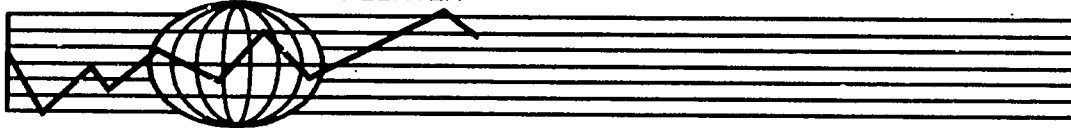


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Rice Policy in Japan's Economic Development

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Rice Policy in Japan's Economic Development*

YUJIRO HAYAMI

Until only a decade ago, Japan's rice policy had been primarily designed to procure "cheap" rice for the industrial population from domestic and colonial producers. For the promotion of industrialization and economic growth the price of rice, the principal wage good, had been kept low to prevent the rise in the wage rate of urban industrial workers. The shift from the traditional cheap rice policy to a recent policy of high price supports is due to the decline in the role of rice as a wage good. The rapid rise in per capita income and the dramatic transformation of Japan's industrial structure contributed to the policy change.

JAPAN's rice policy in the past decade represents a major violation of the theory of international comparative advantage. The price of domestic rice in the late 1960's was more than double the import price due to continuous increases in the government supported price of Japanese-produced rice.

Such high level price support was a heavy burden on the national budget as evidenced by the 1971 budget in which government expenditures for rice support, including the deficit of the Food Control Special Account and expenses for retirement and diversion of paddy fields, amounted to 463 billion yen (1.3 billion U.S. dollars). This total accounted for 50 percent of the agriculture and forestry budget and nearly 5 percent of the total national budget (Table 1). Concomitantly, this price support hindered the shift of agricultural resources from rice production to other products of rising demand such as livestock and vegetables. It also discouraged the out-migration of farm labor to non-agriculture when labor shortage became a permanent feature of the economy.

The purpose of this study is to analyze this current policy issue in the historical perspective of Japan's modern economic growth since the Meiji Restoration (1868).¹ Although this may

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¹ For an excellent review of the history of rice policy in relation to economic growth, see Mochida [17, 18]. For factual descriptions of rice policies, see Ogura [21, pp. 149-210].

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Table 1. Deficit of the food control program in relation to the total national budget and the budget for agriculture and forestry of the central government, 1951-71*

Year	Balance of the Food Control Special Account	Ratio of deficit of the Food Control Account to	
		Agriculture & forestry budget	Total budget
	billion yen	percent	
1951	3.8	- 3.6	-0.5
52	- 14.0	9.7	1.5
53	- 20.6	12.1	2.0
54	- 13.0	11.6	1.3
55	- 0.3	0.3	0
56	- 16.0	17.5	1.5
57	- 6.7	5.5	0.6
58	- 2.1	2.0	0.2
59	- 10.2	8.8	0.7
60	- 28.5	17.1	1.6
61	- 58.6	25.5	2.8
62	- 62.5	24.4	2.4
63	- 78.6	26.3	2.6
64	-126.9	36.4	3.8
65	-128.1	31.6	3.3
66	-213.9	38.5	4.8
67	-248.8	40.3	4.8
68	-278.2	40.6	4.7
69	-344.1	41.6	5.0
	(356.6) ^a	(43.1)	(5.1)
70	-346.2 ^b	34.9	4.2
	(456.4) ^a	(46.0)	(5.6)
71	-292.3 ^b	25.5	2.6
	(476.3) ^a	(49.3)	(4.9)

* Numbers in parentheses are the budget for the deficit from the food control program including the budget for retirement and diversion of paddy field area.

^a Balance of rice and *mugi* control only.

^b Data provided by the Research Section, Food Board, and the Budget Section, Minister's Office, Ministry of Agriculture and Forestry.

appear to be a recent problem, the current issue of rice control and price support can best be understood by comparing long-term changes in the role of rice as a critical wage good to changes in industrial structure and per capita income. Interaction of rice policy and economic growth in the history of Japan also provides information on the strategy of economic development

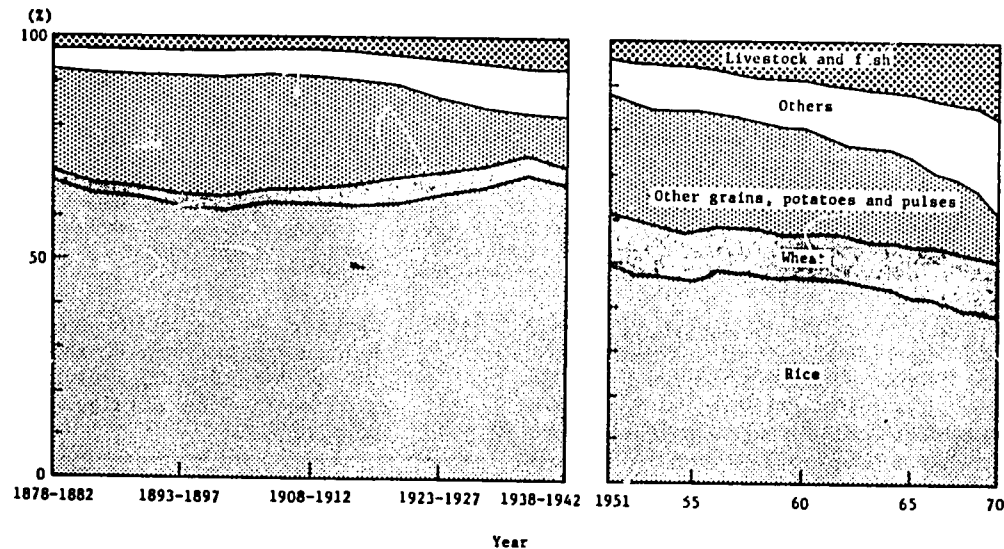


Figure 1. Changes in the shares of various food items in the total calorie intake of the Japanese, 1878-1942 quinquennial data and 1951-1969 annual data
Sources: JMAF [11] and Yamada and Hayami [24]

that would be valuable to countries in South and Southeast Asia which are now exploring conversion of the production potential of rice and other food cereals, increased by recent technical advancements, into overall economic growth.

Role of Rice as a Wage Good

Industrialization and economic growth are conditioned by the availability of agricultural surpluses, especially the surplus of basic food staples as wage goods for industrial workers ("Surplus" is defined here as the difference between production and consumption by producers.). In the classical model of economic development from Ricardo to Arthur Lewis [16] and Fei and Ranis [1], capital returns (hence, capital formation and economic growth) critically depend on the elastic supply of labor to industry, which in turn depends on the elastic supply of food to the urban sector.³ Food may be imported from abroad, but this implies a drain on foreign exchange needed for the import of capital goods and technical know-how critical for development.

Within less than a century, Japan has changed from a predominantly rural state to one of the

world's highly industrialized nations. In the course of this industrialization rice has been the critical wage good. Figure 1 shows rice as the source for more than 60 percent of the total caloric intake of the Japanese before World War II. It was only in the late 1960's that the share of rice in the total caloric intake dropped below 40 percent.⁴ The share of rice in the consumption expenditure of urban blue collar workers continued to be as high as 30 percent until 1930. Despite rapid growth in per capita income, the share of rice in the consumption expenditure of urban worker households did not drop below 10 percent before 1960 (Table 2).

It was critical for the industrial development of Japan before 1960 and particularly before 1920 when labor-intensive light industries (such as textiles) predominated, especially in the manufacturing of export goods, to supply cheap rice to industrial workers to keep their living costs and wages low.

When she opened her doors to foreign countries shortly before the Meiji Restoration, Japan was in real danger of colonialization by the western powers. The national slogan then was to "build wealthy nation and strong army"

³ Such questionable restrictive assumptions as "surplus labor at zero marginal productivity" and "institutional wage rate" are unnecessary for the present discussion.

⁴ Decline in the share of rice from before to after World War II is explained by an increase in wheat consumption. The wheat-eating habit was developed during the period of rice shortage through school lunch programs, etc.

(*Fukoku Kyohai*). To attain this goal it was considered necessary to "develop industries and promote enterprises" (*Shokusan Kogyo*).

Assuming industrial development was a national goal, it is plausible that the price support policy was designed to secure the supply of rice, which could prevent the rise in the cost of living of urban workers. Figure 2 plots the price of rice since 1880. The current (undeflated) price shows a clear upward trend with big jumps during the two World Wars (real line). A remarkable fact is that the price of rice deflated by the general price index (dotted line) remained at about the same level from the early Meiji period up to 1960. However, it was subject to considerable fluctuation because of business cycles (among the most pronounced were downswings in the mid-1880's due to the so-called "Matsukata Deflation"⁴ and in the early 1930's due to the World Depression and an upswing brought on by the World War I boom).

In relation to the long-term trend in the deflated price of rice, it is clear the rapid rise in rice prices during the 1960's was an entirely new phenomenon in the modern history of Japan. The trade of rice with other commodities clearly deviated from a boundary which was stable from 1880 to 1960.

From these observations it is possible to postulate the following hypotheses concerning interactions between rice policy and economic growth in Japan.

First, from the beginning of the Meiji Period to 1960, institutions and policies were, intentionally or not, designed to prevent the price of rice (relative to the general price index) from moving outside a stable boundary. Prevention of an increase in rice prices above a certain upper boundary was motivated to facilitate industrial development by keeping the cost of the critical wage good below a certain tolerable level in an economy dominated by labor-intensive industries.

Policy to keep rice prices above a lower boundary was naturally motivated to prevent the living standards of a majority of the farm population from declining below a subsistence level and thus causing social disorders. More positively it was intended to preserve the basis of agricultural reproduction and to keep alive farmers' incentive to increase rice production

⁴ This deflation was named after Finance Minister Matsukata who executed the deflation policy by consolidating paper currencies to establish the silver standard.

Table 2. Share of the expenditure for rice in total consumption expenditure by urban worker households [14; 19, p. 305]

	Percent
Blue collar workers	
Around 1897	32
1919	27
1926-27	16
1931-33	11
1936-38	15
White collar workers	
1920	18
1926-27	11
1931-33	8
1936-38	11
All urban workers	
1953	12.9
1954	12.7
1955	12.4
1956	11.9
1957	11.8
1958	11.1
1959	10.3
1960	9.5
1961	8.2
1962	7.0
1963	7.4
1964	6.6
1965	6.6
1966	6.0
1967	5.9
1968	5.6
1969	4.3

and productivity. Decline in the production of rice and hence, in the rice self-sufficiency, had to be avoided because it implied a drain on foreign exchange that was critical for industrial development.

Second, the unprecedented spurt of industrial development after the mid-1950's transformed the industrial structure of Japan and increased urban wages dramatically. Strength of Japanese industry in international competition no longer rested on "cheap labor." In response to wage and income increases, the share of rice in urban workers' consumption expenditures declined. Once a critical requirement for industrial development, rice as a wage good drastically decreased in importance. The Japanese economy reached the stage in which a rise in rice prices could be tolerated.

Continuous increases in rice prices during the 1960's were the result of extremely strong political pressure from farmers, requesting income and living level parity with urban workers. If rice had remained a critical wage good, it is inconceivable that political pressure of farm organizations could have brought about a rise

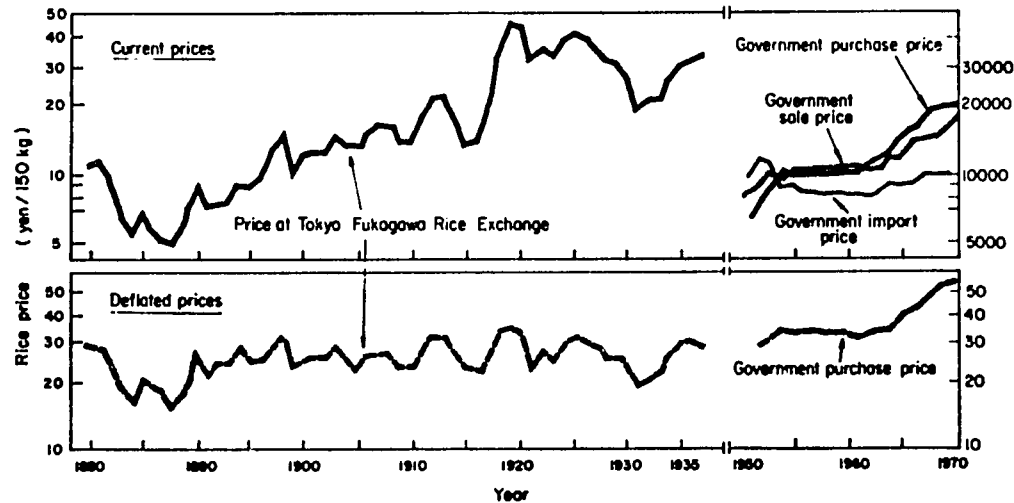


Figure 2. Changes in rice prices, both current and deflated by the general price index (1934-36 = 100), in Japan (log-scale in brown rice term), 1880-1937 and 1951-1970
Sources: Kayo [15, p. 514], JMAP [10] and Ohkawa [22; Vol. 8, p. 134]

in rice prices on such scale as to divert domestic prices several times above international prices.

Rice Policy for Industrial Development

Institutions for delivering marketable surplus

The policy which contributed most to increasing the marketable surplus of rice in the early Meiji period was the Land Tax Revision (1873-76).⁵ To secure stable government revenue, the revision changed the feudal tax in kind levied in proportion to quantities harvested into a modern land tax in cash based on the fixed value of land. With this revision farmers and landlords were forced to market nearly one-quarter of the rice produced to pay the new land tax.

The Land Tax Revision had another important consequence: it concentrated property titles in the hands of landlords. Because the new land tax was fixed in cash, small farmers were often unable to pay the tax in years of bad harvest or low rice prices. They were compelled to borrow money from wealthier farmers or landlords, and many of them lost their land through foreclosure. This process accelerated during the Matsukata Deflation in the mid-1880's which resulted in a drastic decline in rice

⁵ The tax revision on arable land was largely completed by 1873, but was not completed before 1881 on forest and wild fields.

prices (Fig. 2). The area owned by landlords was less than 30 percent of the total arable land at the time of the survey for the Land Tax Revision. It rose to 40 percent in 1892 and had risen to nearly 50 percent by 1930 [23, p. 67].

In those days rent for paddy fields was paid in kind, roughly 50 percent of harvest, and the landlords, who had a much lower marginal propensity to consume rice, received the increase in the share of rice output. This in turn contributed to the increase in the surplus of marketable rice. Rice export in the early Meiji period was supported by the squeeze on farmers' incomes by heavy land tax and rent.⁶

A more "positive" measure to increase rice supply was to increase the productivity and output of rice. Shortly after the Meiji Restoration, the Japanese government tried to develop agriculture by importing western farm machinery and produce crops and livestock by western (Anglo-American) farming techniques. This policy of direct "technology borrowing" proved unsuccessful because of differences in climatic and economic conditions. During the

⁶ According to Max Fesca, a German soil scientist employed by the Meiji Government, "The people of the lower class ate mainly the mixture of rice and barley prepared in the ratio of 1 to 2, or a porridge of millet and rice or of millet and barley, and, as a side dish, ate dried strips of radishes or vegetables of the season: they took almost no fish, even dried ones" [21, p. 182].

1880's the government shifted to a strategy of agricultural development which emphasized raising yields of traditional food staples—above all, rice.⁷

To effectuate this strategy, a labor-intensive and land-saving technology was developed by tailoring Japan's indigenous techniques after modern agricultural sciences from Germany (soil science and agricultural chemistry of the Liebig tradition). Establishment of the Itinerant Instructor System (1885) and the Experiment Station for Staple Cereals (1886), which grew into a national system of agricultural experiment stations, was in line with this strategy. The government also encouraged farmer organization for agricultural improvements such as *Nodankai* (society for discussing farming matters) and *Shushi Kokankai* (society for exchanging seeds) as media for improving and propagating better techniques.

As the result of such efforts, rice production gradually increased, but it failed to match the increase in demand during that initial spurt of industrialization which occurred after the recovery of the Matsukata Deflation and up to the Sino-Japanese War (1894-95). Japan turned from a net exporter of rice into a secular net importer. This raised serious public concern about foreign exchange and national security. Government efforts to counteract the increase in rice import by encouraging the domestic production of rice included the establishment of the National Agricultural Experiment Stations (1896), the Law of State Subsidy for Prefectural Agricultural Experiment Stations (1899), and the Arable Land Replotment Law (1899).

Efforts were successful to develop technology to raise yield per hectare by combining indigenous techniques and modern science, and by the beginning of this century a rather unique technology had been established. *Meiji Noho* (Meiji Agricultural Methods) was primarily based on seed improvement and higher fertilizer application with extremely labor-intensive land preparation, weed and pest control, and water management. With the development and propagation of *Meiji Noho*, Japan increased domestic rice supplies and prevented the further decline in rice self-sufficiency during the first two decades of a century of extremely rapid

industrialization and per capita income growth without raising the price of rice relative to the general price level.

From tariff protection to imperial self-sufficiency

Voices for tariff protection of rice in terms of foreign exchange and national security considerations began to be raised when Japan became a net importer of rice. But voices for securing cheap rice for cheap labor were equally strong. It was in the first year of the Russo-Japanese War (1904-05) that the 15 percent ad valorem tariff was first imposed on imported rice.

This tariff was levied to increase the government revenue for financing the war,⁸ and it was to be terminated at the war's end. Yet the landed interests lobbied to preserve this tariff, and succeeded in making it permanent in 1906 in the form of a specific duty of 0.64 yen per 60 kilograms.

Subsequently, the rice tariff became a major issue of public controversy, similar to those over the British Corn Laws and the German grain tariffs.⁹ Like Malthus and Ricardo on the Corn Laws and Wagner and Brentano on the German grain tariff, Jikei Yokoi in the University of Tokyo and Tokuzo Fukuda in the Tokyo College of Commerce (Hitotsubashi University) represented the two camps. Yokoi, the foremost leader of agricultural fundamentalism, argued for the tariff on the basis of national security, including the preservation of agriculture as the source of strong soldiers and considerations for the balance of payments and the balanced growth of agriculture and industry. Fukuda retaliated on the basis of the economic doctrine of the Manchester School which favored free trade and industrial growth. The controversy continued in the arena of the National Diet. The Imperial Agricultural Society representing the landed interests and the Tokyo Chamber of Commerce representing the manufacturers and traders of export goods lobbied fiercely for opposite ends.

In 1913 the rice tariff controversy in the Diet came to a conclusion with the specific duty of one yen per 60 kilograms, which could be lowered by 0.4 yen by government order. An im-

⁷ See Chapter 7 of Hayami and Ruttan [4] and Ogura [21] for the policies for increasing productivity and output of rice. For more detailed information, see Nogyo Hattat-sushi [20].

⁸ This tariff was also intended to appease landlords who accepted the increase in land tax for financing the War.

⁹ For vivid descriptions of the controversy, see Mochida [17].

portant qualification was that the import of rice from overseas territories, Taiwan and Korea, was made free of duty. This decision pointed to the possibility of solving two conflicting policy goals, (a) self-sufficiency of rice and (b) supply of cheap rice for urban workers, by expanding the source of rice supply from Japan to its overseas colonies. This policy of imperial self-sufficiency was not deliberately adopted before *Kome Sodo* (Rice Riot) in 1920.¹⁰

Increase in rice yield and production, which had kept rice imports from rising, began to slow down in the mid-1910's. Technological potential in *Meiji Noho* was being exhausted as it was being perfected and propagated.¹¹ The agricultural experiment stations in their early days contributed to agricultural productivity growth by exploiting indigenous potential rather than by supplying new potential. The national experiment station gradually moved to conduct more basic research, including original crop breeding projects at the Kinai Branch by cross-breeding (1904) and at the Rikuu Branch by pure line selection (1905). Results of major practical significance lagged, however, for more than two decades.¹²

The exploitation of indigenous potential and the lack of new potential in scientific research, when confronted with the expansion of demand due to World War I, resulted in a serious rice shortage and a high price for rice. These naturally caused disruptions in the urban areas and culminated in the Rice Riot of 1918, which swept over the major cities in Japan.

Faced with a choice between high rice prices, high cost of living, and high wages on the one hand, and a drain on foreign exchange by large-scale rice imports on the other, Japan organized the imperial self-sufficiency programs. Under the program titled *Sanmai Zoshoku Keikaku* (Rice Production Development Program), the Japanese government invested in irrigation and water control and in research and extension to develop and diffuse high-yielding Japanese rice varieties adaptable to the ecologies of Korea

and Taiwan.¹³ Success of this effort created a tremendous rice surplus which flooded the Japanese market. Within 20 years, from 1915 to 1935, net imports of rice from Korea to Japan rose from 170 to 1,212 thousand metric tons per year, and net imports from Taiwan rose from 113 to 705 thousand metric tons. Because of this inflow of colonial rice, the net import of rice rose from 5 to 20 percent of domestic production.

Rice control to counteract colonial rice and depression

Success of the government program to develop Korea and Taiwan as major suppliers of rice to Japan was a mixed blessing. Such large-scale imports of rice, characterized by a relatively inelastic demand schedule, as expected lowered the price and discouraged the production of rice in Japan. A deterioration in the price and in the terms of trade for rice during this period was a logical consequence of the policies designed to increase imports from Korea and Taiwan.¹⁴

During the 1920's competition from colonial rice producers, together with the deflationary policy of the government to return to the gold standard at prewar parity, depressed agricultural prices and income. Finally, the World Depression hit Japan, resulting in a serious agricultural crisis, and the government was compelled to rescue this situation by supporting rice prices.

Attempts to stabilize rice prices by government purchase, sale, and storage activities had been discussed in 1913. In 1915 the Rice Price Adjustment Order was proclaimed, but little operation was done before 1920. When the price of rice began to fall in the 1920's, the Imperial Agricultural Society pressed the government to adopt a rice control program, the so-called "Ever-Normal Granary Plan." This brought about the Rice Law in 1921, which empowered the government to adjust rice supply in the market by (a) operating the purchase, sale, storage, and processing of rice within the financial limit of 2 thousand million yen, and (b) reducing or increasing the import duty and restricting imports from foreign countries.

¹⁰ According to Tobata before the Rice Riot, "... development efforts in Taiwan were concentrated on sugar production and little was done in Korea. It was claimed that the development of rice production in those overseas territories should be suppressed since it was to foster the competition against Japanese agriculture..." [20, p. 597].

¹¹ See Hayami and Yamada [5].

¹² See Nogyo Hattatsushi [20] or Ogura [21].

¹³ For this process, see Hayami [2].

¹⁴ For a detailed quantitative analysis, see Hayami and Ruttan [3].

In response to the rapid decline in rice prices in the late 1920's and 1930's, the Rice Law was amended in 1925, 1931, and 1932, raising the financial limit finally to 4.8 thousand million yen. In 1933 when a bumper crop caused a phenomenal surplus of rice, the Rice Law was replaced by the Rice Control Law which authorized the government to buy and sell unlimited quantities of rice at the floor and ceiling prices. The government rice control operation was extended to colonial rice.

Government storage reached a peak of 1.4 million tons at the end of 1934. After this year the balance of rice demand and supply took a dramatic turn. Increasing military involvement in China created effective aggregate demand, which expanded the demand for rice. Also, both labor and capital were diverted from productive purposes to military purposes. After the China Incident in 1937, shortages of labor and material inputs such as fertilizer were keenly felt. Government stores of rice rapidly decreased and were exhausted in 1939 by the severe drought which hit western Japan and Korea.

In the progress of the war the government was forced to take direct control of rice distribution and began with the Rice Distribution Control Act in 1939.¹⁴ Increasing numbers of food items were added to the list of direct control and rationing. Finally, the Food Control Act, proclaimed the second year of the Pacific War in 1942, put nearly all items of food under the strict control of the government.

Rice Policy in the Post-War Growth

During the 20 years of "miraculous" recovery and growth of the Japanese economy after the devastation of World War II, rice shifted from a major wage good critical for industrial development to a minor item in household consumption expenditures. This change fostered a condition in which rice prices rose to an unprecedented level under the strong pressure of farmers requesting income and wage parity with urban workers. This section reviews this process and appraises rice policy relative to long-term historical trends.

¹⁴ The most comprehensive review of rice policy and the food control program during and after the war may be seen in the Ministry of Agricultural and Forestry, Board of Food [9]. For a concise summary see Mochida [18] and Ogura [21].

Rice policy for economic recovery

The rice problem became an especially critical issue in Japan during the recovery from war devastation. A compulsory delivery of rice from producers at a price far below market equilibrium had to be enforced to maintain the subsistence of a majority of the urban population suffering acute food shortage and hyperinflation. Consumer price for the government ration of rice was set even lower than producer and import prices.

In 1946, by the direction of the General Headquarters of U.S. occupation forces, the government introduced the parity price formula for the determination of the producer price of rice. Theoretically, this formula guaranteed the same terms of trade of rice with the commodities that farmers had bought in the base years (1934-36). However, the commodity prices taken in the calculation of the parity index were the official prices of government rationing. Since farmers had to rely on black markets to a large extent for the purchase of both production and consumption goods, the parity price did not really guarantee "parity." To secure the delivery of rice at below-equilibrium prices, the Food Emergency Measure Act was promulgated in 1946, empowering the government to expropriate undelivered rice. Several incentive schemes were also designed, giving bonuses to producers who completed delivery.

The government also made substantial investments in reclamation, irrigation, drainage, agricultural research, and extension. Increase in food production was considered a necessary condition in the design for industrial recovery. In the program for the rehabilitation of industry, called *Keisha Seisanforshiki* (Differential Production Scheme), the government fund was first allocated to coal mining. Increased outputs of coal were delivered to fertilizer, iron, and steel industries; increased outputs in food from fertilizers and in iron and steel were returned to coal mining to expand the cycle of reproduction.

As industry was rehabilitated on the basis of compulsory delivery of cheap food, agricultural production recovered with the increased supply of industrial inputs to agriculture. Government controls on food commodities were lifted one by one: potatoes in 1949, wheat in 1952, etc. It was planned to lift the direct control on rice in

April 1952, but this plan was withdrawn because of the dark prospect of food supply during the Korean War.

The Korean War was a windfall to Japanese industry. Increase in military and civil procurement from the U.S. stimulated investment by raising capital returns and improved the balance of payments, providing the basis for a spurt of industrialization. Industrial production recovered to the prewar level by 1953 and continued to rise rapidly.

Disparity in income and wages between agriculture and industry increased after the Korean War boom. To cope with this situation, the determination of rice prices by the parity index was modified in 1952 to account for (1) lag in the level of consumption and living of rural households compared to urban households and (2) changes in the levels of material inputs to rice production. It was later decided that the government should consult not only the parity index but also the cost of rice production in determining the producer price of rice.

Despite these changes in the price determination formula, the price of rice was remarkably stable before 1960 (Fig. 2) and the deficit of the Food Control Special Account did not rise (Table 1). During the 1950's exporting from Japan was still dominated by the products of labor-intensive light industries such as textiles and toys. The balance of payments was the ceiling of the rate of industrial expansion and economic growth. In such situations it appears the rice policy was successful during the 1950's in contributing to industrial development by keeping the price of a critical wage good from rising, without causing a drain on foreign exchange and undue pressure on the national budget.

This success was based on (1) increases in rice productivity and output, especially after the bumper crop in 1955, resulting from public investments in land infrastructure and in agricultural research and extension; and (2) stability in the prices of industrial products purchased by farm producers. However, it does not seem likely that rice price stability could be maintained despite the strong political pressure of rice producers if the industrial development were not a national goal and rice were not a critical wage good for the development.

Changing role of rice and rice policy

The first big spurt of industrial development since 1955 ushered the Japanese economy into a

new era. Within 10 years per capita income nearly trebled and approached the level of Western Europe. Both the industrial structure and the export structure came to be dominated by capital-intensive industries. Labor shortage became a secular feature of the economy after 1960, and the wage differentials were greatly reduced among different sizes of enterprises and between blue collar and white collar workers.

With the dramatic increase in income and wages of industrial workers, particularly low-income manual workers, their diet rapidly changed. Before 1960, decline in the starchy food staples in the total caloric intake of the Japanese was mainly attributed to the decline of inferior grains such as barley. From 1960 the share of rice also began to decrease (Fig. 1). The absolute per capita consumption of rice began to decrease sharply in 1965 (140 kilograms in 1955 to 117 kilograms in 1969). Rice in the consumption expenditures of urban worker households declined rapidly from 10.3 percent in 1959 to 4.3 percent in 1969 (Table 2). Importance of rice as a determinant in the cost of living of urban workers was drastically reduced. Rice was no longer the critical wage good for industrial development.

By 1960 disparities between agriculture and non-agriculture in net product (or income) per worker and income per capita of population were wide open (see Column G, Table 3 and Column B/D, Table 4). It was natural that farmers tended to identify the declining price of rice as the cause of growing income disparity. Strong demands from farmers for fair returns for their labor resulted in 1960 in a rice price determination formula called the "Production Cost and Income Compensation Formula."

In this formula the price of rice is determined by the cost of production at the paddy field in which yield per hectare is lower than the national average by one sigma (one standard deviation). Since rice yield per hectare is in general inversely correlated with the cost of production per unit of output, this formula implies that the price thus determined covers the cost of production of marginal producers ("marginal" in the sense of a cost lower than average by about one standard deviation). A critical point in this formula is that wages for family labor are valued by non-farm wages in order to guarantee "fair returns" for the labor of rice producers.

With this formula the producer price of rice rose rapidly, corresponding to the rise in indus-

Table 3. Changes in relative productivity and relative prices between agriculture and manufacturing, 1953-68 [7, 13]

Year	Net product per worker ^a (current prices)		Ratio of net product per worker (current prices) $C=A/B$	Index of product prices		Relative price index $F=D/E$	Ratio of net product per worker (constant prices) $G=C/F$
	Agriculture	Manufacturing		Agriculture ^b	Manufacturing ^c		
	A	B		D	E		
1953-55 av.	68	225	percent 30	101	100	99	percent 30
1960	98	445	22	100	100	100	22
61	111	500	22	109	100	109	20
62	122	514	24	120	98	122	20
63	130	616	21	128	99	129	16
64	146	646	23	134	99	135	17
65	167	682	24	149	99	151	16
66	191	777	25	160	101	158	16
67	245	910	27	174	102	171	16
68	290	1017	29	177	102	174	17

^a Net domestic product at factor cost per gainful worker. Agriculture workers include forestry workers. 1968 data are preliminary.

^b Ministry of Agriculture and Forestry index of agricultural product prices at farm gate.

^c Bank of Japan index of wholesale prices of manufacturing products.

trial wages. It doubled from 10.4 thousand yen per 150 kilograms of brown rice¹⁶ (193 U.S. dollars per metric ton) in 1960 to 20.6 thousand yen (382 U.S. dollars) in 1968. The difference between producer price and import price increased from less than 20 percent to more than 100 percent. As shown in Figure 2, the domestic price of rice as deflated by the general price index deviated during the 1960's from a stable boundary held over from the Meiji period through 1960.

¹⁶ Brown rice is husked but unpolished rice. Conversion factors both from paddy to brown rice and from brown rice to polished rice are roughly 80 percent.

The Production Cost and Income Compensation Formula was designed to reduce the gap between farm and non-farm income and wages. This policy goal seems to have been satisfied with the rising prices. Income per agricultural worker compared to the income of manufacturing workers improved from 1960 to 1968 with the rapid rise in agricultural prices relative to manufacturing prices. This more than compensated for the relative decline in the net product per farm worker in real terms (Table 3). Increase in the price of rice, which constituted about 40 percent of the total value of agricultural output, was a major factor in im-

Table 4. Changes in relative income between farm and urban worker households, 1953-1968 [13, 14]

Year	Farm household				Urban worker household		Relative income per	
	Income per household			Total income per person B	income ^a per		household A/C	person B/D
	Farm income	Off-farm income ^a	Total A		household C	person D		
1953-55 av.	211	139	350	55	334	70	105	79
1960	239	210	449	78	491	112	91	70
1961	258	243	501	89	542	128	92	70
1962	294	287	571	103	610	146	94	71
1963	317	325	642	118	655	157	98	75
1964	350	382	732	136	732	176	100	77
1965	401	434	835	157	797	194	105	81
1966	455	493	948	182	870	215	109	85
1967	562	573	1135	221	967	240	117	92
1968	579	669	1248	247	1068	272	117	91

^a Includes transfer income.

Table 5. Net returns to labor (per hour)* by major farm products, 1965-67 averages [8b, p. 22]

	Yen/hour	Rice=100
Rice	306	100
Wheat	91	30
Potatoes	225	73
Sweet potatoes	140	46
Red beans	167	55
Cucumber	167	55
Tomato	181	59
Tangerine orange	346	113
Apple	117	38
Rapeseeds	119	39
Tobacco	118	38
Tea	226	74
Cocoon	153	50
Milk	145	47
Egg	182	59
Hog	137	45

* The value of output minus the cost of production (except labor wages) divided by the hours of labor. The production cost includes land rent, capital interest and depreciation, and current input expense.

proving relative income for agriculture. Rise in agricultural prices, together with increase in off-farm income, resulted in a marked reduction in the gap in income per person and per household between agriculture and non-agriculture (Table 4).

Satisfaction of the income parity objective involved substantial loss of economic efficiency. High rice prices should have reduced consumer surplus not only by contracting the demand for rice itself but also by obstructing the shift of resources from rice to other high-demand agricultural products such as livestock and vegetables. The support of rice prices also depressed the out-migration of agricultural labor to non-agriculture.

More conspicuous squanders were the rapidly accumulating surplus rice in government storage and the multiplying deficit from the food control program. Already in 1965-67 had the production of rice become so much more profitable than other agricultural products (Table 5) that resources had been shifted to rice production. Rice production continued to rise until it reached a record 14.4 million tons in 1967. Meanwhile, consumption remained stable until 1965, when it rapidly declined, resulting in the annual addition of 2 million tons to the government rice storage. The deficit from the rice control program reached 40 percent of the budget of the central government for agriculture and forestry, nearly 5 percent of the total 1968 national budget.

How could such squander of resources and loss of economic efficiency be tolerated during the 1960's? Certainly, it was the extremely strong political pressure of farm organizations which achieved the handsome rise in rice prices. Although the farm population declined in the course of rapid industrial growth, electoral districts have changed little, leaving the political weight of farm votes intact.¹⁷ Rural districts have continued as solid conservative blocks, which the present government could not dare to lose.

Why then were the powerful rural votes unsuccessful in raising the price of rice during 1950's? Why couldn't the equally strong (or stronger) political power of landlords before the War achieve a comparable support on rice? It appears that this question can be answered only in terms of decline in the role of rice as a wage good for industrial development. As has been observed, importance of rice as a determinant of the cost of living of industrial workers was greatly reduced during the 1960's. Because of the rise in capital intensity and the transformation in industrial structure, increases in the cost of living and in wages became less critical for the international competitive power of Japanese industry. Rice was no longer a critical wage good for industrial development. This appears to be the reason why the government and society yielded to the pressure of farmers for increases in rice prices.

In retrospect, the cost of rice support in the past decade was a cost of economic growth that society had to bear; to some extent, like inflation or environmental pollution, it had a trade-off with economic growth. If the price determination had been left to market mechanism, there never would have been a dramatic decline in rice prices to result in an extremely wide income disparity between the rural and urban sectors. Eventually, labor and other agricultural resources would have been efficiently reallocated to the production of other agricultural commodities or to manufacturing and service industries. But this might have generated more social tension than the present political system could have absorbed.

Prospect

By the end of the 1960's it had become apparent the cost of rice support exceeded the

¹⁷ There is an estimate that one vote in rural districts is worth 4 to 7 votes in Tokyo. See Henmi [6, p. 200].

limit which society could tolerate. An increasingly serious problem was the deferment of public funds and other agricultural resources to rice. For example, in recent years increased vegetable and fruit prices were cited as major causes for the elevated consumer price index. However, the government could not appreciably increase expenditures for improvement in production and marketing of vegetables because of the pressure of an increasing deficit in the food control program (In the 1971 budget only 3 billion yen were allocated to the improvement of vegetable production and marketing, much less than 0.01 of the rice control expense.).

The ever-increasing rice surplus and the rice control program deficit finally worked as brakes on further price increases in 1968. A program for retirement and diversion of paddy fields was launched in 1969, partly to stop the increasing deficit and partly to counteract the drain of resources to rice. Finally, it was announced in 1971 that the government had set the limit on the purchase of rice to 5.8 million tons; this marked the first major policy change since the Rice Control Law of 1933 when the government initiated the purchase of rice in unlimited quantities.

From this point it seems only a step to a shift from direct to indirect control. However, powerful agricultural cooperatives with some 5 million members and 400,000 employees, organized in a pyramidal shape from village cooperatives to prefectural and national associations, would do everything possible to stop this shift. Their marketing, storage, and credit operations are based on the rice control program in which cooperatives are the sole agents for the delivery of rice.

It is impossible to speculate when the government will abandon direct control of rice. However, it is highly unlikely the government will yield to the pressure of farm organizations for a major increase in rice prices as long as 8 million tons of surplus do not decline appreciably.¹⁸ For political considerations it is equally unlikely the price will be reduced. If the price of rice is frozen at the present level, relative profitability would increase for the crops of high income elasticity, and resources would shift from rice to

¹⁸ It may be possible for farmers to achieve minor increases. In fact, in 1971, after two years' price fixity, the farm block won a 3 percent increase in the price of rice through a fierce political battle. It is, however, inconceivable to have major price increases comparable to those in the 1960's.

these crops. But, since the gap in the returns to labor among rice and other commodities is wide open, as shown in Table 5, the shift of agricultural resources from rice would proceed only very slowly.

The gap between the domestic price and import price of rice is not likely to be reduced. It seems impossible that Japan would liberalize rice trade in the near future since the present storage of 8 million tons is not likely to decline rapidly at the frozen price.¹⁹

Conclusions and Implications

This review of history explains changes in Japan's rice policy since the Meiji Restoration by assuming a national goal of promoting industrial development by securing an elastic supply of rice for urban workers as the basis of an elastic supply of labor to industry. This goal had to be attained without causing a drain on foreign exchange by large-scale rice imports, which also was critical to industrial growth. The revision of land tax and the development of landlordism during the Meiji period worked unconsciously to increase rice surplus. More conscious policies were to increase rice production by public investments in land infrastructure and agricultural research and extension. When domestic supply could not keep up with demand, the source of rice supply was extended to overseas colonies.

Policies for the same goal were practiced during the recovery of the Japanese economy from World War II by means of compulsory delivery and investments in land infrastructure, research, and extension. The government's rice control program of the 1950's was successful in stabilizing the rice price without increasing the import of rice. This contributed substantially to the post-recovery growth and capital accumulation in industry, preparing a basis for the economic transformation of the 1960's.

While industry developed rapidly on the basis of a stable food supply, agriculture was left behind, and the income disparity between

¹⁹ There is even a possibility that the surplus will increase, considering the rapid decline in price consumption. According to a study conducted by the Ministry of Agriculture and Forestry, an estimate of income elasticity of demand for rice on 1960-68 time-series data is as low as -0.75 [12, p. 79]. This implies that the annual decline in rice consumption in Japan will be 7.5 percent of the total consumption or about 700,000 tons per year, assuming an annual growth rate of per capita income of 10 percent.

farmers and urban workers increased. Farmers considered themselves ill treated and demanded "fair returns" for their labor comparable with the wages of industrial workers. When the economy and the industrial structure were transformed by the first big spurt of industrial development since the mid-1950's, the role of rice as a wage good declined drastically. This allowed the political pressure of agricultural producers to succeed in raising rice prices. Japanese economy had grown to the point where it could tolerate the cost of price support.

In a time when the demand for rice was expanding rapidly in response to increases in income and population, the price of rice was deliberately kept stable. When per capita income rose to a level where demand for rice turned negative and began to contract rapidly, rice prices were allowed to rise. This was the paradox of economics and political economy.

Japan's historical experience is of significance today to developing countries in the tropics. These nations are attempting to convert new food production potentials emerged from the "Green Revolution" into a basis for sustained economic growth. As the Japanese experience suggests, the food production potential, if properly exploited and delivered to urban workers, can contribute to capital accumulation and industrial development by reducing the cost of

labor in industrial production. Another possibility is that as the reduced cost and prices of food staples become reflected in real wage rates they will result in downward shifts in the cost schedules of traditional export products such as rubber, copra, and plywood as well as new export products such as feed grains (e.g., maize in Thailand) and vegetables (e.g., asparagus and mushrooms in Taiwan). If this counteracts effectively the competition from synthetics and temperate zone agricultural products, export crops might again emerge as a leading sector in the tropical economy.

Whether these possibilities materialize depends, to a large extent, on (a) efficient public investments in land infrastructure, agricultural research and extension to exploit the potential in food staples as well as to discover and develop profitable new crops, and (b) efficient organization of marketing and agrarian institutions including tax and credit to secure the delivery of food surplus at prices that reflect shifts in food production cost schedules. Converting potential food surplus into industrial growth, or the development of an export crop sector while maintaining sufficient equity in welfare among the rural population and between rural and urban sectors, will require extreme skill for these developing countries in the decade to come.

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