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## RICE POLICIES OF TAIWAN

Rice is a commodity with unique economic and political significance for Taiwan's 16 million people. It is grown by almost 90 percent of the Province's 880,000 farm families, and since World War II, it has generated an important portion of Taiwan's foreign exchange earnings. In addition, rice has often been used in paying or calculating wages, rents, loans, and in settling other transactions. For example, rice served as legal tender for the bonds issued under the Land Reform Program to compensate landlords for land compulsorily purchased by the government for redistribution to tillers.

In 1973 rice acreage amounted to 778,000 hectares, or about 47 percent of the 1,645,000 hectares planted to crops in that year (8). The total area of paddy land was 517,000 hectares, implying that two crops of rice were planted on about half of the paddy land. The importance of rice in agriculture can also be observed from the composition of the gross domestic product generated by agriculture. In 1974 rice accounted for about 50 percent of the total value of crops produced in Taiwan and for about 35 percent of agricultural output, including livestock. Because a considerable amount of locally-produced food grains and tuber crops are consumed as livestock feed, rice probably provides about 35 percent of the income of farm families.

### PRODUCTION, CONSUMPTION, MARKETING, AND EXTERNAL TRADE IN RICE

#### *Production*

Taiwanese farmers prefer to grow rice if appropriate land is available. This attitude can be explained in large part by technical and economic relationships. Until mid-1973, the price of rice was lower than that of other crops such as fruits and vegetables. But the input-output relationships for growing rice tend to be more clear-cut and predictable to most farmers. Rice growing is much less affected than other crops by natural hazards, such as typhoons. Insects and diseases affecting rice are more easily controlled, and the market price also tends to be rather stable. Hence, the anticipated net revenue from rice may be comparable to other high-priced but more risky crops.

Rice output in Taiwan increased in all but three years between 1950 and 1968. From 1960 to 1968, the annual growth rate of rice production was 3.4 percent,

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exceeding the average population growth rate of 3 percent per annum for the period. Between 1969 and 1972, however, rice output remained stable at levels somewhat below the peak of 2.5 million tons produced in 1968, until the high support price in 1973 helped boost rice production again.

Because the planted acreage of rice has changed little since 1960, rice production increases were achieved almost entirely by raising yields. From 1950 to 1972, the yield of brown rice increased at an average rate of 100 kilograms per hectare per year. Factors underlying this increase in yields include: development and distribution of better varieties; production and supply of chemical fertilizers and pesticides; extension of new farming practices; improvement of irrigation facilities and methods; and increased supplies of simple but efficient farm implements.

An analysis of the cost of paddy production is made every year on the basis of surveys conducted by the Food Bureau. The analysis shows that in 1972 production costs of the first and second crops were similar, ranging from N.T.\$441 (U.S.\$11.03) to N.T.\$466 (U.S.\$11.65 at N.T.\$40 = U.S.\$1, prevailing in 1972) per 100 kilograms of paddy. The production cost per hectare was about N.T.\$20,000 per crop of rice in the same year.

Intensive cultivation methods are characteristic of rice production in Taiwan. Labor used for growing one hectare of rice, for example, was 97 days for the first crop and 89 days for the second crop in 1950. The highest labor input experienced for the first crop was 109 days in 1965. Because of the labor shortage experienced in the rural areas in recent years, however, the amount of labor used in the production of rice has begun to decline.

As a result of both increased labor use and rising wage rates, the weight of labor cost in the total production cost of rice has increased steadily during the past two decades. For the production of first crop rice in 1950, for instance, an amount of N.T.\$688 was used for one hectare of paddy. The total production cost was N.T.\$2,295, indicating that wages alone accounted for roughly 30 percent of the total. Labor costs increased steadily, and in 1972 they reached N.T.\$9,133 per hectare. The total production cost for the first rice crop was N.T.\$19,867 in that year, of which labor accounted for about 46 percent.<sup>1</sup>

Nonfarm inputs in the production of rice have also increased remarkably in the past 20 years. In 1950 chemical fertilizers distributed by the government for rice production totaled 301 kilograms per hectare. This figure increased to a record level of 919 kilograms in 1964. Between 1964 and 1969, chemical fertilizers used for rice production maintained a level of around 900 kilograms per hectare, but since 1970 there has been a declining trend. Over the entire period, however, fertilizer costs have been second only to labor costs and have accounted for about 25-30 percent of the total costs of producing paddy.

### *Consumption*

According to a recent survey, the average family expenditure on rice alone accounted for 85.7 percent of the expenditures on staple food, 24.1 percent of all foods, and 10.7 percent of all consumption expenditures (7). If the price of rice

<sup>1</sup> Hired labor accounted for 52 percent of the labor costs.

had not been maintained at an artificially low level, the relative share of rice in family expenditures would have been even larger. The per capita energy intake in Taiwan, 2,733 calories per day in 1974 (4), was one of the highest in Asia. Rice supplied 1,323 calories or 48 percent of this total.

Rice is consumed three times a day by the majority of families in Taiwan. A survey in 1972 indicated that average per capita consumption of rice was 131 kilograms of polished rice (3). However, substantial differences exist among different groups in the population. The per capita consumption of rice is influenced by the degree of urbanization. Consumption per capita was 96 kilograms of polished rice for urban families, 137 kilograms for suburban families, and 151 kilograms for rural families.

If rice consumption is expressed in expenditure terms, however, the variation of rice expenditure among different groups of the population becomes narrower due to marketing margins. The rice consumption expenditure for the three groups of the population was N.T.\$720 per person per year for the urban population, and N.T.\$965 and N.T.\$997 for the suburban and rural populations, respectively. These findings imply that the aggregate income elasticity of rice is negative and that the per capita consumption of rice can be expected to decrease when people can afford luxury foods such as meat, milk, and eggs.

### Marketing

Following the rapid economic growth of Taiwan in recent years, rice production has moved toward a more commercial basis. Table 1 indicates that 57 percent of total rice production was marketed off farms in 1973 as compared to 49 percent in 1950, even though average farm size became smaller.

Rice is marketed through two channels, free market and government; the government accounts for about 30 percent of the total. In the free-market channel,

TABLE 1.—OFF-FARM MARKETING AND GOVERNMENT COLLECTION OF RICE\*

Year	Total off-farm marketing (thousand metric tons)	Government collection (thousand metric tons)	Off-farm marketing to total production (percent)	Government collection to off-farm marketing (percent)
1950	701	388	49	55
1952	802	429	51	53
1954	848	554	50	73
1956	821	520	46	63
1958	882	545	47	62
1960	875	466	46	53
1962	1,067	596	51	56
1964	1,171	670	52	57
1966	1,263	636	53	50
1968	1,356	697	54	51
1970	1,330	499	59	38
1972	1,332	309	55	23
1973	1,278	259	57	20

\* Off-farm marketing figures for 1950-68 are quoted from T. H. Lee, "Government Interference in the Rice Market in Taiwan," paper presented to the Rice Policy Conference in Manila, International Rice Research Institute, April 20, 1971, p. 5, and those for 1970-73 are estimates of the authors; figures of off-farm marketing include government collections.

TABLE 2.—PRICE DIFFERENTIATION OF RICE AMONG FOUR CITIES IN TAIWAN\*  
(N.T.\$ per kilogram)

	Taipei	Keelung	Taichung	Kaohsiung	Maximum price difference	Percent against lowest price
1972						
September	8.00	7.83	7.71	7.72	0.92	3.76
October	8.00	7.83	7.54	7.69	0.46	6.10
November	8.00	7.83	7.43	7.67	0.57	7.67
December	8.00	7.89	7.49	7.71	0.51	6.81
1973						
January	8.22	8.28	8.16	8.20	0.12	1.47
February	8.33	8.22	8.12	8.33	8.21	2.59
March	8.29	8.00	8.00	8.06	0.29	3.63
April	8.21	8.00	8.00	8.00	0.21	2.63
May	8.17	8.00	7.91	8.00	0.26	3.29
June	8.17	8.22	7.86	8.00	0.36	4.58
July	8.22	8.33	8.00	8.28	0.33	4.13
August	8.50	8.37	8.03	8.78	0.75	9.34
Average	8.18	8.07	7.85	8.04	0.33	4.20

\* Data from Wen-fu Hsu, "A Study of Marketing of Selected Agricultural Products in Taiwan" (in Chinese), Department of Agricultural Economics, National Taiwan University, April 1974, p. 76.

rice mills at local markets play a predominant role. In addition to processing paddy into brown rice and polished rice, most rice mills in Taiwan also perform wholesaling and retailing functions. Customarily, rice shipped to a distant market is in the form of brown rice because it can be stored longer than polished rice. In 1974 there was a total of 19,000 rice merchants, including shippers, wholesalers, retailers, and processors.

Rice storage is an important function in adjusting seasonal supply to non-seasonal demand. Customarily, farmers store their rice in on-farm warehouses or storage bins. The government rice is stored in farmers' association warehouses, and storage is consigned to private rice mills only if the warehousing capacity in the local farmers' associations falls short.

Most producers store their rice for more than six months, but few store it longer than a year. Government rice, however, is stored for a much longer period, usually from 12 to 18 months (1). Storage losses expressed as ratios to total storage costs (excluding value of the commodity) are about 18 percent in on-farm warehouses and 11 percent for government-stored rice.

The rice market appears to be the most competitive agricultural product market in Taiwan. Numerous buyers and sellers operate in the market, and the product is well-known and relatively homogeneous in quality. For these reasons, price differentiation among different localities is negligible. As shown in Table 2, recent differences in monthly prices among four major cities have been less than 5 percent. The marketing costs for rice are presented in Table 3. Under this cost structure, rice farmers receive nearly 85 percent of the retail price. Middlemen margins were only 9 percent, while other costs, including transportation and processing expenses, represented about 7 percent.

TABLE 3.—COSTS OF MARKETING 100 KILOGRAMS OF POLISHED RICE\*

Items	Amount (N.T.\$) <sup>a</sup>	Percent of retail price
Farm value (140 kg. of paddy—equivalent to 100 kg. of polished rice)	601.41	84.57
Transportation	11.98	1.69
Packaging	2.33	0.33
Processing	11.27	1.59
Wholesale margin	24.03	3.38
Sub-total	49.61	6.98
Wholesale price	651.02	91.54
Transportation	3.39	0.48
Processing	15.00	2.11
Packaging	0.74	0.10
Retail margin	41.02	5.77
Sub-total	60.15	8.46
Retail price of polished rice (100 kg.)	711.17	100.00

\* Data from Wen-fu Hsu, "A Study of Marketing of Selected Agricultural Products in Taiwan" (in Chinese), Department of Agricultural Economics, National Taiwan University, April 1974, p. 92.

<sup>a</sup> The conversion rate of N.T.\$ to U.S.\$ is 38 to 1 for 1974 and after.

### External Trade

Table 4 contains data on rice production and exports between 1953 and 1973. The largest quantity of rice exported during these 20 years was 263,000 tons in 1957, when foreign sales accounted for 14 percent of total production. Rice exports since 1967 have decreased to around 50,000 tons, or about 2 percent of annual production.

#### OBJECTIVES OF RICE POLICY, 1945-70

The four principal objectives of rice policies in Taiwan since World War II have been (1) to produce as much rice as possible from limited agricultural resources; (2) to control (procure) as much rice as possible for the government; (3) to export as much rice as possible to earn foreign exchange; and (4) to stabilize the market price of rice as a basis for economywide price stabilization.

A variety of economic and political concerns has given rise to this set of objectives. Food shortages were severe on the mainland during the Second World War. Because of this experience and the large population influx from the Chinese Mainland, there was a natural concern about producing sufficient food from domestic sources. Lessons were also learned from the hyper-inflation during and immediately after the war years on the mainland. The Chinese economy was predominantly rice-based, and a large part of business and daily life was directly or indirectly carried out in terms of rice. A sufficient supply of rice was therefore an indication of affluence and stability in the total economy. Foreign exchange was needed to finance the import of capital goods, raw materials, and modern technology from foreign countries. In the initial stages of the postwar economic rehabilitation and development, Taiwan did not have anything significant to export except rice and sugar.

TABLE 4.—PRODUCTION AND EXPORT OF BROWN RICE\*

Year	Production (metric tons)	Export (metric tons)	Exports as a percentage of production
1953	1,641,557	89,525	5.45
1954	1,695,107	89,850	5.30
1955	1,614,953	167,133	10.35
1956	1,789,829	113,850	6.36
1957	1,839,009	262,931	14.30
1958	1,894,127	181,762	9.60
1959	1,865,316	93,725	5.03
1960	1,912,018	48,116	2.52
1961	2,016,276	93,373	4.63
1962	2,112,875	39,373	1.86
1963	2,109,037	186,407	8.84
1964	2,246,639	234,765	10.45
1965	2,348,041	238,661	10.16
1966	2,379,661	220,817	9.28
1967	2,413,790	96,040	3.98
1968	2,518,103	52,964	2.10
1969	2,321,633	51,428	2.22
1970	2,462,643	5,652	0.23
1971	2,313,802	83,817	3.62
1972	2,440,329	27,568	1.13
1973	2,254,730	80,964	3.59

\* Data from Taiwan Provincial Food Bureau, *Taiwan Food Statistics Book* (Taipei, 1974 ed.), pp. 2 and 99.

In view of the role of rice as the traditional staple food of Taiwan, it is understandable that the government considered adequate supplies to be imperative. Since rice imports were not always dependable and there were continuing balance-of-payments problems, the government made extensive efforts to increase domestic rice production. The successful implementation of rice production programs was instrumental in the steady overall economic growth that Taiwan has experienced during recent years.

The role of rice as a wage good has been a particularly important influence on government policy. In many instances, rice was used to hedge against inflation, and often financial transactions were made in terms of, or in relation to, rice. Under these conditions, fluctuations in the price of rice were considered to have an adverse influence on the prices of other commodities and services. It was argued that a rise in rice prices would raise labor costs, thereby raising the cost of production in labor-intensive industries. Increases in the cost of producing industrial goods would in turn affect their competitive position in international markets, and the pace of industrialization would slow down. Consequently, stabilizing the general price level meant maintaining rice prices at relatively low levels.

In earlier periods, policy makers also wanted to limit money circulation by requiring that transactions be made in kind. They noted that if fertilizer were bought for cash, the farmers would have to sell their rice for cash. Many government officials believed that barter transactions would help eliminate the circula-

tion of money and that the resulting pressure of money on prices would thus be avoided.

Most government officials also maintained that the scale of operation of the majority of farmers was too small to permit any appreciable marketable surplus of rice. The small-scale cultivators would therefore not benefit from higher rice prices. Policy makers felt that small farmers would benefit more from having inputs supplied at reasonable costs to help lower production costs. Furthermore, they felt that fertilizer would become an object of speculation by dealers, and, as a consequence, fertilizer prices would fluctuate more than under a government-controlled barter system.

During the first two decades of postwar agricultural rehabilitation, government policies were quite successful in achieving both greater rice production and greater control over rice marketing. The government increased the amount of rice under its control by supplying more bartered fertilizer and by increasing land-tax burdens. Under the slogan of "more food for the people and the military," government policies toward rice were not seriously challenged.

The Provincial Food Bureau (PFB) maintained a large cadre of workers to handle the government's daily business of rice collection, fertilizer distribution, storage management and rice processing and distribution. In 1974 the size of the PFB staff was about 3,000 full-time employees. Moreover, the field operations of the PFB are entrusted to the farmers' associations and to local rice mills on a fee basis; recent rates have been N.T.\$70 per metric ton for the distribution of fertilizer and N.T.\$8.50 per metric ton of paddy for the collection and storage of rice. Because the associations and mills have not been paid enough to recover all incidental costs, it is difficult to calculate precise marketing costs. Expenses of the PFB are met by the profits made from the barter of fertilizer for rice, stabilization sales, and exports of rice. Because the cost calculations of government-distributed rice are inaccurate, there is strong speculation that inefficiencies exist in the government's collection and distribution of rice.

Rice prices in Taiwan have been very stable except in 1953, 1960, and 1974, when they experienced sharp upsurges because of bad weather and short supplies. In addition, the price spread between producers' prices and consumers' prices has been narrow. The seasonal price fluctuations in normal years are also small in magnitude. To a large extent, this price stability resulted from active government participation in rice marketing and strict application of government regulations in the rice market. Even with this relatively high degree of stability, however, many people have not been satisfied with the effectiveness of the government's rice program.

#### RECENT CHANGES IN RICE POLICIES

Taiwan's rapid growth in the 1960s resulted in challenges to many of the earlier rice policies. As industrialization increased rapidly, agriculture became a declining industry and incomes of farmers were reduced relative to those of non-farmers. With rising incomes, nonfarm consumers shifted their consumption patterns, and thus food items, other than rice, provided better income opportunities for farmers. This diversification within agriculture impeded further increases in rice production.



Because of the relative decline in farm income, the government was reluctant to increase the heavy burden on the rice-growing farmers through the land tax or through the barter of fertilizer for rice. It also became more difficult for the PFB to generate net profits from a barter ratio unfavorable to the farmers. In the 1950s the PFB made a yearly profit of N.T.\$388 million (U.S.\$24.87 million at an exchange rate of U.S.\$1 = N.T.\$16), but given their relative fall in income, growers appeared no longer willing to bear such a heavy tax burden in the 1970s (2, 5). It became difficult to induce farmers to grow more rice when other goods, such as fruits, vegetables, and livestock, offered better profit opportunities. As a result, rice production has declined somewhat since reaching its record level in 1968.

Consumers have also found themselves in altered circumstances. Having more money to spend than before, they are becoming less responsive to rice prices because now only a small portion of their income is spent on rice. Consequently, the theory that price of rice influences living costs and wage levels is much less plausible than before. More and more, government employees are finding rice rations inconvenient and are demanding payment in money.

Since 1970 rice policies have shifted emphasis. The PFB's scope of activities has narrowed as production programs, including irrigation and demonstration projects, were dropped. The PFB stopped supplying feed and agricultural chemicals. Most importantly, the bartering system of fertilizer for rice was formally abolished in 1973. The government instead instituted a guaranteed price for rice to assure a reasonable income to rice growers. The minimum price of paddy rice was set at N.T.\$5.20 per kilogram for the first rice crop of 1973 and the guaranteed price was increased to N.T.\$6 for the second crop. The price was set at N.T.\$10 for the first and second rice crops of 1974 and N.T.\$11.50 for the first and second rice crops of 1975, the highest prices farmers have ever received. A rice stabilization fund also was established in April 1974 with a total amount of N.T.\$3 billion. This fund is evidence of the government's desire to participate indirectly in the rice market rather than to control the rice supply directly. While the land tax is still collected in kind, the rate was lowered. Compulsory purchase remains in effect, but the purchase price is now to be set no lower than the market price. Government policies are thus moving in a direction more favorable to rice farmers.

The shifts in rice policy objectives in Taiwan are illustrated in Table 5. Before 1970 the emphasis was on consumers' welfare, government revenue, and economic stability. Self-sufficiency was not considered a primary objective of rice

TABLE 5.—CHANGES OF WEIGHT OF RICE POLICY OBJECTIVES IN TAIWAN BEFORE AND AFTER 1970\*

Objectives	Weight before 1970	Weight after 1970
Farmers' income	—	0.3
Consumers' welfare	0.3	0.3
Government revenue	0.3	—
Foreign exchange	0.1	—
Self-sufficiency	—	0.2
Economic stability	0.3	0.2
Total	1.0	1.0

\* Authors' estimates.

policy because of the export potential for rice in the 1950s and 1960s. The foreign market for Ponlai varieties of rice largely disappeared in the late 1960s, however, because of increased rice production in Japan. The Taiwanese government continued to depress rice prices until 1972. As a consequence, farmers switched from rice production to other crops. For example, some farmers replaced the rice crop with bananas when banana production started to show handsome profits after the reorganization of the export system. This tendency continued in the South, where most of the export bananas are grown. It is estimated that 25,000 hectares of paddy field were converted to banana production during the period from 1963 to 1970.

In recent years, as world food shortages have become increasingly serious, the government has made self-sufficiency in rice a national policy. This policy is not likely to be changed in the coming years if the world food supply does not show significant improvement. To increase rice production and improve farmers' incomes, the government has changed its rice price policy by providing incentive prices to rice growers. It is expected that this policy will halt the decline of rice production and narrow the disparity between the incomes of farmers and those of nonfarmers.

#### GOVERNMENT POLICIES FOR RICE PROCUREMENT AND DISTRIBUTION

Compulsory collection and rationing of rice were in Taiwan by the Japanese government during World War II. In that period, the surplus rice was purchased compulsorily and rationed at official prices to the nonfarm population. After restoration of the island province, this policy was abandoned temporarily by the Chinese government. However, new measures were introduced to cope with the problems of food shortage caused mainly by the large influx of people from the mainland.

The total rice collection by the government expressed in terms of unpolished brown rice was about 400,000 metric tons a year in 1950. It increased to about 500,000 metric tons from 1950 to 1960, to about 550,000 metric tons between 1961 and 1965, and reached an all-time high of about 700,000 metric tons in 1968. Total rice collection by the government then declined to about 500,000 metric tons per year thereafter and further dropped to 309,000 and 259,000 metric tons in 1972 and 1973, respectively. The major means for collecting rice have been the paddy land taxes in kind, compulsory purchases of paddy from the paddy landowners, rent on government-owned farmland, proceeds in kind from the sale of public land, barter of fertilizer for rice, sales proceeds collected from ex-tenants who received land under the land reform program, and repayment of rice production loans.

#### *Land Taxes*

The paddy land tax and the surtax in kind on the owners of paddy land were inherited from schemes adopted in mainland China. For rural lands other than paddy fields, however, related taxes are collected in cash. In 1974 the amount of rice to be paid by paddy landowners was calculated as follows: paddy land tax in kind equals tax unit *Yen* (Y) times 22 kilograms (paddy rice) times paddy

land area; and compulsory purchase of rice equals tax unit (Y) times 35 kilograms (paddy rice) times paddy land area.

The land-tax unit is determined on the basis of the productivity of the land. The cultivated land, both paddy and upland, has been classified into 26 grades. For each grade a tax unit ranging between Y1.2 and Y49.0 is assigned. Land-tax collections have been adjusted seven times since 1945 by changing the amount of paddy to be collected per tax unit without changing the tax unit for a specific grade of land. For instance, the amount was 8.85 kilograms in 1946, 11.505 kilograms in 1947, 14.16 kilograms in 1950, 19.37 kilograms in 1962, 27.0 kilograms in 1969, and 22.0 kilograms in 1974. In 1973 a total of 120,658 metric tons of brown rice was collected from a total paddy land area of 544,505 hectares. On average, approximately 281 kilograms of paddy per hectare were collected under this scheme.

#### *Compulsory Purchase of Paddy*

The compulsory purchase of paddy from landowners at official prices constitutes another source of government-produced rice. Any parcel of paddy land is subject to payment of paddy land tax plus compulsory purchase of rice. Collections, made on top of the paddy land tax, are calculated on the basis of the tax unit which depends upon the productivity of land. The amount to be purchased has been adjusted several times since 1950. In 1973 the figure was 12 kilograms per tax unit, but in 1974 the assessment was raised to 35 kilograms to offset the decrease in government-collected rice after the abolition of the system of bartering fertilizer for rice.

If the price paid by the government equals the market price of paddy, the compulsory purchase of rice is tantamount to a business transaction between the government and the farmer. The government, however, has typically paid only 70–80 percent of the prevailing market price. The difference between the official and market prices thus constitutes an additional, but hidden, tax on the paddy landowners. However, since 1973 the government has raised the purchase price of rice to the market price level in order to increase farm incomes. In 1973 the compulsory purchase of paddy by the government amounted to 57,000 metric tons of brown rice, or roughly half of the amount collected through land taxes.

#### *The System of Bartering Fertilizer for Rice*

In order to control as much rice as possible, the government devised a barter system for fertilizer and rice in 1948. Under this system, chemical fertilizers were distributed to the rice growers by the government in exchange for paddy. Spot barter was made for 40 percent of the fertilizer, while the remaining 60 percent was loaned to the rice growers to be repaid after harvest. Since all fertilizers, both domestic and imported, were controlled by the government, farmers in need of chemical fertilizer (except for sugarcane growers whose fertilizer was distributed by the Taiwan Sugar Corporation) traded paddy to the government. The exchange ratio of rice for fertilizer was usually unfavorable to rice farmers. The amount of rice required for one kilogram of ammonium sulphate was 1.20 kilograms for the first crop of 1950. Although the exchange ratio has since been re-

duced several times, reaching 0.53 kilograms in 1972, this arrangement never won the full support of most rice growers. Rice collected by the government through this system constituted the bulk of government-procured rice until the system was abolished in 1973.

Fertilizers were not the only commodity that the government offered to the farmers in exchange for rice. The PFB also bartered other production materials, including soybean cake and consumer goods such as cotton cloth. Unlike the monopolistic position in supplying chemical fertilizer, however, the government had to compete with commercial channels in supplying these other materials. The other barter programs failed, partly because of the unrealistic barter ratios established by the PFB and partly because of the cumbersome nature of the programs.

### *Other Methods*

In the center of a postwar land reform program, the government compulsorily purchased land from landowners and distributed it to tenant cultivators. The land value was to be repaid by the tenants in semiannual installments over 10 years. The payment of the land value was to be made in paddy if the land was paddy land. Rice collected in this way amounted to about 50,000 metric tons in the peak year of 1959 and has decreased since then.

The government also acquired a substantial amount of cultivated land that was previously owned by Japanese nationals during the Japanese occupation. This public land was leased to farmers for cultivation, and a part of it was sold to tillers. Both land sales and land rent were collected in kind. In the peak years of 1964 and 1965, rice collected by this means amounted to 38,000 metric tons per year.

In addition, the PFB has provided rice production loans to needy rice growers in an effort to encourage rice production. The rice production loan, bearing an interest rate of 3 percent per crop, is to be repaid in paddy. In calculating the amount of rice to be repaid, the PFB uses the market price of rice prevailing one month after harvest. The cash production loan is then converted into paddy at the lowest price during the season. Through this procedure, the borrowing farmers are required to repay the principal with interest rates higher than the nominal rates. For this reason, rice production loans have never been popular among rice farmers, and program achievements always have been far below the established targets.

The share of the government's rice collection by all of these programs in the total amount of rice marketed off-farm averaged between 50 and 60 percent during 1950-70. By 1970, however, this share was only 38 percent, and it declined to 20 percent in 1973.

### *Distribution of Government Rice*

The collection of government rice was by no means considered an end in itself. The disposal of government rice has been made through several channels including rations to armed forces, military dependents, civil servants, public school teachers, and mine workers. In addition, the government undertakes market stabilization sales and exports.

Taiwan maintains a large armed force. About 100,000 to 120,000 metric tons per annum of government rice are used to provision military personnel. In addition, low pay to the military is compensated partially by rations of rice and other necessities. These free rations are provided to officers for use by their families but not to draftees. The rice used for this purpose is rather limited, about 40,000 to 50,000 metric tons per year.

As a part of government employees' and teachers' salaries, the government provides free rations of about 100,000 to 120,000 metric tons of rice per year. Since 1970, however, rice distribution under this category has declined significantly because many eligible persons have chosen to receive a money equivalent instead of rice. Many people have criticized direct distribution of rice because of the administrative difficulties involved and because the rice offered was of inferior quality.

In order to stabilize the domestic market price of rice, the PFB has occasionally made sales from its stock of rice. Stabilization sales are usually conducted in periods of rising prices. The government's price is usually about 5 percent lower than the prevailing price so that further rises in the market price may be checked. However, stabilization has not always been possible because the PFB has sometimes been unable to release an unlimited amount of rice at a fixed price into the market. Amounts of government rice released in this way have fluctuated widely during the past 20 years, ranging between 244,000 metric tons in 1960 and 29,000 metric tons in 1969.

In the early stages of postwar economic development in Taiwan, the export of rice played an important role in earning foreign exchange. Rice exports were monopolized by the government; no commercial establishment was permitted to handle exports. Rice for export was supplied from government stocks. In 1965 rice exports reached a record of about 300,000 metric tons, but exports have declined significantly since 1966 in large part because Japan became a rice-surplus country.

A considerable amount of logistic support is required for the collection, storage, processing, and control of government rice. The PFB does not have the local facilities to handle these operations. Field operations for the distribution of fertilizers and for the collection, storage, and processing of rice are entrusted to local farmers' associations and merchant rice mills. The merchant rice mills are authorized only to collect rice turned in to the government for land taxes and compulsory purchases. All other local rice activities are entrusted to farmers' associations. These groups are paid a limited handling fee for handling government rice.

To facilitate the storage of paddy and of chemical fertilizers, the township farmers' associations have constructed many fertilizer and rice warehouses. Both the PFB and the Joint Commission on Rural Reconstruction (JCRR) have provided financial assistance in the form of grants or loans for these storage facilities. Of the existing 850,000 metric tons of warehouse capacity, about half was constructed with PFB and/or JCRR assistance.

The recovery ratio in the processing of paddy into brown rice is a crucial factor in making more rice available to final consumers. To help renovate the rice hulling facilities of the farmers' associations, JCRR has assisted in the reconstruction of mills. As a result, the recovery ratio of brown rice from Ponlai rice has

increased from about 76 percent in the immediate postwar period to about 80 percent in recent years.

The government intervenes in the market when prices deviate from desired levels. When the market price of rice rises substantially, the government food authorities release stocks at lower prices until the market price is reduced to the desired level. The stabilization level is arbitrarily set by the PFB though it is usually 15 to 20 percent higher than costs of production.

The "official price" of rice is applicable to the following categories: payments for rice compulsorily purchased from owners of paddy land; conversion of land tax in kind into cash for upland and single-cropping paddy land yielding only one crop of rice annually; and settlement of accounts between food authorities and other government agencies regarding rice rations. The official price of rice is announced by the PFB every season. During the two decades before 1973, the official price of rice was usually set 20 to 30 percent lower than the market price.

The year-to-year changes in rice prices during the past 20 years are presented in Table 6. Several conclusions can be drawn from these data. First, prices at the farm, wholesale, and retail levels are close. Second, except in 1973 and 1974, the year-to-year changes in the price of rice have been gradual, showing the effectiveness of government control over rice prices in most years. Third, the government has maintained a relatively low price for rice. This policy has been based on the belief that rice is a necessity and that its cost should not impose hardships on the general populace.

Statistics provided by the PFB reveal that between 1955 and 1969 the rice

TABLE 6.—PRICES OF RICE AT DIFFERENT MARKET LEVELS\*\*<sup>a</sup>

Year	Farm price of paddy	Wholesale price of polished rice (N.T.\$/kilogram)	Retail price of polished rice
1954	1.89	2.27	2.93
1955	2.10	2.93	3.15
1956	2.18	3.18	3.42
1957	2.34	3.36	3.63
1958	2.46	3.49	3.75
1959	3.09	3.72	3.97
1960	4.19	5.29	5.50
1961	3.93	5.81	5.98
1962	3.79	5.47	5.90
1963	4.00	5.61	5.91
1964	4.09	5.80	5.93
1965	4.13	5.85	5.97
1966	4.15	5.93	6.02
1967	4.41	6.23	6.32
1968	4.63	4.49	6.70
1969	4.53	6.47	6.89
1970	4.80	7.06	7.23
1971	4.65	6.72	7.34
1972	4.93	7.04	7.81
1973	5.69	8.17	9.63
1974 (March)	11.06	16.11	20.09

\* Data from Taiwan Provincial Food Bureau, *Taiwan Food Statistics Book* (Taipei, 1974 ed.).

<sup>a</sup> The conversion rate of N.T.\$ to U.S.\$ is 38 to 1 in 1975.

price index was consistently 22 to 36 percent lower than the general price index (6). Since nearly all farmers in Taiwan are engaged in rice production and the entire populace consumes large amounts of rice, the policy to maintain relatively low rice prices has had an important impact on income distribution by enlarging the discrepancy between farm and nonfarm incomes. In addition, depressed prices have reduced incentives for farmers to make further investments and thereby to enhance agricultural productivity. While the low price policy for rice has had some unfavorable results, it nevertheless contributed greatly to social stability and to the sustained growth of the Taiwan economy.

#### SUMMARY

Because of the importance of rice in both production and consumption, rice policy in Taiwan directly influences the stability of the economy and the welfare of the people. For more than two decades following the Second World War, Taiwanese rice policy generally favored consumers at the expense of producers. Since 1970, however, the policy orientation has been reversed in an effort to stimulate increases in production.

In view of the role of rice as a wage good, the government initially aimed to keep the price of rice at relatively low levels. Rising rice prices would very likely have led to increases in industrial wage rates, thereby undercutting the competitiveness of Taiwan's nascent manufacturing firms in the domestic market and abroad.

Although it kept rice prices low, the government did not ignore the producers of rice. It made efforts to stabilize or reduce the prices of purchased inputs, including fertilizers, chemicals, farm implements, and irrigation facilities. To some extent, these measures were effective, and rice production steadily increased until 1968 when it peaked at 2,520,000 metric tons. At the same time, foreign exchange earnings from the export of rice played a significant role in financing vital imports for economic development.

After 1968, total rice production began gradually to fall. Largely as a result of government pricing policies, farmers switched to more profitable crops. Other rice farmers increasingly took off-farm jobs, the availability of which was one of the by-products of the substantial postwar growth of the Taiwanese economy. This situation forced the government to reconsider its rice policy.

Beginning in 1970, the government introduced high, guaranteed prices for rice and abolished earlier policies considered detrimental to the interests of rice farmers, most notably the system of bartering fertilizer for rice. These new policies have provided substantial incentives to rice producers, and preliminary estimates of the rice crop in 1975 indicate a return to the peak levels produced in 1968.

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