1,254	1,611	6,421	1,795	8,216

^a Korean rice year beginning November 1 of year stated.

Source: Republic of Korea, Ministry of Agriculture and Forestry, Yearbook of Agriculture and Forestry Statistics (Seoul: Seoul Printing Company, 1970).

wheat) averaged 6.7 percent during 1961-1970. However, wheat supplies registered a yearly increase of 25.6 percent. Rice is the main source of food grains, providing 56 percent of aggregate supplies in 1970. But food grain imports are dominated by wheat, which accounted for 70 percent of imports. From 1961-1969 imports increased from one percent to 23 percent of aggregate food grain supply and accounted for 22 percent of supply in 1970.

IMPACT ON PRICE STABILIZATION

The impact of government food grain policy on price stabilization of major food grains will be analyzed from two aspects: (1) seasonal fluctuations, and (2) annual increases.

Seasonal Price Fluctuation

Seasonal price fluctuations have been reduced during the period 1966-1970. However, reduced price fluctuations cannot be entirely attributed to direct government intervention because annual government procurement was less than ten percent of production (Tables 1, 2, 3). In addition, farmer cooperatives have been a factor in reducing price fluctuations through purchasing and storage programs.

Annual Price Increases

The impact of changes in the prices of major food grains on wholesale price levels and consumer price levels can be measured by the weight of major food grains on the wholesale and consumer price indices. The weight of major food grains on the wholesale price index is 124.4/1,000.0 (Rice: 105.0/1,000.0, Barley: 12.9/1,000.0 and Wheat: 6.5/1,000.0). While the weight of major food grains on the consumer price index is 255.7/1,000.0 (Rice: 207.0/1,000.0, Barley: 12.9/1,000.0 and Wheat: 19.5/1,000.0. This means that a one percent change in major food grain prices is associated with a 0.1244 percent change in the wholesale price level and a 0.2557 percent change in the consumer price level.

During the period 1961-1971, government procurement prices and resale prices of major food grains increased substantially.

Based on price indices and rates of change in government resale prices, the changes in wholesale price levels and in consumer price levels were calculated as follows:

1. Change in wholesale price levels per year:

(a) Rice price: $R_r^W = 105.0/1,000.0 \cdot 63.02 = 6.62$ percent

(b) Barley pprice: $R_b^W = 12.9/1,000.0 \cdot 35.94 = 0.46$ percent

(c) Wheat price: $R_w^W = 6.5/1,000.0 \cdot 34.58 = 0.22$ percent

2. Change in consumer price levels:

(a) Rice price: $R_r^C = 207.0/1,000.0 \cdot 63.02 = 13.05$ percent

(b) Barley price: $R_b^C = 29.2/1,000.0 \cdot 35.94 = 1.05$ percent

(c) Wheat price: $R_w^C = 19.5/1,000.0 \cdot 34.58 = 0.67$ percent

The above equations suggest that rising government resale prices during the period 1961-1971 were accompanied by wholesale price increases of 7.30 percent ($6.62 + 0.46 + 0.22 = 7.30$) and consumer price increases of 14.77 percent ($13.05 + 1.05 + 0.67 = 14.77$) per year. Increase in the price of rice was the primary force causing the wholesale and consumer price levels to increase.

IMPACT ON CONSUMPTION

From 1961-1970 rice decreased from 60 to 55 percent of major food grain consumption. During the same period wheat increased from 12 to 20 percent of consumption (Table 8). The annual growth in consumption of individual food grain was calculated as:

1. Trends in consumption:

$$\text{Rice: } T_r = 3144.20 + 100.18t \quad (R^2 = 75.7)$$

$$\text{Barley: } T_b = 1303.40 + 82.07t \quad (R^2 = 61.8)$$

$$\text{Wheat: } T_w = 457.07 + 110.92t \quad (R^2 = 81.3)$$

$$\text{Major food grains: } T_m = 4985.87 + 293.93t \quad (R^2 = 92.8)$$

2. Annual growth in consumption:

$$\text{Rice: } R_r^c = (100.18/3144.20) \cdot 100 = 3.2 \text{ percent}$$

$$\text{Barley: } R_b^c = (82.07/1303.40) \cdot 100 = 6.3 \text{ percent}$$

$$\text{Wheat: } R_w^c = (110.92/457.07) \cdot 100 = 24.3 \text{ percent}$$

$$\text{Major food grains: } R_m^c = (293.92/4985.87) \cdot 100 = 6.0 \text{ percent}$$

where t is the time variable ($t = 0$ in 1960) and consumption units are in 1,000 metric tons. Wheat consumption is increasing rapidly, primarily because of government policy aimed at substituting wheat for rice in a portion of Korea's food grain consumption.

Table 8. Consumption of Major Food Grains, Korea, 1961-1970.

KRY	National aggregate consumption				Per capita consumption			
	Rice	Barley	Wheat	Total	Rice	Barley	Wheat	Total
	-----1,000 metric tons-----				-----Kilograms-----			
1961	3,188	1,544	620	5,352	125.5	60.8	24.4	210.7
1962	3,430	1,510	703	5,643	131.3	57.8	26.9	216.0
1963	3,157	1,346	967	5,470	117.5	50.1	36.0	203.6
1964	3,780	1,315	904	5,955	134.2	47.6	32.7	214.5
1965	3,859	1,737	826	6,422	136.0	61.2	29.1	226.3
1966	3,554	1,885	820	6,259	122.2	64.8	28.2	215.2
1967	3,976	2,097	1,129	7,200	133.5	70.4	37.9	241.8
1968	3,854	2,118	1,523	7,495	126.5	69.5	50.0	246.0
1969	3,961	2,155	1,629	7,745	127.2	69.2	52.3	248.7
1970	4,193	1,841	1,550	7,584	133.9	58.8	49.5	242.2

Source: Republic of Korea, Bureau of Food Administration in the Ministry of Agriculture and Forestry.

IMPACT ON FARM INCOME TRANSFER

The following criteria were considered in analyzing the impact of government food grain programs upon farm income: (1) quantity procured from farmers, (2) procurement price, and (3) commercial price levels during harvest season. Government procurement prices of major food grains have often been lower than commercial prices at farm markets during the harvest season. Especially in the case of rice, the government procurement price did not keep up with rapidly increasing commercial price levels. Although total farm income transfer has been negative in recent years, the transfers resulting from the wheat and barley programs have been positive (Table 9). This is because government procurement prices for wheat and barley have been higher than commercial prices. Perhaps one reason for a negative total farm income transfer involves the high cost of food grain programs. The following section investigates the impact of food grain programs upon the government budget.

Table 9. Farm Income Transfer, 1961-1970^a

KRY	Rice	Barley	Wheat	Total
		\$1,000		
1961	-	-1,833	-	-1,833
1962	4,426	-628	-	3,798
1963	-908	-	-	-908
1964	-636	-193	-	-829
1965	-720	-1,038	3	-1,755
1966	2,419	4,536	-4	6,951
1967	2,642	796	-4	3,437
1968	-521	372	5	-144
1969	-3,727	2,657	193	-877
1970	-2,615	1,085	614	-916

^a See Table 4 for exchange rates used to calculate Farm Income Transfer.

Source: Tables four, five, and six.

GOVERNMENT BUDGETARY BALANCE

Budgetary balance is a measure of net government deficit or surplus resulting from the government marketing operations of major food grains. This involves the calculation of (1) government revenue gained from reselling domestic and imported barley and wheat, (2) government handling cost of both domestically procured and imported food grains, and (3) wages to employees under the government grain account.

Table 10 indicates budgetary balance of the government marketing operations of major food grains during the period 1961-1970. Total budgetary balance has been in deficit throughout the 1960's with the exception of 1963 and 1968.

Increasing government support prices for wheat and barley plus loss of grain in government storage have contributed to the deficit. Thus, Korea's major food grain programs have not been self-financing.

Table 10. Budgetary Balance of Government Grain Account, Korea, KRY 1961-1970.

KRY	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
-----Thousand Dollars-----										
Revenue										
Resale	24,192	51,285	108,162	39,663	44,022	66,959	74,270	112,036	189,516	232,955
Other ^a	13,423	17,185	9,838	18,784	7,103	20,441	17,314	12,203	6,079	1,186
Total	37,615	68,470	118,000	58,447	51,125	87,390	91,584	124,239	195,595	234,141
-----Thousand Dollars-----										
Cost										
Purchase	40,308	75,515	83,362	50,663	49,078	80,685	77,759	100,480	191,257	202,830
Other ^b	12,323	9,308	22,515	18,839	9,889	23,963	22,033	22,452	23,497	31,702
Total	52,631	84,823	105,877	69,502	58,967	104,648	99,792	122,932	214,754	234,532
Balance ^c	-15,016	-16,353	12,123	-11,055	-7,842	-17,258	-8,208	1,307	-19,159	-391

^a Service charges, rents and revenues from by-products.

^b Marketing costs and salaries for employees under government grain account.

^c Balance is computed by subtracting total cost from total revenue.

Source: Republic of Korea, Bureau of Food Administration in the Ministry of Agriculture and Forestry.

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