

Progressive High Productivity and Surplus Production of Rice in Japan

—On the Background of Rice Production Control—

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INTRODUCTION

There were no geographers who had ever expected to have a first experience of rice production control in 1970 in Japan.⁽¹⁾ Rice production in Japan has a long history of more than two thousand years. Rice is also the traditional staple food in Japan, where agriculture has long concentrated on rice production, and so farmers and public organizations have paid great attention and devoted considerable efforts to an expansion of rice production for the purpose of the perfect self-sufficiency of it.

A great deal of their efforts for increasing rice yield was, however, compelled to break down in 1970, because the Government production guidance was officially announced for the production control to balance supply with demand of rice.⁽²⁾ In 1970, the Government established a five year plan for rice production control. An acreage of about five hundred and forty thousand hectares of paddy fields for rice production would be scheduled to be converted into other crop lands and reforested lands by 1975.⁽³⁾ Nevertheless, there is no doubt that rice cultivation and production will long continue to hold a leading place in Japanese agriculture.

This article will discuss and analyse some important factors of surplus rice stocks or high productivity of rice production and the background of first rice production control in Japan. In this case, it should be kept in mind that overproduction is, in general, one of the proper and conspicuous problems of capitalist society.

TREND OF SUPPLY AND DEMAND OF RICE

Agricultural production in Japan recovered pre-war levels in 1949, while mining and manufacturing production did not get back their pre-war levels until 1955. On the other hand, increase of the nation's per capita income due to economic growth has boosted the gradual domestic demand for agricultural products and has also expanded markets of agricultural products. As a result of this, the Japanese diet shifted from such 'substitute' foods as miscellaneous cereals, potatoes and pulses or rice with a fair amount of barley to pure rice without barley. This brought about an increase of rice consumption per capita per year by the early 1960's after the Second World War, as shown in Table 1. The annual per capita consumption of rice reached the peak with 118.3 kilograms on national average in 1962. This period may be said to be the first evolutionary stage of food consumption in Japan after the War. But in the latter half of the 1960's, high economic growth which began in 1956 resulted in the notable rise of national income and the remarkable changes in the

Table 1 Domestic rice consumption per capita per year (in kilograms)

Fiscal year	Consumption			Rate of rice calories taken (%)
	National average	Non-farm household*	Farm household	
1955	110.7	93.5	160.5	47.4
1960	115.0	99.0	156.4	48.2
1961	117.4	94.7	150.4	48.3
1962	118.3	90.4	155.6	48.0
1963	117.3	89.1	158.8	47.1
1964	115.9	85.6	150.9	46.2
1965	111.7	81.9	147.6	44.5
1966	105.8	76.9	145.5	41.8
1967	103.3	75.0	142.9	40.5
1968	100.1	71.3	141.3	39.1
1969	97.1	66.5	135.2	38.2
1970	95.1	64.6	133.2	37.0
1971	93.2	62.5	132.7	36.1
1972	91.8	58.8	128.3	35.2
1973	91.1	55.5	127.7	34.4

* Calendar year. Data prior to 1962 are of cities with 50 thousand or more inhabitants.

Sources: Compiled from *Food balance sheet*, Minister's Secretariat, Ministry of Agriculture and Forestry, *Farm household economy survey*, Statistics and Information Department, Ministry of Agriculture and Forestry, and *Family income and expenditure survey*, Bureau of Statistics Office of the Prime Minister.

Table 2 Demand outlook of agricultural products in 1982 (in thousand tons)

	Demand outlook		Consumption		Domestic production	
	1977	1982	1966	1970	1966	1970
Rice	12,708 - 12,171	11,090 - 10,560	12,503	11,948	12,745	12,689
Wheat	5,790 - 5,848	5,760	4,983	5,207	1,024	474
Barley and rye	1,995 - 2,058	2,310 - 2,360	1,707	1,685	1,105	369
Sweet potatoes	2,673 - 2,605	1,473	4,810	2,564	4,810	2,564
Irish potatoes	3,653 - 3,625	3,607	3,383	3,611	3,383	3,611
Soy beans	4,149	4,427	2,339	3,281	199	126
Other pulses	466	381	421	393	206	255
Peanuts	284 - 295	188	198	115	139	70
Tea	104 - 106	127 - 132	68	100	?	91
Vegetables*	17,175 - 17,528	20,840 - 21,474	13,356	15,210	13,324	15,126
Fruits	10,786 - 11,693	10,273 - 11,195	6,327	6,636	5,643	5,454
Milk and milk products	8,442 - 9,281	8,751 - 9,705	4,277	5,355	3,409	4,789
Meat**	2,439 - 2,771	3,555 - 4,220	1,071	1,678	913	1,473
Eggs	1,887 - 1,987	2,271	1,084	1,817	1,005	1,766
Raw silk	514 - 541	611 - 686	331	408	312	342
Sugar	2,855 - 2,976	3,820 - 4,117	1,996	2,829	523	642
Oils and fats	1,648 - 1,744	2,030 - 2,141	1,058	1,361	?	?

* Included watermelons, muskmelons, Japanese cantaloups and strawberries.

** Unit is in a thousand bales.

Sources: Compiled from *Prospect of demand and supply of agricultural products and a tentative plan of production*, and *Food balance sheet*, Minister's Secretariat, Ministry of agriculture and Forestry.

pattern of food consumption. Typical starchy foods like potatoes or sweet potatoes steadily lost their position to such protein-rich and fatty or oily foods as meat, eggs, milk, fats and oils, and fruits and vegetables. This second evolutionary stage of food consumption change was a result of the influence of American or west-European cultures in the post-war period. In fact, for the sake of westernization of food consumption structure, to eat bread at breakfast has popularized throughout this country in recent years. It is often seen that even

Table 3 Transition of rice demand and supply (brown rice, in thousand tons)

Fiscal year	Total domestic production	Import	Carried over (only old rice)	Total demand	of which for			Government purchase	Rate of purchase	Supply under non-government control
					Staple food	Industry	Feed and seed			
1955	12,385	1,290	121	11,275	10,584	368	113	4,785	38.6	1,739
1956	10,889	558	762	11,658	10,898	424	114	4,310	39.5	889
1957	11,464	433	355	12,346	11,584	414	120	4,623	40.3	1,300
1958	11,993	403	216	12,172	11,410	416	121	5,090	42.4	1,488
1959	12,501	247	280	12,337	11,571	413	122	5,616	44.9	1,521
1960	12,858	219	440	12,618	11,786	470	124	6,139	47.7	1,419
1961	12,419	77	501	13,062	12,160	535	121	6,229	50.2	1,094
1962	13,009	182	95	13,315	12,410	536	118	6,759	52.0	1,350
1963	12,812	239	17	13,410	12,429	597	133	6,862	53.6	1,263
1964	12,584	502	14	13,361	12,336	609	121	6,886	54.7	1,261
1965	12,409	1,052	52	12,993	12,037	606	121	7,203	58.0	993
1966	12,745	679	205	12,503	11,512	636	131	8,064	63.3	678
1967	14,453	364	644	12,483	11,412	714	129	9,862	68.2	763
1968	14,449	265	2,975	12,251	11,188	707	130	10,069	69.7	757
1969	14,003	48	5,533	11,965	10,972	640	131	8,662	61.9	(859)
1970	12,689	15	7,202	11,948	10,894	712	121(252)	6,775	53.4	(1,692)
1971	10,887	10	5,891	11,895	10,812	718	109(1,474)	4,725	43.4	(2,692)
1972	11,889	12	3,074	11,847	10,788	734	105(1,254)	5,424	45.6	(2,197)
1973	12,149	38	1,477	12,078	10,941	807	107(480)	5,587	46.0	(2,634)

(1) Figures in 1973 are included those of Okinawa Prefecture.

(2) Figures in carried over column are of rice year, which is from November to October.

(3) Figures of the brackets in feed and seed column represent old rice feed, as of the end of October every year.

(4) Figures of the brackets in supply under non-government control column denote only "Jishu-Ryutsu" rice (see NOTE 6). Data of free market rice are unknown after 1969.

(5) Figures in import column are of polished rice.

Sources: *Statistical yearbooks of food control*, Food Control Section, Food Agency, Ministry of Agriculture and Forestry, and *Food Balance Sheet*, see Table 1.

rice producing farmers and their children have staple foods other than rice once or twice a day in the villages. Consequently, the quantity of rice consumption in even farm households has gone down step by step (Table 1). Gross consumption of rice has a decreasing trend after the summit of 13.41 million tons in 1963, in spite of the population growth (Table 3). The tendency toward decline of rice consumption in Japan will continue in the future. According to the estimate of Ministry of Agriculture and Forestry (Table 2), the annual rice consumption per capita will be under 80 kilograms in the early part of the 1980's.

On these changing patterns of diet structure, the foodstuff consumption from the viewpoint of nutrition should be considered. The percentages of the taken calories of starchy, of animal and of fruit and vegetable foods per day for the individual Japanese were 74.4, 6.1 and 4.0 percent respectively in 1955, although the total calory intake per capita per day was 2,239.7 calories in the same year. Every one of these figures was 69.0, 7.7, 4.9 percent and 2,289.7 calories in 1960, and changed into 54.7, 12.7, 5.9 and 2,471.9 calories respectively in 1970 (Table 4). The importance of starchy foods went down to fifty percent of the total calory intake. The ratio of animal protein taken as a calory source, 25.7 percent in 1955 and 41.3 percent in 1970, continues to increase against the ratio of vegetable protein. Furthermore, in the transition of consumption of main foodstuffs, the intake of fats and oils, sugar, milk and milk products, eggs, meat, fruits and vegetables goes up instead of the consistent decrease of cereal consumption, as given in Table 5. In other words, this is caused by a remarkable change of structure in the consumption of foods.

As Japan has viewed West European and American countries as being the advanced nations since Meiji Restoration, even westernization of diet, which is the changing pattern of diet from rice meal to bread or an intake of animal foods, has been also regarded as modernization and advancement of diet, especially by the beginning of high economic

Table 4 Change of nutrition in take per capita per day

			1955	1960	1965	1968	1969	1970	1971	1972
Quantities	Calories (Cal.)	Total	2,239.7	2,289.7	2,407.7	2,446.1	2,446.5	2,471.9	2,510.0	2,525.5
		of which								
		Starchy foods	1,666.5	1,580.0	1,527.5	1,425.4	1,384.4	1,351.3	1,333.4	1,320.7
		Animal foods	135.7	176.9	250.3	280.6	290.7	312.7	327.2	334.7
		Vegetables and fruits	89.3	113.0	128.2	152.0	146.8	146.8	148.5	155.7
		Others	348.2	419.8	501.7	588.1	624.6	661.1	669.3	701.5
	Protein (gm.)	Total	65.7	69.5	73.7	75.5	75.4	76.2	78.0	79.4
		of which								
		Animal	16.9	21.2	26.8	29.3	30.1	31.5	33.1	33.8
Percentages	Calories (%)	Vegetable	48.8	48.3	46.9	46.2	45.3	44.7	44.9	44.8
		Fats and oils	22.2	29.1	40.2	47.3	49.0	52.0	53.7	56.6
		Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		of which								
		Starchy foods	74.4	69.0	63.4	58.3	56.6	54.7	53.1	52.3
		Animal foods	6.1	7.7	10.4	11.5	11.9	12.7	13.0	13.3
	Protein (%)	Vegetables and fruits	4.0	4.9	5.3	6.2	6.0	5.9	5.9	6.2
		Others	15.6	18.3	20.8	24.0	25.5	26.7	26.7	27.8
		Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		of which								
		Animal	25.7	30.5	36.4	38.8	39.9	41.3	42.4	42.6
		Vegetable	74.3	69.5	63.6	61.2	60.0	58.7	57.6	56.4

Sources: See Table 2.

Table 5 Indigenous net supply of agricultural products per capita per year (in kilograms)

Fiscal year	1955	1960	1965	1966	1967	1968	1969	1970	1971	1972	1973
Cereals	155.8	149.6	145.0	141.1	139.0	135.2	131.5	128.5	127.0	125.1	124.6
Rice	110.7	114.9	111.7	105.8	103.4	100.2	97.1	95.1	93.2	91.8	91.1
Wheat	25.1	25.8	29.0	31.3	31.6	31.3	31.3	30.8	31.0	30.9	31.0
Barley and other cereals	20.0	9.1	4.5	4.0	4.0	3.7	3.1	2.6	2.8	2.4	2.5
Potatoes	46.1	30.5	22.8	20.2	17.7	17.4	16.2	16.2	16.5	16.6	16.2
Starch	4.6	6.5	8.3	8.3	9.0	8.7	8.5	8.1	7.8	7.9	7.9
Pulses	9.4	10.2	9.8	9.7	10.0	9.9	10.1	9.8	10.0	9.7	9.8
Vegetables	82.4	99.7	109.6	115.8	116.3	124.9	120.1	115.6	119.4	118.0	112.4
Fruits	12.3	22.3	28.5	32.1	33.0	38.3	36.7	37.6	38.0	44.3	43.7
Meat (excl. whale meat)	2.4	3.4	6.9	7.8	8.5	8.9	10.2	11.6	14.6	15.4	16.2
Eggs	3.4	6.3	8.3	10.5	11.4	12.5	13.8	14.8	14.9	14.6	14.5
Milk and milk products	12.1	22.3	37.4	41.7	43.3	45.2	47.3	50.1	50.8	51.9	52.9
Sugar	12.3	15.1	18.8	19.8	21.1	21.9	24.2	26.9	26.7	28.0	28.4
Oils and fats	2.7	4.3	6.8	7.6	8.2	8.6	9.1	9.5	9.9	10.6	11.1

Sources: Compiled from *Food balance sheet*, see Table 1.

growth in the period after the Second World War. This thought is, however, not necessarily receptive in Japan, because there is a typical Japanese pattern of diet. There is no reason or evidence that traditional pattern of diet in Japan is no good for Japanese. On the other hand, bread has been provided with milk in school lunches after the War. Furthermore, although the consumer (Government) price of rice has been raised gradually, that of wheat has had a general tendency to lower with increasing import of wheat. It is not too much to say that growth of wheat import was led deliberately. Such enlargement of relative consumer price-difference between price of rice and wheat has also caused the decline of rice demand and the rise of wheat demand inversely (Table 6).

**Table 6 Wheat and barley import and domestic production
(in thousand tons)**

Fiscal year	Wheat			Barley		
	Import	of which for Feed	Indigenous production	Import	of which for Feed	Indigenous production
1955	2,236	60	1,468	681	—	1,148
1960	2,628	496	1,531	—	—	1,206
1961	2,578	714	1,781	—	—	1,127
1962	2,417	723	1,630	—	—	1,023
1963	3,359	856	716	382	214	646
1964	3,447	996	1,244	498	301	812
1965	3,468	871	1,287	470	380	721
1966	3,986	970	1,024	531	439	711
1967	4,222	1,208	997	609	589	673
1968	3,947	1,157	1,021	636	617	640
1969	4,397	1,105	758	670	641	538
1970	4,623	1,310	474	883	883	418
1971	4,641	1,284	440	764	764	364
1972	5,328	1,307	284	1,177	1,038	250
1973	5,319	1,250	202	1,303	1,024	171

(1) Figures in import columns are recorded ones on the Bill of Lading.
Sources: Compiled from *Statistical yearbooks of food control*, Food Control Section, Food Agency, Ministry of Agriculture and Forestry. *Monthly return of foreign trade of Japan*, Import Section, Customs and Tariff Bureau, Ministry of Finance.

PRODUCTION STRUCTURE OF RICE

Factors of the rapid increase of gross production of rice will be discussed in this chapter.

As shown in Table 2, in 1955, there was the richest rice harvest in the production history of Japan, of which yield was 12.385 million tons, summed up paddy field rice and upland field rice. This figure was over by 1.1 million tons against the same year demand of rice. Since then, annual rice outputs of around 12.5 million tons to 1965, except the excessive production by nearly 200 thousand tons for indigenous supply in 1959 and 1960, were in short supply between 20 and 90 thousand tons every year. The shortage of rice was remarkably severe from 1963 to 1965. To make up for this deficiency of rice supply, the Government must import the foreign rice and carry out a policy for increasing the output of rice. Rice production in 1967, however, was good, and the yield was 14.453 million tons. It was even said that that was the 'abnormally' best harvest remembering the good weather conditions in the post-war period (Statistics Survey Division, Ministry of Agriculture and Forestry, 1963, p. 80). The level of this productivity stage held in the next year and in the following year in spite of cold weather damage in the northern parts of Japan in 1969.

The sharp increase of rice production is due to such factors as the increase of yield per hectare which was made possible by the innovation and diffusion of production techniques including mechanization, the increase of rice planted acreage owing to a relative advantage of the producer price of rice and the preferential policies for only rice production.

Three views mentioned above will be examined in detail as follows.

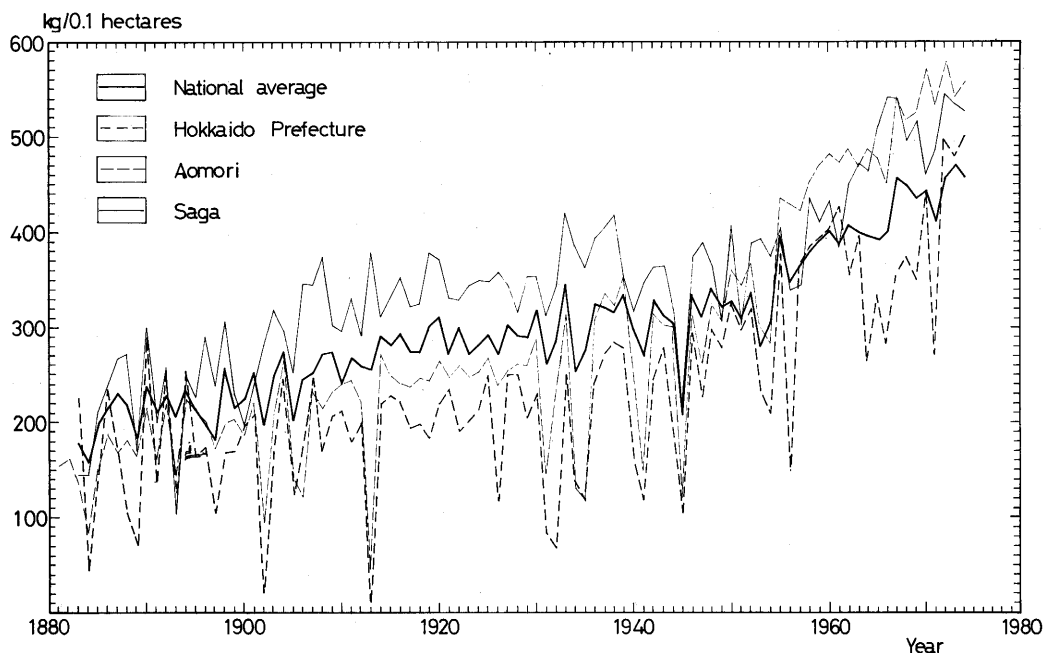


Fig. 1 Trend of yield in paddy field rice in Japan after 1880*

* These figures are of which are converted *koku* per *tan* into kilograms per 0.1 hectares. Changing rate is 151.25.

Sources: Compiled from *A hundred year of agriculture in Japan*, Institute of Asian Economy, *Basic statistics of agriculture in Japan*, Agriculture, Forestry and Fisheries Research Council.

Table 7 Yearly changes of land productivity by district (rice in paddy field, in kilograms per 0.1 hectares*)

Districts	1955	1960	1965	1966	1967	1968	1969	1970	1971	1972	1973
Paddy field rice											
All Japan	396	401	390	400	453	449	435	442	411	456	470
Hokkaido	343	400	334	283	452	474	351	443	273	500	479
Tohoku	431	495	463	449	517	510	495	535	475	513	520
Hokuriku	414	426	439	436	485	511	467	469	452	464	499
Kanto and Tosan	395	410	378	385	421	426	403	426	407	439	446
N. Kanto	368	389	350	360	388	403	390	413	386	427	432
S. Kanto	388	410	392	375	438	425	377	407	401	426	428
Tosan	496	481	452	484	516	507	487	511	485	502	531
Tokai	378	366	324	346	395	395	390	378	366	359	419
Kinki	416	381	325	390	420	398	401	400	389	411	429
Chugoku	397	357	361	407	442	425	454	399	396	429	466
San-in	392	378	364	401	431	439	456	402	384	446	466
San-yo	400	349	361	409	446	419	452	398	401	502	466
Shikoku	377	358	340	374	413	377	423	365	375	410	413
Kyushu	364	373	408	429	445	418	445	405	408	471	458
N. Kyushu	387	390	429	462	470	447	372	417	424	493	483
S. Kyushu	301	329	349	339	377	339	371	368	360	400	377
Upland field rice											
All Japan	175	173	172	175	172	207	203	184	158	210	207

* 1 hectare = 2.47114 acres

Sources: Compiled from *Survey of crops*, Crop Statistics Division, Statistics and Information Department, Economic Affairs Bureau, Ministry of Agriculture and Forestry.

Increase of yield per 0.1 hectares

Above all, the most important factor for growth of rice production is the increase of yield per 0.1 hectares, of which trend can be traced in Figure 1 for about the last hundred years in Japan. In this figure a general tendency to go up towards the new stage of productivity in paddy field rice roughly every decade, and the stage of high stable yield in recent years, particularly in northern Tohoku district, should be paid attention to. Furthermore, the increase of productivity is remarkable especially in the northern marginal rice producing areas of Japan, as shown in Table 7. The reason why productivity of paddy field rice farming reached a high stable level in 1967 cannot always be explained exactly or completely, but some factors are pointed out as follows.

Standardization of plant varieties in paddy field rice

The first factor is the advancement of standardization of paddy field rice plant varieties, which promise higher yield and are highly resistant to lodging by wind, in spite of heavy chemical fertilization of three elements as mentioned below. Table 8 shows every one of the proportions in higher ten ranks by planted acreage of paddy field rice plant varieties in Japan. The yearly rate of total planted acreage of ten kinds of varieties to the total of all Japan shifted from 27.1 percent in 1956 to 57.5 percent in 1973. Standardization of paddy field rice plant varieties did not progress so much in the 1950's and in the early part of the 1960's, but that was over one third in 1965. Although these ten ranks were occupied by 'non-brand' and high yield varieties of paddy field rice plant before the rice production control, they were replaced by 'brand' varieties in recent years after the rice production control. The shift towards certain varieties in planted acreage of paddy field rice plant varieties is due to the changing demand of good taste in rice and the development of mechanization in rice farming.

Techniques of rice cultivation

The second factor of sharp increase of yield in paddy field rice in the post-war period is the innovation and diffusion of paddy rice cultivation techniques which are nursing healthy seedlings and early planting cultivation, heavy chemical fertilization and improvement of method of fertilization, and improvement of prevention and extermination to vermins or plant diseases.

Table 8 Percentages of planted acreage by plant varieties of paddy field rice**

Rank	1956		1960		1965		1970		1973	
1	Norin No. 18	4.4%	Kinmaze	5.1%	Honenwase	5.8%	*Nihonbare	8.3%	*Nihonbare	12.8%
2	Norin No. 29	3.5	Norin No. 18	3.6	Fujiminori	5.3	*Honenwase	6.5	*Koshihikari	8.6
3	Norin No. 22	3.5	Towada	3.5	Koshihikari	4.7	*Koshihikari	5.9	*Sasanishiki	6.6
4	Norin No. 17	2.9	Sasashigure	3.2	Kinmaze	3.2	Reimei	5.4	*Reiho	6.6
5	Fujisaka No. 5	2.5	Norin No. 29	2.8	Hoyoku	3.1	*Sasanishiki	5.1	Toyonishiki	6.3
6	Sasashigure	2.3	Norin No. 22	2.4	Koshijiwase	3.1	Fujiminori	4.5	*Honenwase	6.0
7	Norin No. 41	2.1	Honenwase	2.4	Yamabiko	2.3	*Reiho	3.6	*Koshijiwase	2.9
8	Kinmaze	2.1	Norin No. 17	2.4	Norin No. 18	2.2	Kinmaze	2.2	Todorokiwase	2.9
9	Norin No. 25	1.9	Koshijiwase	2.1	Akebono	2.0	Chuseishinsenbon	2.1	Reimei	2.6
10	Mihonishiki	1.9	Ginmasari	1.9	Sasanishiki	1.9	Shiokari	1.8	Koyonishiki	2.3
	Total	27.1	Total	29.4	Total	33.6	Total	45.4	Total	57.6

* Brand varieties which was designated by production, percentage of planted acreage, encouraged variety, taste, results of inspection of rice and so on by Prefecture.

** Shown only ranks of higher ten kinds of varieties of rice.

Sources: Compiled from *Survey of crops*, see Table 7. Data of investigation by Inspection Division, Administration Department, Food Agency.

Table 9 Spread of protected rice seedling bed area* (in thousand, farmhouseholds and hectares)

		Protected seedling bed			Normal open seedling bed		Type unknown
		Total	of which Incubation modified nursery	Polyethylene covered upland field bed	Total	of which paddy field bed	
1960	Number of farmhouseholds	1,902	1,693	306	3,680	2,935	141
	Acreage	1,032	904	115	1,809	1,420	11
	Rate of acreage (%)	36.2	31.7	4.0	63.4	49.8	0.4
1962	Number of farmhouseholds	1,990	1,741	359	3,441	2,685	151
	Acreage	1,214	1,041	164	1,711	1,315	4
	Rate of acreage (%)	41.4	35.5	5.6	58.3	44.8	0.1
1965	Number of farmhouseholds	1,772	1,336	428	2,043	1,599	8
	Acreage	1,634	1,197	420	1,457	1,129	2
	Rate of acreage (%)	52.4	38.4	13.5	46.7	36.2	0.1
1967	Number of farmhouseholds	2,229	1,773	562	2,669	1,999	116
	Acreage	1,771	1,259	505	1,336	987	25
	Rate of acreage (%)	56.2	40.4	16.0	42.4	31.4	0.8

* These data are of first class farm households in 1965 and 1967, but acreage is estimated for those of all Japan. First class farm households refer to those with cultivated land of 0.5 hectares or more (for Hokkaido, 1 hectare or more). The farm households with cultivated land of less than 0.5 or 1 hectare, however, were included in the total sales of farm households for the year amounted to 100,000 yen or more.

Sources: Compiled from *Survey of structure of crop production 1965 and 1967, Annual sample census of agriculture, 1960 and 1962*, Statistics and Information Department, Ministry of Agriculture and Forestry.

1) Diffusion of protected seedling bed for paddy field rice plants

The rate of spread of protective bed for paddy field rice plants in acreage was under twenty percent in 1960 but rose to forty percent in 1962, and to over fiftysix percent in 1967, as given in Table 9. As the use of protected rice seedling bed advanced both the date of seedling and the date of setting in paddy fields, the growing season of rice plant was extended artificially, particularly in such unstable regions of rice cultivation in the past as the northern parts and high mountainous lands in Japan, where growing of paddy rice plants was restricted. On the other hand, in the southern parts of Japan the harvest time of rice was advanced before the coming of typhoon season or rainy season in autumn. Throughout the country, this technique has popularized and contributed extremely to make the yield of paddy field rice stabilize and increase with the distribution of plastic- or polyethylene films. So, the regional distribution in the ratio of diffusion of protected rice seedling bed was seen only in the northern half of Japan in 1955, but even in the southern parts of Japan in 1970, as shown in Figure 2. It is no exaggeration to say that the ratio of spread in protected rice seedling bed has perhaps reached the peak at the present time.

2) Improved methods in heavy fertilization

As to heavy fertilization in general increase of chemical fertilizer for paddy field rice cultivation, the consumption of phosphorous fertilizer went on increasing sharply, particularly in recent years, as shown in Table 10. Because it was proved that heavy fertilization of phosphorous fertilizer with sufficient use of nitrogenous fertilizer was one of the effective measures for the increase of yield in paddy fields, as soils in paddy field consisted of acid volcanic ash in Japan, fertilization of phosphorous fertilizer was notably increasing in recent years.

It is remarkably characteristic that the recent improved methods of nitrogen fertilization are mainly of top or side dressing and also the increase of fertilization in amount, especially, of fertilization for head-sprouting of rice plants about three and half weeks before heading

of rice plants (Table 11.). This method of fertilization is very effective for the prevention of lodging of rice plants. The amount of silicate of calcium also increased for good growing of rice plants, because decreasing soil fertility is one of the serious problems with the heavy fertilization of chemical fertilizer, the fall-off of production of organic fertilizer (Table 10) and close planting cultivation of paddy field rice plants. Farm households with large scale rice planted acreage tend to execute the fertilization many times.

Although such early planting cultivation by heavy fertilization necessarily causes rice disease of blight blast, development of prevention methods against the disease contributed to push up the higher limit of heavy fertilization in rice cultivation with the improvement of extermination against rice stem-borer (Table 12) and to make sure that high yield in paddy fields is maintained at the present time. The larger the total size of rice planted acreage is,

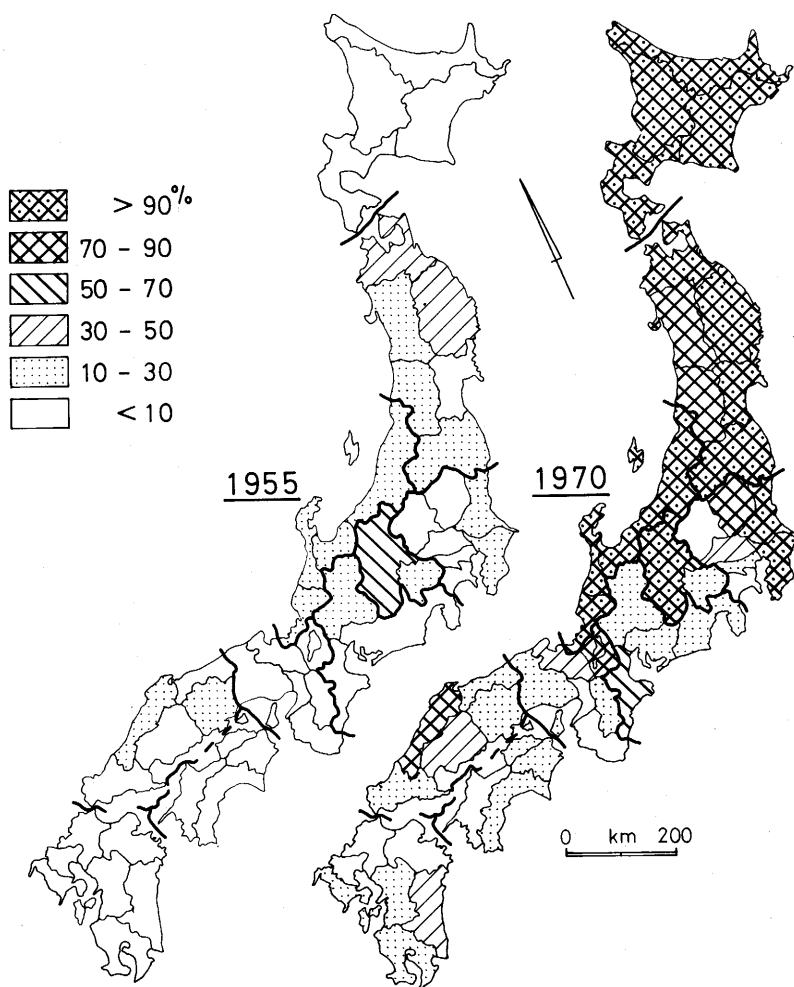


Fig. 2 Regional pattern in the ratio of diffusion of protected rice seedling bed in 1955 and 1970.

(1) Both thick and thin solid lines are the boundary of districts and of prefectures.

Sources: Compiled from *Survey of crops*, No. 10 and No. 15, see Table 7.

Table 10 Trend of fertilization per 0.1 hectares in rice cultivation* (in kilograms)

	1955	1960	1965	1966	1967	1968	1969	1970	1971	1972	1973
N	7.38	8.83	8.53	9.18	9.61	10.24	10.12	10.02	9.47	9.53	9.90
P ₂ O ₅	5.09	6.77	7.45	8.28	8.86	10.09	10.74	10.73	10.10	10.32	10.25
K ₂ O	6.49	7.59	7.21	7.83	8.09	8.97	9.12	9.16	8.64	8.90	9.05
Compost and stable manure	654	636	545	501	507	512	501	451	407	349	287
Silicate of calcium	—	—	14.1	19.2	22.7	28.6	33.0	30.9	27.0	22.7	22.8

* Three elements are those which are calculated in terms of each component of chemical fertilizer in the result of rice production cost, but compost and stable manure are not consisted in these elements.

— indicates no data.

Sources: Compiled from data of investigation by Crop Statistics Division, Statistics and Information Department, Economic Affairs Bureau, Ministry of Agriculture and Forestry.

Table 11 Top dressing of fertilizer in rice cultivation 1968 (in thousand farm households)

By size of rice planted acreage	Number of farm-households in fertilization of top dressing	Rate of left item to total rice planted farm-households	Percentage of farmhouseholds by times of fertilization			Percentage of farmhouseholds by fertilization periods	
			1	2	3	At the panicle formation stage	After the beginning of heading period
National average	3,871	81.1%	33.1%	28.4%	19.5%	72.3%	29.6%
Prefectures, except Hokkaido	3,834	82.0	33.2	28.9	20.0	73.2	30.2
Under 0.5 hectares	1,964	75.7	36.3	27.5	12.9	67.1	22.5
0.5 — 1.0	1,182	86.7	32.3	30.9	23.8	78.5	34.3
1.0 — 1.5	423	90.8	26.4	31.5	33.0	83.5	44.5
1.5 — 2.0	159	92.9	23.0	28.1	41.9	85.3	51.9
Over 2.0	107	94.2	19.5	25.9	48.7	87.3	60.9
Hokkaido	37	37.3	30.6	5.7	1.0	27.8	5.5

Sources: See Table 9.

the higher are both the rates of farm households and the times executed prevention and extermination against rice plant pests, as shown in same Table. On the other hand, the spread of herbicides is remarkably effective for lessening the labour in rice cultivation. 3,796 thousand first class farm households⁽⁴⁾ planting rice used these agricultural chemicals in their paddy fields in acreage of 2,406 thousand hectares in 1967 (Statistics and Survey Division, 1969). However, remembering the pollution of human environment, especially that by agricultural chemicals and fertilizers, is severe in modern Japan, it can be said that agriculture of Japan is now just at the cross roads.

3) Mechanization in rice farming

The third factor is development of mechanization in rice cultivation. The elevation of productivity was brought about by development and distribution of agricultural implements and machines, although the respective rates of working members mainly, seasonally or subsidiarily engaging in rice farming are increasing year by year, not only in the middle-aged or over and the old but also in the female; that is, development of mechanization has coped with the deterioration of labour quality. It is most notably important that for the improvement of agricultural productivity the cultivation of paddy fields has been almost entirely mechanized with the introduction of small cultivators in place of draft animals since 1950 or 1955, as given in Table 13. Other machines are also in widespread use with 32,500 rice seedling planters and 261,000 power reapers in recent years. The total number of rice farming households was 4,773 thousand in Japan in December 1967. Only 12 percent of the total farming households cultivated their paddy fields without tractors or power cultivators. 56.1 percent of rice farming households used the power sprayers in prevention and

Table 12 Prevention and extermination for rice plant pests in 1967* (in thousand hectares)

By size of rice planted acreage	Rate of farm household executed	Percentages of farm household by executed times				Acreage executed	
		1-2	3-4	5-6	over 7	Acreage	Percentage
All Japan	96.5	33.4	36.3	18.3	8.5	2,963.6	97.0
Prefectures, except Hokkaido	96.5	33.5	36.3	18.3	8.5	2,740.6	96.6
Under 0.5 ha.	94.9	38.6	34.2	15.7	6.4	673.3	94.4
0.5 - 1.0	98.2	30.0	37.5	20.6	10.2	943.6	96.9
1.0 - 1.5	99.1	23.0	40.0	22.2	13.0	552.3	97.2
1.5 - 2.0	99.3	21.2	41.3	23.2	13.6	287.5	98.1
Over 2.0 ha.	99.5	17.3	45.2	25.2	11.9	283.9	98.3
Hokkaido	95.3	29.0	40.5	19.2	6.5	223.1	96.0

* See Table 9.

Sources: See Table 9.

Table 13 Number of agricultural equipments and machines owned* (in thousand numbers)

Agricultural equipments and machines	1960	1965	1966	1967	1968	1970	1971	1972	1973
Agricultural tractors and power cultivators	514	18.9	38.5	57.5	124.3	3,449	267.2	278.1	290.8
Driving type									
Walking type		2,490	2,725	3,021	3,030		3,201	3,256	3,312
Power sprayers	232	600	717	905	1,041	959	1,149	1,163	1,214
Power dusters	73	286	409	724	898	1,213	1,215	1,268	1,306
Rice seedling planters	—	—	—	—	—	32.5	31.2	34.8	36.2
Hand type									
Power type							46.2	128.3	248.3
Power reapers	—	—	—	146	277	261	582	805	1,010
Combines with auto thrashers	—	—	—	—	—	—	84.2	117.0	158.7
Dryers	—	—	1,073	1,367	1,457	1,227	1,616	1,676	1,719
Trucks and auto tricycles	108	418	562	884	864	981	1,015	1,081	1,130

(1) Those owned by co-operative groups are excluded.

(2) — shows no data.

(3) As of first December except data in 1970, which are as of first February.

Sources: Compiled from *Statistical yearbooks of Ministry of Agriculture and Forestry*, Statistics and Information Department, Economic Affairs Bureau, Ministry of Agriculture and Forestry.

extermination of rice plant pests in 1967, and 22.9 percent executed prevention by helicopter or aeroplane. Auto-thrashers were used by 53.2 percent of farm households. Power reapers, however, were used by only 3.1 percent farm households (Statistics and Survey Division, 1969).

4) Land improvement for paddy fields

The fourth factor is the fruitful results of land improvement. The official statistical data of the total land acreage improved every year are not available, but those since 1960 can be seen. National Government has given the highest priority not to land improvement which is irrigation and drainage in upland fields including meadows and pastures, but to those in paddy fields. The situation had been intensified in the Prefectural Governments or in other groups, as shown in Table 14. Eighty to ninety percent of the total land improvement in acreage has been executed in paddy fields every year since 1960. As a result, according to the investigation by Agricultural Land Bureau, Ministry of Agriculture and Forestry (1970), of 3,434.8 thousand hectares of the total paddy field acreage in 1968, completion of both irrigation and drainage accounts for 680 thousand hectares (19.8 percent); completion of

irrigation but imperfection of drainage, 672.5 thousand hectares; incompleteness of irrigation but perfection of drainage, 395.4 thousand hectares; and incompleteness of both irrigation and drainage, 1,686.9 thousand hectares. About a half of paddy fields in acreage is still unstable in irrigation and drainage in spite of the great efforts for their completion by the many organizations and people for a long time in Japan. It is expected that the productivity of paddy fields will rise further in the future after the perfection of irrigation and drainage in these paddy fields.

Increase of rice planted acreage

Expansion of paddy fields in acreage

The great second important factor for increase of rice production is the recent expansion of rice planted acreage. The acreage of paddy fields had shown a yearly increase prior to 1970 in spite of the decrease of total cultivated land acreage which was caused by the conversion of agricultural lands into such non-agricultural ones as lands for industrial plants or residential areas in parallel with the high economic growth since 1956. As a result, land used for paddy fields reached a peak of 3,441 thousand hectares in acreage, occupying 58.8 percent of the total cultivated land acreage in 1969.

Although the expansion of paddy fields resulted in the boom of reclamation of lands for paddy fields, it is an unquestionable fact that the boom was brought about by the more relative advantage of the producer price of rice than that of other commercial crops, as mentioned below. The reclamation for paddy fields was executed in the northern part of

Table 14 Trend of land improvement acreage* (in thousand hectares)

	Irrigation and drainage executed				Irrigation and drainage executed		
	By the National Government	By the Prefectural Government	By other groups		By the National Government	By the Prefectural Government	By other groups
1960 Paddy field	7.1	32.3	36.8	1967 Paddy field	36.5	31.6	40.9
Upland field	5.5	0.9	1.4	Upland field	4.3	5.0	2.6
Total	12.6	33.2	38.2	Total	40.8	36.6	43.6
1961 Paddy field	14.6	30.1	36.3	1968 Paddy field	74.7	63.5	51.7
Upland field	3.1	—	1.2	Upland field	27.3	3.4	14.5
Total	17.7	30.1	37.5	Total	102.0	66.8	66.2
1962 Paddy field	6.2	43.9	39.2	1969 Paddy field	20.6	64.6	46.6
Upland field	3.1	0.9	3.0	Upland field	15.8	3.3	10.2
Total	9.3	44.8	42.2	Total	36.4	67.8	56.8
1963 Paddy field	18.3	36.7	39.0	1970 Paddy field	40.5	58.9	44.2
Upland field	4.5	1.8	3.4	Upland field	14.3	4.4	4.5
Total	22.8	38.5	42.4	Total	54.8	63.2	48.7
1964 Paddy field	?	?	31.8	1971 Paddy field	24.2	62.8	34.7
Upland field	?	?	2.7	Upland field	5.9	4.4	0.9
Total	29.5	40.3	34.5	Total	30.1	67.3	35.6
1965 Paddy field	36.5	31.6	40.9	1972 Paddy field	21.4	87.7	44.6
Upland field	4.3	5.0	2.6	Upland field	7.5	0.7	1.2
Total	40.8	36.6	43.6	Total	28.9	88.5	45.7
1966 Paddy field	41.2	57.3	35.2				
Upland field	12.3	9.1	3.7				
Total	53.5	66.4	38.9				

* Data prior to 1964 and after 1965 are of independent sources, so, both does not continue.

Sources: Data prior to 1964 are compiled from investigation by Planning Division, Planning Department, Agricultural Structure Improvement Bureau, Ministry of Agriculture and Forestry. Data after 1965 are compiled from *Administration statistics of construction of agricultural lands*, 1975, Land Improvement and Consolidation, Constructive Department, Agricultural Structure Improvement Bureau, Ministry of Agriculture and Forestry.

Japan between Northern Kanto district and Hokkaido, while paddy fields were ruined by industrial plants, residential and other urban land uses in the southern part of Japan, as given in Table 15. The situation and problems for it were reported in former articles by the writer (Oishi, T., 1967, 1968 a and b, 1969 a and b and 1971). Consequently, it might be appreciated if rice producing farmers in the southern parts of Japan insist that the rice production control in 1970 should be achieved mainly in the new rice cultivation areas in the northern parts of Japan.

Problems of producer price of rice

As for the relative advantage of the producer price of rice, this should be examined in comparison with the producer prices of other main crops in relation to capitalism in modern Japan; this is because capitalism has always embraced the possibility of overproduction and the attendant problems in itself.

It is quite proper that the problem of overproduction of rice should arise in contemporary society where capitalization of agriculture has made great progress with a high ratio of 74.2 percent (national average), in the rate of rice sale to the total rice production in 1969⁽⁵⁾ (Ministry of Agriculture and Forestry 1969/1970, p. 210). Although underdeveloped productivity (above all, the shortage of rice production) has left people's living unstable for a long time in human history in Japan, overproduction of rice had not come into question until capitalism subjected agriculture to its rule. This question, accordingly, should be understood as one of the economic problems and the price problems which did happen not spontaneously but intentionally or politically.

Prices of manufactured goods or service fees and charges are more or less monopolistic or oligopolistic prices, and also administered prices by the producers in the markets at the

Table 15 Expansion and ruin of paddy fields after 1960* (in thousand hectares)

Districts		1960	1965	1966	1967	1968	1969	1970	1971	1972	1973
All Japan	Expansion Ruin	30.1 17.7	22.9 25.5	25.0 22.0	45.8 28.7	47.8 28.9	39.7 34.0	20.5 45.4	10.3 61.8	8.8 60.8	10.5 48.6
Hokkaido	Expansion Ruin	8.1 0.9	8.0 2.2	6.6 1.1	12.1 1.2	13.0 0.8	9.9 1.4	3.9 2.1	1.8 4.4	0.7 5.2	1.4 3.5
Tohoku	Expansion Ruin	5.8 1.1	6.3 1.7	9.1 1.5	15.4 2.1	17.6 3.0	15.5 2.0	8.8 3.5	4.4 8.1	2.7 7.1	2.8 5.3
Hokuriku	Expansion Ruin	3.7 2.3	0.8 2.1	1.4 3.7	1.8 3.1	3.8 6.8	1.7 2.7	1.3 4.4	0.5 5.1	0.8 6.1	0.9 5.5
Kanto and Tosan	Expansion Ruin	5.5 3.0	5.6 3.9	5.0 3.0	10.8 4.5	8.5 4.3	7.6 5.5	2.9 9.2	2.1 9.9	1.5 8.3	1.9 7.4
Tokai	Expansion Ruin	2.5 3.9	0.2 3.9	0.3 3.2	1.4 4.1	0.9 3.7	0.7 3.9	0.2 6.4	0.2 7.2	0.2 6.9	0.4 6.0
Kinki	Expansion Ruin	2.3 4.4	0.1 4.1	0.9 4.2	1.1 4.6	0.2 3.7	0.3 5.5	0.1 7.0	0.2 8.4	0.3 6.7	0.3 5.6
Chugoku	Expansion Ruin	0.7 0.8	0.8 3.3	0.5 1.8	0.3 2.9	0.2 2.5	0.3 4.0	0.1 5.3	0.1 6.0	0.3 7.4	1.0 5.8
Shikoku	Expansion Ruin	0.3 0.4	0.1 1.4	0.1 1.1	0.1 1.3	0.3 1.4	0.3 2.6	0.1 3.1	0.1 4.4	0.0 4.2	0.2 3.5
Kyushu	Expansion Ruin	1.2 1.0	1.1 2.8	1.1 2.5	2.8 4.7	3.3 2.7	3.5 6.5	3.0 4.5	0.8 8.4	2.2 9.2	1.7 6.3

* Expansion of paddy fields includes land reclaimed, land reclaimed by drainage and filling up, land restored and changed from upland fields. Ruin includes lands for damage by natural disasters and lands dilapidated artificially for factories, roads and residences.

Sources: Compiled from *Survey of crops*, see Table 7.

present time in Japan. As only agricultural products, however, are the free goods, their prices are, in general, perfectly competitive. They are decided and are made to fluctuate independently of the producers' intention. This is caused by abundant supply of agricultural products in the markets by many petty farmers. A little unbalance between supply and demand of agricultural products causes the prices to fluctuate drastically, because agricultural products have a small price elasticity. Transactions in agricultural products, therefore, have been a proper object of speculation. The same principle applies to dealings in rice in the markets. Self-control in rice production is so difficult in the free market system that transactions in rice will be also an object of speculation in this case.

Food control system and income in rice farming

Food control system, which is based on Food Control Law (Law No. 40 in 1942), has functioned as price supporting of rice and so played an important part in the function of the agriculture protection to be the most important foundation as the system that maintains agricultural production at the present time in Japan. Hence, many rice producing farmers devoted their lives to produce rice to sell as much as possible to contribute to increasing rice productivity.

Income from rice cultivation, however, was raised up to 49,605 yen per 0.1 hectares in 1968, as the producer price of rice went up year by year to 20,640 yen per 150 kilograms of rice in 1968. All amounts of rice that the farmers produced could be purchased in the Government price by the Government owing to Food Control Law. Price decision system, which aimed at the compensation of production cost and income for farm households, was newly introduced in the decision of Government purchase price of rice after 1960. Figure 3 proves this system of price decision, including that labour cost of family workers in the farm households was reestimated in the equilibrium labour cost of manufacturings with five persons or over employed in the cities, to be of great benefit to the rice producers. So, food control system is still in the most important position in agricultural administration and in price policy. Furthermore, in comparison with both curves of yield in paddy field rice (Fig. 1) and of the producer price of rice (Fig. 3) after 1960, there is a similarity, the sharply upward tendency of the gradient, between the two lines. The yearly high producer price of rice can be considered as an important factor for the promotion of high stable yield in paddy fields in recent years. The Government's selling price of rice is set below the total costs for purchasing rice and managing its distribution, and that gives rise to the deficit in the Food Control Special Account, of which deficit is covered by the General Account, about a quarter of the total agricultural budget every year. The Government, however, introduced the 'Jishu-ryutsu' system⁽⁶⁾ to dissolve a part of the deficit in the Food Control Special Account in 1969.

High income per 0.1 hectares of some crops in the intensive horticulture applying facilities is exactly recognized (for example, 3,112 yen in cabbages, 2,972 yen in eggplants in 1969 as given in Table 16), but these crops need a great deal of labour hours for growing and have some unstable factors in the market price decision systems which are due to a large number of small scale competitive producers, unexpected weather and a certain speculative spirit. On the contrary, rice cultivation, which has hardly been influenced by weather in recent years, is one of the stable agricultural management types for farm households in modern Japan, because of the improvement of paddy rice plant varieties, innovation and diffusion of cultivation techniques and growth of mechanization as mentioned above. Consequently, labour hours for paddy field rice cultivation were cut down yearly; that is, 128.1 hours per year in 1969 and 92.7 hours in 1973 decreased by twenty-six percent and

forty six percent of the figure in 1960 respectively (Table 17).

Wages per day in rice farming

The reward of invested labour per day in paddy rice cultivation (Table 16) was pulled up to 2,440 yen in 1969, to be one of the top classes in main crops or livestock with a rise in rice producer's price and yearly cut down of labour hours for paddy rice cultivation, as shown in Table 17. Even the reward of invested labour per day in crops in intensive horticulture is remarkably at the low level (Table 16). Great relative advantage of paddy field rice cultivation is clearly certified. Lessening the labour and mechanization in paddy

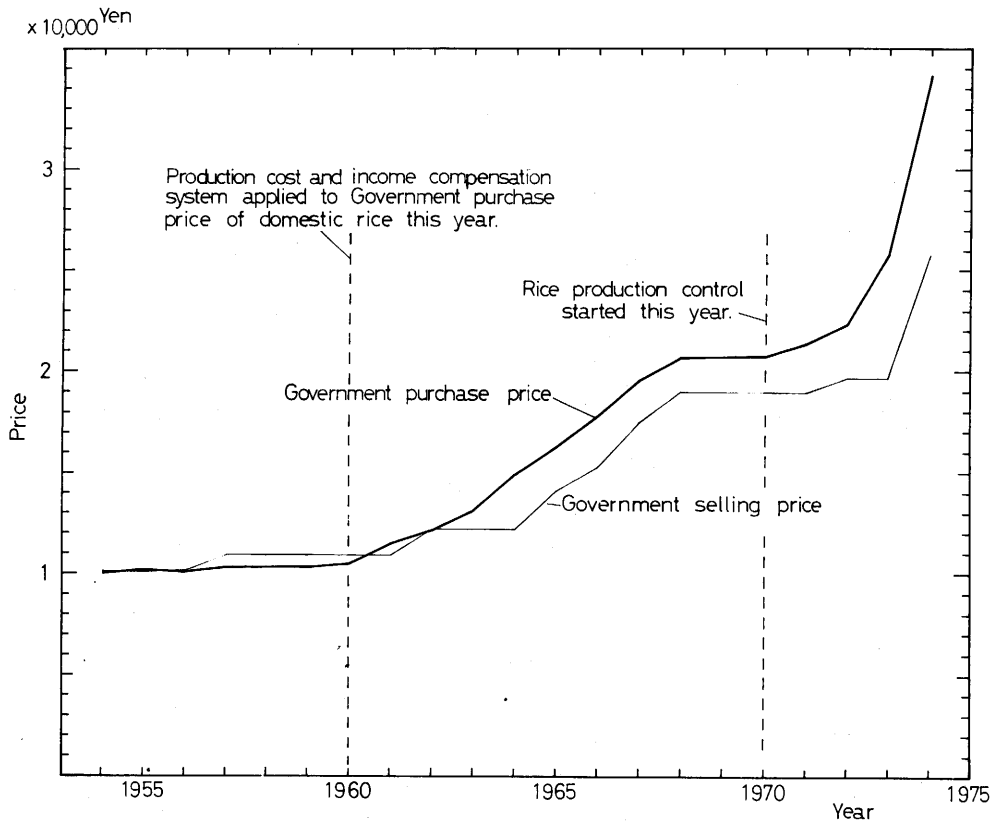


Fig. 3 Trend of Government purchase price of rice

- (1) Every price is that in the month of revised price every year.
- (2) All of Government purchase price and selling price are of mean value of brown rice from first to fourth class, but the former includes the cost of packing.

Sources: Compiled from *Statistical yearbook of food control*, see Table 13.

field rice cultivation resulted in promotion of the relative advantage for farm households with larger scale cultivated acreage of paddy fields under their management. The larger they are, the greater relative advantage the farm households can receive, because farmers could make the National Government buy all their harvested rice due to Food Control System in Japan. However, as there was a steady increase of depreciation cost, this in 1973 is seven times as much as that in 1960, in spite of about three times in other cost in the same period,

as given in Table 17. It suggests that diffusion of mechanization in paddy field rice cultivation throughout the country is quite extraordinary. As a result of this extraordinary mechanization and much use of agricultural chemicals or fertilizer as mentioned above, rice production cost and rice price have been enhanced. This is also the result of increase of part-time farm households in rice cultivation. That may inversely mean overinvestment of fixed capital in rice cultivation.

Preferential policies for rice cultivation

Rice was very much important as taxes before Meiji Restoration and as rent for tenancy paid in kind previous to the Second World War. By the Land Reform in the post-war period, establishing landownership by the actual cultivators, eliminating the dominance of landlords, many farmers were liberated from the heavy burden of high rent for tenancy paid in kind in paddy field cultivation. It is, consequently, not denied that the establishment of subjectivity in many rice producing farmers strongly influenced the promotion of rice yield in paddy fields. Furthermore, because of a long history of rice cultivation in Japan and importance of rice as a main foodstuff for all Japanese, especially in the post-war period, a great deal of attention and works of farmers or policies and eyes of statesmen have been kept mainly on the rice cultivation for its improvement and for increase of rice production. In this section only Government policies for agricultural production after the War are discussed by some examples from a viewpoint of preferential policies for rice cultivation.

Agricultural mutual relief system

First of all, we will take the agricultural insurance for instance, particularly, agricultural mutual relief works, which every farmer feels close to himself and, which has contributed to

Table 16 Trend of the reward of invested labour (family members) per day in main agricultural products (in Yen)

	1960	1965	1966	1967	1968	1969	1970	1971	1972
Paddy field rice*	1,053	2,008	2,301	2,627	2,794	2,440	2,493	2,308	3,004
Wheat	312	525	544	672	981	605	454	441	702
Six-row barley	268	350	610	766	833	775	621	1,090	1,149
Brewing barley	398	653	899	1,203	1,392	1,164	774	1,456	1,633
Sweet potatoes	568	967	1,192	750	610	812	832	800	1,177
Irish potatoes	899	1,268	802	2,455	2,504	1,658	3,906	2,408	2,961
Soy beans	1,127	812	—	1,256	1,205	1,227	1,655	963	2,527
Cucumbers (forcing culture)	—	949	1,127	951	816	1,639	1,192	1,864	1,524
Tomatoes (semi-forcing)	1,094	1,831	1,458	1,588	1,183	1,449	2,189	2,360	2,803
Cabbages (summer harvest)	161	— 325	1,847	2,210	1,500	3,112	4,764	5,177	409
Eggplants	796	—	—	3,088	1,467	2,972	2,474	2,344	2,360
Onions	1,939	1,994	487	2,687	— 2,250	263	3,293	2,442	1,189
Apples (<i>Kokko</i>)	1,430	1,218	1,267	1,605	1,120	1,415	2,189	1,628	2,201
Apples (<i>Kogyoku</i>)	1,998	943	1,444	1,804	808	1,396	2,695	1,758	2,484
Mandarine oranges	—	3,138	2,861	3,187	1,916	4,274	4,033	3,933	1,179
Rapeseed (uplandfield)	718	849	684	772	950	1,154	1,444	1,345	1,306
Tabacco	310	756	905	918	887	1,134	1,080	1,203	—
Tea	559	1,526	2,863	2,355	2,766	4,174	4,577	4,963	7,044
Cocoons	404	723	1,136	1,577	1,228	1,246	1,729	1,201	1,757
Fattening hogs	395	982	844	648	1,974	2,992	1,526	1,407	2,888
Fattening Cattles	219	376	1,275	775	1,666	593	1,553	2,117	2,475
Raw milk	225	622	871	1,168	1,848	2,010	2,166	2,119	2,839
Hen eggs	—	187	1,882	1,421	2,333	1,830	1,864	679	2,426

* As of selling farm households in which crop damage is less than twenty percent of normal crop and selling amount is more than a bale (= sixty kilograms)

Sources: Compiled from Survey of production cost of main agricultural products, Survey of production cost of rice, Survey of production cost of wheat and barley and Survey of production cost of livestock, Statistics and Information Department, Economic Affairs Bureau, Ministry of Agriculture and Forestry.

the promotion of rice production in Japan, a frequently disaster-prone country. Agricultural mutual relief works were originally started under the Agricultural Insurance Law (Law No. 68 in 1938) and the livestock insurance under the Livestock Insurance Law (Law No. 19 in 1929). Both insurances are managed under the Law of Compensation for Agricultural Damages, which was established by combining the above two laws at the present time. Agricultural mutual relief business, according to this provision (in Article 83), are of crops (rice, wheat and barley), silk worm and cocoon, livestock (cattle, horses, sheep, goats and breeding swine), and another one, which is voluntary mutual relief works.⁽⁷⁾ For the premium in the former three mutual relief business, the National Treasury supports a large part of expenses of premium for the insured.

Although all farmers who plant crops of rice, wheat and barley must insure themselves compulsorily, fifty percent of their mutual relief premium even at the lowest is provided by the National Treasury on a graduated scale. This is stipulated in Articles 12 and 107 of the Law of Compensation for Agricultural Damages. The National Treasury used to bear all expenses⁽⁸⁾ for the part of premium which is over thirty percent in the ratio of mutual relief premium. This business stimulated the planting of three crops and promoted the increase of production of these crops, especially in the unstable regions where there were frequent agricultural damages and disasters due to mainly cold weather, drought, storms or floods. Figure 4 shows the regional patterns of the National Treasury charge of mutual relief premium per kilogram of paddy field rice. We can find out the critical rice production areas, particularly Hokkaido, which includes the northern marginal areas of rice production, to be granted an exceptional favour of a high amount of premium charge by the National

Table 17 Trend of rice production cost* (in Yen)

Production cost per 0.1 hectares		1960	1965	1966	1967	1968	1969	1970	1971	1972	1973
Commodities		8,427	11,871	12,962	14,535	16,410	19,177	20,507	22,004	24,049	26,982
of which											
Fertilizers and manures		3,300	3,744	4,074	4,334	4,608	4,822	4,543	4,297	4,286	4,611
Draft animals		1,093	346	241	196	116	95	72	36	40	20
Depreciation		1,904	4,313	4,833	5,674	6,733	8,614	9,981	11,234	12,843	14,266
Agricultural chemicals						1,199	1,464	1,480	1,672	1,790	2,119
Labour, employment		1,115	1,755	1,844	2,179	2,540	2,662	2,729	2,519	2,404	2,139
Labour, family members'		7,763	13,871	15,313	17,330	18,467	19,831	20,146	21,150	21,427	23,716
Charges and fees		455	887	938	1,025	1,118	1,400	1,521	1,684	1,953	2,517
Total cost		17,760	28,294	31,057	35,069	38,535	43,070	44,903	47,357	49,833	55,354
Value of by-products		2,204	2,156	2,241	2,406	2,460	2,446	1,967	1,930	1,966	2,409
Primary production cost		15,556	26,138	28,816	32,663	36,074	40,624	42,936	45,427	47,867	52,945
Capital interest and land rent		2,141	3,095	3,317	7,648	8,467	9,795	10,510	11,408	12,542	14,266
Secondary production cost		17,697	29,233	32,133	40,311	44,542	50,419	53,446	56,835	60,409	67,211
Labour hours per 0.1 hectares		172.9	141.0	140.0	139.4	132.7	128.1	117.8	110.3	99.0	92.7
Gross income		32,056	49,167	55,277	66,440	69,673	67,778	67,859	66,204	74,592	89,605
Yields per 0.1 hectares		443	445	455	502	497	484	487	464	495	511
Reward of invested labour per day per 0.1 hectare by the size of planted acreage	National average	1,053	2,008	2,301	2,627	2,794	2,440	2,493	2,308	3,004	4,084
	Under 0.3 hectares	884	1,587	1,799	1,977	2,005	1,695	1,514	1,422	1,863	2,395
	0.3 - 0.5	839	1,593	1,854	1,983	1,990	1,889	1,727	1,646	2,024	2,810
	0.5 - 1.0	922	1,764	2,037	2,244	2,350	2,175	2,136	2,063	2,539	3,439
	1.0 - 1.5	1,060	2,092	2,433	2,681	2,804	2,651	2,637	2,626	3,132	4,245
	1.5 - 2.0	1,191	2,287	2,653	3,004	3,180	2,961	3,045	2,917	3,527	4,809
	2.0 - 3.0	1,310	2,521	2,823	3,384	3,592	2,998	3,424	3,000	3,881	5,355
	Over 3.0	1,688	2,428	2,747	3,538	3,816	2,489	3,400	2,831	4,761	6,136

* Only rice selling farm households, see Table 16.

** Depreciation cost is of buildings, facilities for land improvement and agricultural equipments or machines.

Sources: Compiled from *Survey of production cost of rice*, Statistics and Information Department, Economic Affairs Bureau, Ministry of Agriculture and Forestry.

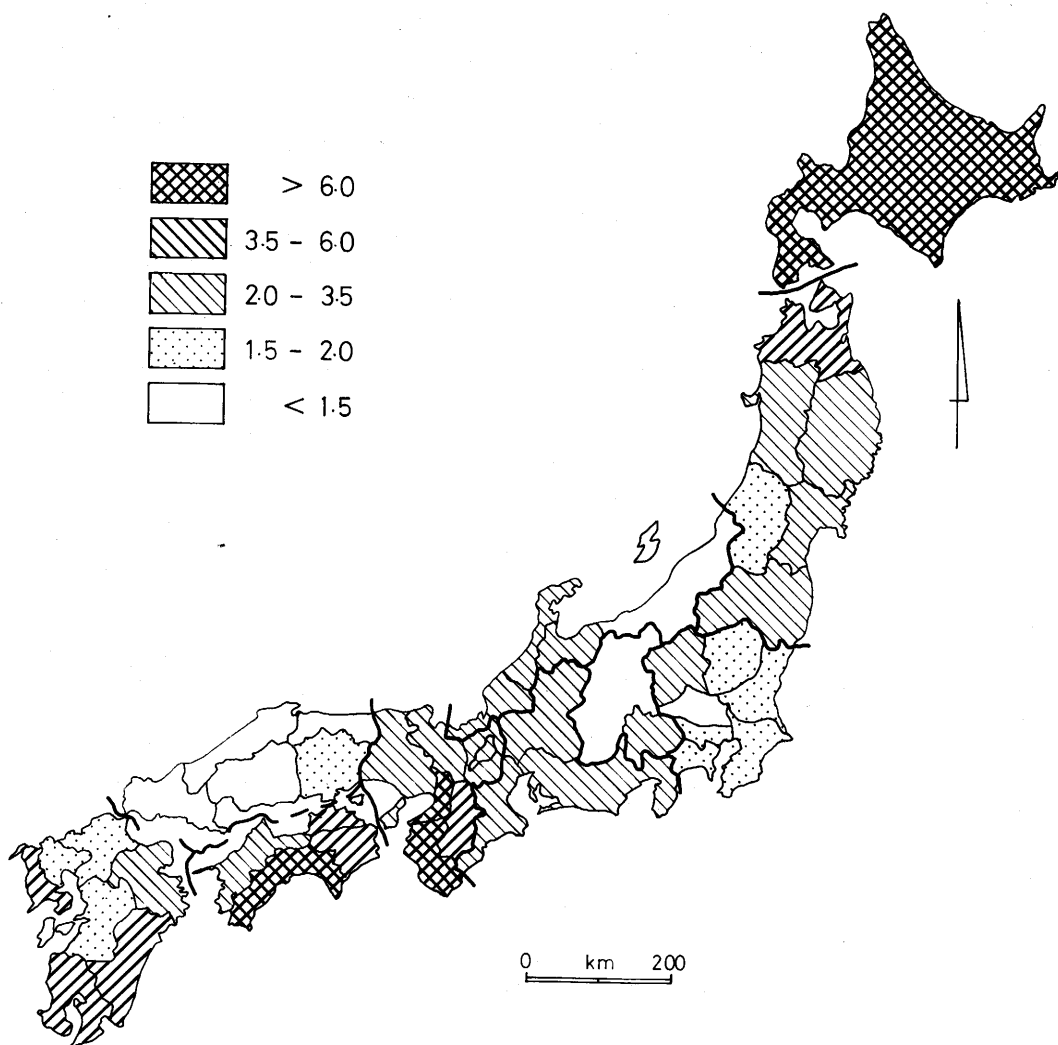


Fig. 4 Regional pattern of National Treasury expenses of mutual relief premium per a kilogram of paddy field rice in 1969.

(1) See foot note (1) in Fig. 2.

Sources: Compiled from *Statistical yearbook of food control*, see Table 13.

Treasury except some areas in the southern parts of Japan which are often visited by typhoons. Consequently, there are very often the greatest amounts of reinsurance money paid by the Government in Hokkaido, as shown in Table 18. Thus, increase of rice production has been crystallized in Hokkaido which is the northern critical area for rice production, although rice plants are originally tropical. But soy beans and wheat were deported out of Hokkaido where they are indeed reasonable crops for the climatic conditions from the standpoint of the most adaptable crops for every land. Then, self-sufficiency rate of soy beans and wheat fell to three and four percent respectively in Japan in 1974.

On the contrary, as for the mutual relief for silk worm and cocoon, the business is undertaken for spring and summer-fall cocoon. The farmers must insure them compulsorily.

Table 18 Reinsurance money paid by the Government by district (in Million Yen)

Districts	1960	1965	1966	1967	1968	1969	1970	1971	1972
All Japan	934	12,144	12,619	5,124	4,014	7,112	3,183	23,088	3,826
Hokkaido	—	3,215	7,581	—	—	3,620	30	14,067	—
Tohoku	4	589	964	262	295	218	91	3,006	66
Hokuriku	4	102	559	845	27	13	—	1	—
Kanto	—	903	1,853	586	103	2,418	135	1,570	137
Tosan	—	265	194	149	503	281	2	58	65
Tokai	14	1,064	502	1	47	18	16	503	1,887
Kinki	185	2,778	25	33	49	15	8	54	306
Chugoku	49	532	52	155	90	1	632	627	588
Shikoku	382	1,957	404	95	944	12	1,193	821	135
Kyushu	296	738	480	2,999	1,956	517	1,075	2,379	641

(1) Data are on paddy field rice only.

(2) Figures in Shikoku and Kyushu include those of second crops of rice.

(3) Figures do not include those of Okinawa Prefecture. Due to rounding procedures, there may be discrepancies between the totals and the sum of breakdowns in value.

Sources: Compiled from *Statistics of mutual relief work on agricultural products*, Agricultural Insurance Management Division, Economic Affairs Bureau, Ministry of Agriculture and Forestry.

But fifty percent of expenses in their mutual relief premium is borne by the National Treasury against the ordinary or the extraordinary damages and disasters of silk worm or cocoon, and all expenses in the case of ultra-extraordinary disasters. They cannot, however, receive insurance money for the damage of mulberry trees or leaves but only for the decrease in production of cocoon.

In the mutual relief business for livestock, the percentage of National Treasury charge varies in kinds of livestock and breeding number of heads. Their ratio ranges from fifty percent for dairy cattle to thirty percent for other livestock.

Now, we can see in Table 19 how the difference in the percentage of National Treasury charge for each of the agricultural products appears in the result of the actual management of mutual relief business. It is remarkably clear that National Treasury expenses for the premium had a great tendency toward the rice production, seventy to eighty percent of the grand total charge, prior to 1970, when the Government began rice production control.

Invested capital for the improvement of agricultural production base by the Government

Secondly, we will turn to the improvement of agricultural production base for which in national budget was appropriated about twenty percent of general account relating agriculture, forestry and fisheries in Japan every year. For example, in the budget for the improvement of agricultural production base, in which land improvement, reclamation by drainage, agricultural land development and so on are included, was appropriated 162,323 million yen in 1969. This amount showed 63.6 percent of 255,088 million yen in the total budget for public works relating to agriculture, forestry and fisheries, and also showed 21.1 percent of 768,764 million yen (11.4 percent of national finance) in the total budget of general account relating to agriculture, forestry and fisheries. However, the greater part of this budget, over three quarters of the total budget for the improvement of agricultural production base, used to be invested in lands for rice production, as shown in Table 20.

Since Agricultural Foundation Law in 1961, the Government has insisted on the selective expansion of agricultural production as one of the agricultural policies. Nevertheless, an adequate balance between supply and demand of vegetables, fruits and livestock are not always realized even at present. Although both ratios of output in horticulture and livestock to the gross agricultural output value were 26.7 and 22.1 percent in 1969, as given in Table 21, that of rice, on the other hand, occupied 42.1 percent. The percentages of horticulture and livestock in the budget for the improvement of agricultural production foundation were

Table 19 Trend of National Treasury expenses for the mutual relief premium* (in million Yen)

	1955	1960	1965	1966	1967	1968	1969	1970	1971	1972
Paddy field rice	6,508 (59.9) %	6,985 (64.6) %	12,070 (61.7) %	13,946 (61.6) %	16,902 (62.0) %	19,488 (61.9) %	22,644 (61.9) %	17,995 (60.6) %	17,812 (60.6) %	12,419 (59.3) %
Upland field rice	312 (62.7)	302 (68.0)	362 (66.0)	389 (66.0)	430 (66.8)	437 (66.7)	428 (66.7)	409 (67.9)	344 (67.9)	334 (66.9)
Wheat and barley	971 (57.2)	959 (60.3)	1,455 (59.8)	1,386 (59.8)	1,331 (59.8)	2,206 (65.0)	2,039 (65.5)	1,765 (65.5)	1,507 (66.9)	1,190 (67.1)
Total	7,791 (59.7)	8,246 (64.2)	13,886 (61.6)	15,721 (61.6)	18,663 (59.9)	22,132 (62.3)	25,110 (62.3)	20,169 (60.8)	19,662 (60.6)	19,627 (59.9)
Spring cocoon	181 (52.7)	303 (66.3)	396 (65.2)	408 (65.1)	448 (65.2)	471 (64.0)	520 (64.3)	549 (64.5)	585 (64.8)	578 (64.5)
Summer, fall cocoon	359 (50.2)	338 (53.6)	492 (53.7)	527 (53.7)	644 (53.6)	697 (53.3)	737 (53.2)	766 (53.2)	804 (53.2)	810 (54.6)
Total	540 (51.0)	641 (59.0)	887 (58.2)	932 (58.1)	1,093 (57.8)	1,168 (57.2)	1,256 (57.3)	315 (57.4)	389 (57.5)	1,388 (58.3)
Milk cow	179 (24.2)	363 (24.1)	515 (20.8)	539 (20.6)	1,834 (40.8)	2,177 (41.0)	2,685 (43.4)	2,947 (44.2)	3,050 (44.4)	3,952 (47.4)
Other cattle	190 (26.3)	188 (22.2)	152 (16.3)	162 (14.8)	461 (29.0)	543 (28.0)	642 (30.4)	700 (31.8)	746 (31.8)	1,306 (41.4)
Horses	192 (13.9)	148 (19.5)	87 (15.2)	81 (13.9)	151 (22.7)	132 (21.3)	120 (20.7)	108 (19.6)	96 (18.7)	134 (24.9)
Other livestock	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	21 (30.1)
Total	561 (23.6)	700 (22.3)	754 (18.9)	781 (18.2)	2,446 (36.2)	2,852 (36.2)	3,446 (38.8)	3,755 (39.9)	3,891 (40.0)	5,414 (44.7)
Fruits and fruit trees	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	130 (10.0)	14,172 (10.0)	18,581 (10.0)	17,780 (10.0)
Grand total	8,892 (53.9)	9,587 (56.2)	15,528 (55.4)	17,435 (55.4)	22,201 (55.8)	26,152 (57.6)	29,826 (57.9)	25,253 (56.2)	25,959 (56.0)	21,033 (59.5)

* Percentages indicate the ratio of national treasury charge of premium to the total mutual relief premium.
 Sources: Compiled from "Statistics of agricultural mutual relief for crops", "Statistics of agricultural mutual relief for silk worm and cocoon" and "Statistics of agricultural mutual relief for livestock", Agricultural Insurance Management Division, Economic Affairs Bureau, Ministry of Agriculture and Forestry.

only 12.8 and 8.7 percent in the same year, furthermore, the growth rate of which was much slower prior to the starting year of rice production control, as shown in Table 20. On the other hand, the ratio of rice in this budget still showed the high percentage of 68.3 in 1969 in spite of the decrease of the percentage of output in rice production to the total output. Thus, the preferential budget in the improvement of agricultural production base was appropriated for rice production.

The same examples can be shown in all aspects of agriculture in Japan, that is, it is not too much to say that agricultural policies did not used to think much of agriculture except paddy field rice farming before the surplus stock and overproduction of rice came to a head.

SUMMARY AND CONCLUSION

Old rice stock in the Government was there in amount of 7.2 million tons in the early part of 1970 in Japan, although the shortage of foodstuff production had not stabilized people's living for a long time in human history. In 1967, rice productivity reached a new stage, about 14.5 million tons, in the total domestic production of rice in Japan, which was over by 2.5 million tons to the total domestic rice consumption in the 1960's and early period of the 1970's. On the other hand, deficit in the Food Control Special Account amounted to 346,200 million yen at the end of the fiscal year of 1969. Accordingly, the Government production guidance was announced for the production control to balance supply with demand of rice in 1970.

The writer has discussed and analysed some important factors of surplus rice stocks or high productivity of rice production and the background of first rice production control in Japan.

Table 20 Budgets for selective expansion of agricultural production in the improvement of agricultural production base (in million Yen)

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
Horticulture	6,768	9,042	9,335	12,858	15,939	16,033	20,823	30,739	43,438	62,366
of which										
Sugar beets and canes	1,085	1,308	1,438	1,808	1,960	2,201	2,461	2,488	4,440	5,087
Vegetables	3,371	4,682	4,136	5,495	6,599	6,575	8,057	13,017	18,793	31,438
Fruits	2,312	3,051	3,762	5,555	7,369	7,257	10,306	15,234	20,204	25,841
Livestock	6,364	7,256	9,201	10,345	11,262	11,883	14,038	18,199	24,203	37,233
of which										
Meadow	1,215	1,502	2,181	2,586	3,466	4,077	5,505			
Reclamation	4,356	4,726	5,579	5,475	4,450	4,602	2,818	16,703	19,469	30,897
Reclamation pilot	793	1,029	1,441	2,284	3,347	3,204	5,014			
Land improvement	—	—	—	—	—	—	—	106	351	976
Land reclamation by drainage	—	—	—	—	—	—	701	1,310	4,383	5,359
Seliculture	407	553	694	1,302	1,546	1,668	1,280	1,470	2,478	3,180
Total	13,539	16,851	19,229	24,504	28,742	29,583	36,140	50,328	70,119	102,780
Rice	50,557	59,234	59,544	70,693	85,198	93,686	110,433	119,922	132,043	147,187
Other upland field crops	1,440	1,266	13,375	14,556	16,558	16,137	15,750	18,775	21,163	25,500
Grand total	65,556	77,351	92,148	109,753	130,498	139,406	162,323	189,025	223,325	275,467

Sources: Compiled from *Budget for Agricultural Land Bureau*, Administration Division, Agricultural Land Bureau, Ministry of Agriculture and Forestry.

Table 21 Total output of agriculture and its percentage (in hundred million Yen)

	Output								Percentage							
	1955	1960	1965	1968	1969	1970	1971	1972	1955	1960	1965	1968	1969	1970	1971	1972
Rice	8,634	9,074	13,691	20,097	19,614	17,662	15,655	17,856	52.0	47.4	43.1	45.8	42.1	37.9	34.2	35.1
Wheat and barley	1,155	1,060	940	980	752	483	496	337	6.9	5.5	3.0	2.2	1.6	1.0	1.1	0.7
Miscellaneous cereals	123	113	59	51	44	32	28	35	0.7	0.6	0.2	0.1	0.1	0.1	0.1	0.0
Pulses	501	487	518	513	518	546	497	571	3.0	2.5	1.6	1.2	1.2	1.1	1.2	1.1
Potatoes	639	577	793	678	666	781	678	764	3.8	3.0	2.5	1.6	1.4	1.7	1.5	1.5
Horticulture	2,782	3,801	7,570	10,098	12,440	13,830	13,864	15,372	16.7	19.9	23.8	23.2	26.7	29.7	30.3	30.3
Vegetables	1,191	1,741	3,744	5,170	6,504	7,400	7,233	8,228	7.2	9.1	11.8	11.8	14.0	15.9	15.8	16.2
Fruits and nuts	662	1,154	2,100	2,674	3,563	3,965	4,018	4,143	4.0	6.0	6.6	6.1	7.6	8.5	8.8	8.2
Flowers	79	87	192	283	357	425	497	558	0.5	0.5	0.6	0.7	0.8	0.9	1.1	1.1
Tea and industrial crops	850	819	1,534	1,971	2,016	2,040	2,116	2,443	5.1	4.3	4.8	4.5	4.3	4.4	4.6	4.8
Others	228	303	590	795	836	871	949	1,040	1.4	1.6	1.8	1.7	1.8	1.9	2.1	2.0
Cocoon	466	564	727	1,108	1,078	1,261	1,040	1,199	2.8	3.0	2.3	2.5	2.3	2.7	2.3	2.4
Livestock	1,856	2,913	6,628	9,280	10,318	10,835	12,131	13,218	11.2	15.2	20.9	21.2	22.2	23.2	26.5	26.0
Processed	233	256	253	282	321	341	407	402	1.4	1.3	0.8	0.6	0.7	0.7	0.9	0.8
Grand total	16,617	19,148	31,769	43,846	46,587	46,643	45,745	50,794	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Compiled from the data by Statistics and Survey Division, Ministry of Agriculture and Forestry, "Statistical yearbook of agricultural production income", 1973, "Statistical yearbook of Ministry of Agriculture and Forestry", 1972/1973, Statistics and Survey Division, Economic Affairs Bureau, Ministry of Agriculture and Forestry.

Change of diet structure in parallel with high economic growth since 1956 were examined for trend in supply and demand of rice in Japan.

The annual per capita consumption of rice has consistently decreased after the peak with 118.3 kilograms on national average in 1962, the term to which from the end of the War can be said to be the first evolutionary stage of food consumption in Japan in the post-war period in which the Japanese diet shifted from such 'substitute' foods as miscellaneous cereals, pulses, potatoes or rice with a fair amount of barley to pure rice without barley. In the second evolutionary stage of food consumption change in the latter half of the 1960's, the consumption of protein-rich and fatty or oily foods such as meat, eggs, milk, fats and oils or fruits and vegetables went steadily up in Japanese diet. This is also clearly expressed in the taken nutrition.

That was the result of strong Americanization or westernization in food consumption structure by the initiative of the Government, which was from rice meal to bread or animal foods. It is because to change into this pattern of diet has been advertised as modernization and advancement of diet especially after the War, despite the fact that there has been a typical Japanese pattern of diet in Japan. Bread has been also provided with milk in school lunches after the War. So, it is often seen that even rice-producing farmers have bread as a chief food once or twice a day in the villages in recent years. Nevertheless, consumer price of rice has been raised up gradually, and that of wheat has had a general tendency to lower, with growth of wheat import which was led deliberately. Consequently, gross consumption of rice in Japan has a decreasing trend after the summit of 13.41 million tons in 1963, in spite of the growth of total population.

Although there was, in general, the shortage of rice production until 1966 in Japan, the new level of rice productivity was realized to the perfect self-sufficiency of rice in the next year.

Production structure of rice is discussed from three standpoints which are the increase of yield per hectare that was made possible by the innovation and diffusion of production techniques including mechanization, the expansion of rice planted acreage owing to a relative advantage of the producer price of rice and the some examples of preferential policies for only rice production.

Increase of yield per hectare in paddy field rice has a general tendency to go up toward the new stage of productivity about every decade in Japan. The stage of high stable yield in recent years reached 4.7 tons per a hectare in national average and that is remarkable especially in the northern marginal parts of Japan, for instance, over 5.8 tons per a hectare in Aomori Prefecture, and over 5.0 tons in Hokkaido Prefecture in 1973.

The important factors for high stable productivity in paddy field rice farming are standardization of plant varieties in paddy field rice and development of techniques in rice cultivation. The former didn't so much progress in the 1950's and in the early part of the 1960's, but the rate of total planted acreage in higher ten ranks of plant varieties in paddy field rice was over thirty percent in 1965, but 57.5 percent in 1973. These varieties are highly resistant to lodging by wind and also contributed to the mechnization of rice farming. The latter consists of diffusion of protective seedling bed for paddy field rice plant, improved methods in heavy fertilization, mechnization in paddy field rice farming and land improvement for paddy fields.

Diffusion of protective seedling bed for paddy field rice plant made rapid progress to be about hundred percent in the rate of popularization in the northern half of Japan with the distribution of plastic or polyethylene films and the spread of cold-weather proof varieties in paddy rice plant in 1970, and advanced the harvest time of rice before the coming of

typhoon season or rainy season in autumn even in the southern half of Japan.

Improved methods in heavy fertilization are of favorable opportunity and of the number of times in fertilization with the increasing consumption of phosphorous and nitrogenous fertilizers in the typical soil type in Japan. Early planting cultivation of rice with this improved heavy fertilization was very effective for the prevention of lodging of rice plants, but caused rice plant diseases especially blight blast. Development of agricultural chemicals, however, got over these difficulties with improvement of prevention and extermination against rice plant diseases and injurious insects, especially rice stem-borer. The spread of herbicides and mechanization are evaluated for the increase of rice production with the lessening of labour in rice farming.

Land improvement for paddy fields, in which both irrigation and drainage has completely finished in 19.8 percent of the total paddy field acreage, is also greatly appreciated.

Expansion of rice planted acreage was caused by the increase of paddy fields in acreage which were developed in the northern parts of Japan in spite of the decrease of total cultivated land acreage in recent years, and by the problems of producer price of rice under the Food Control System.

The latter problems are commonly associated with a capitalist society, because it has always embraced the possibility of overproduction and the attendant problems in itself. As only agricultural products are the free goods, their prices are perfectly competitive in general to be decided and be made to fluctuate independently of the producers' intention in the markets, despite administered prices by the producers in manufactured goods or service fees. This is because abundant supply of agricultural products to the markets is done by many petty farmers. As agricultural products have a small price elasticity, a little unbalance between supply and demand of agricultural products causes the prices to fluctuate drastically. Transactions in agricultural products have, therefore, been one of the important objects of speculation. The Food Control System has prevented dealings of rice in the markets from speculation, and has, consequently, functioned as price supporting of rice, protection of agriculture and maintenance of agricultural production in recent years in Japan. Hence, many rice farmers have devoted their lives to produce rice to sell as much as possible.

Relative advantage of producer price of rice was realized by the introduction in 1960 of price decision system for the compensation of production cost and income of rice farming households. As a result of yearly rise of producer price of rice after 1960, wages per day in rice farming were in one of the top classes every year in main crops or livestock; in addition, working hours in rice cultivation were gradually reduced.

Preferential policies for rice cultivation can be shown in all aspects of agricultural policies before rice production control in Japan. Agricultural mutual relief system and invested capital for improvement of agricultural production base by the Government are here discussed as examples.

In the former case, the National Treasury has supported a large part of the expenses in mutual relief premium, seventy to eighty percent of the grand total charges, for paddy field rice every year before rice production control in 1970. Hokkaido district, which includes the northern marginal areas of rice production, is granted an exceptional favour of high amount of premium charge by the National Treasury except some areas in the southern parts of Japan which are often visited by typhoons.

In the latter example, over three quarters of the total budget for improvement of agricultural production base used to be invested in lands for rice production in the same way; in other words, it is too much to say that all agricultural policies sought to further rice production.

ACKNOWLEDGMENT

The writer wishes to dedicate this article and to express his sincere gratitude to Professor Dr. Saburo Noma for his guidance, teaching and encouragement in the Department of Geography, Tokyo Metropolitan University. The writer is grateful to the members of Statistics and Survey Division, and of many other Divisions, especially the members of Library, Ministry of Agriculture and Forestry, for their help and advice. Permission for the use of data and sources was kindly given by them. The writer also would like to express his sincere thanks to the members of Economic Geography Study Group at the Department, especially Associate Professor Tadao Yokota, Department of Geography, Tokyo Metropolitan University, Miss Akiko Wada, Associate Professor of Department of Literature, at Tsuru Bunka University, and Mr. Toshihiko Aono, Associate Professor of Department of Economics, at Chuo University, for discussions with them and their fruitful comments. The writer also is deeply grateful to Miss Monica Barry for her advice on the English expressions of this article.

NOTES

- (1) In fact, the tentative rice production control was executed in the previous year. It was the Government plan that land use in paddy fields was scheduled to be converted into other crops in acreage of ten thousand hectares. Subsidy for it was twenty thousand yen per 0.1 hectares. Total budget, including office expenses and subsidy for improvement of agricultural land bases, was 3,524 million yen in 1969.

Overproduction and surplus of rice also came into question, to present a plan of rice production control in 1933, but it was not realized owing to an extremely bad rice harvest in 1934 and budgetary problems in compensation for rice production control in that year.

- (2) Targets and results of rice production control starting in 1970 in Japan are given in the Table below. Both in 1970 are a million tons and 138.8 thousand tons. The rate of achievement is 139 percent in national average which varies between 103 percent in Hokuriku district and 141 percent in Kyushu district except the highest rate (299%) in Hokkaido. Only 21.9 percent of controlled paddy field acreage is converted into other crop use. More than three quaters is fallowed. Surprise and shock of rice production

Table 22 Targets and results of rice production control in Japan

	1970	1971	1972	1973	1974**
Targets (in 1,000 tons) (A)	1,000	2,300	2,150	2,050	1,180
Results (in 1,000 tons) (B)	1,388	2,257	2,327	2,299	1,164
(B)(A) (%)	139	98	108	112	99
Results in acreage (in 1,000 ha.)	337	541	566	562	315
Of which conversion to					
Feed crops	15	57	67	69	67
Vegetables	29	73	66	62	57
Other crops*	69	212	226	229	217
Arboretum	3	18	25	30	33
Forest	2	15	21	25	29
Non-agricultural uses	2	2	3	4	6
Fallow only	219	257	251	236	—
Fallow for land improvement	42	37	40	38	30

* Winter crops are included.

** Fallow was stopped in 1974.

Sources: Compiled from investigation data by Crop Production Division, Agricultural Production Bureau, Ministry of Agriculture and Forestry.

control to rice producing farmers are stated in these figures in 1970, because converted land use into arboreta was only 3.2 percent (3,000 hectares). Acreage of fallow with land improvement, on the other hand, amounted to forty two thousand hectares, 12.4 percent. So, we cannot but recognize that rice farmers would like to raise productivity of paddy fields for the future even in times of awkward situations. Subsidy for rice production control was eighty one yen a kilogram of rice, 35,073 yen per 0.1 hectares in 1970. Total expenditure for rice production control was 113,500 million yen in the same year.

- (3) These were: twenty thousand hectares for feeds, thirty four thousand for perennial crops, one hundred and eighty thousand for pulses, fifty six thousand for vegetables, thirty thousand for other crops and fourth thousand hectares for reforestation.
- (4) As for first class farm households, see Table 9.
- (5) The rate of rice sale to the total rice production was 92.4 percent maximum in Hokkaido district and 63.8 percent minimum in Tokai district in 1969. It was generally higher in far northern districts of Japan.
- (6) According to Food Agency (1975), 'Jishu-Ryutsu' system was begun in 1969 to introduce marketing within the limit of distribution system under the Food Control Law. Under this system, the authorized quantities of rice are sold not to the Government but to wholesalers designated assemblers of rice. The whole process of rice distribution, however, is under the Government control based on the Food Control Law.
- (7) Mutual relief works for sheep and goats were done away with in 1966. Those for fruits and fruit trees were started in 1968. Tentative works for some crops in upland fields and horticulture are now on.
- (8) A maximum of seventy percent of the premium charge in paddy field rice and eighty percent in upland field rice and barley are now aided by the National Treasury as the Law was amended in 1972 (Agricultural Insurance Management Division, Economic Affairs Bureau, Ministry of Agriculture and Forestry, 1975, p. 15.).

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- (* in Japanese, ** in English.)