

AN ANALYSIS OF GRAIN CONSUMPTION IN JAPAN

by

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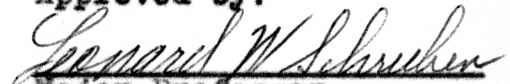
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TABLE OF CONTENTS

INTRODUCTION..... 1

**The Problem..... 1**

**Hypothesis..... 2**

**Procedures..... 2**

THE MARKET STRUCTURE..... 7

    Changes in the Market Structure..... 7

    Price Stabilization for Agricultural Products..... 18

    Marketing System of Wheat..... 24

THE MOVEMENT OF GRAIN CONSUMPTION..... 33

    Changes in Production & Planted Area of Rice, Wheat,  
        Barley and Naked Barley..... 33

    Changes in Import of Wheat..... 38

    Changes in Price of Grain..... 44

    Changes in Grain Consumption (Macro Analysis)..... 48

    Changes in Grain Consumption (Micro Analysis)..... 62

    Changes in eating habits..... 73

CONCLUSION..... 77

ACKNOWLEDGMENTS..... 82

BIBLIOGRAPHY..... 83

APPENDIX..... 85

## INTRODUCTION

### The Problem

Wheat, barley and naked barley are the principal cereals consumed in Japan, aside from rice. Their total planted acreage is about 26 per cent of the total cultivated acreage. Besides, Japan is importing great quantities of wheat every year. In 1960, 2,628,161 metric tons of wheat were imported which is about twice as much as is produced.

Barley is prepared for food through a simple processing procedure and wheat through the milling process. Main consumption forms of wheat, barley and naked barley, including imported wheat, are milling flour, cleaned barley, cleaned wheat, beer, bean paste, soy and feed.

During the period of postwar food shortage, Japan's dependence on wheat and barley increased rapidly. Recently, with an increased supply of rice, the consumption of barley and naked barley has been decreasing while the consumption of wheat as bread, noodles, and flour is rather stable.

Milk and milk production are related to the consumption of bread, and the number of cows and the amount of milk produced is more than three times the prewar level. Their annual growth rate of production is about 10 per cent and the present milk production amounts to 1.9 million tons. However, compared with the United States and European countries, dairy cow density in Japan is extremely low.

The national income of Japan is increasing very rapidly. The annual growth rate was 7 per cent during the period 1953 to 1959, compared with 0.8 per cent in the United States, 2.1 per cent in England, and 5.3 per cent in West Germany. In 1959 it increased 17.5 per cent over the previous year.

With such a high rate of increase in national income and an increase in production of rice, the future movement of wheat consumption is worthy of study.

The objectives of this study are (1) to analyse the current consumption of grain, and (2) to predict probable trends in grain consumption.

#### Hypothesis

Consumption of wheat in Japan has a tendency to increase as personal income in that country increases. Consumption of rice has a tendency to decrease as personal income increases. Consumption of barley and naked barley has a tendency to decrease as personal income increases.

#### Procedures

Data were collected which related to the probable reasons for changes in the consumption of grain, which are: (1) the change on the supply side, such as change in production and import, (2) movement of the related goods, and (3) the change caused by the change in income, population, taste, and price. Those data are published by the Ministry of Agriculture and



Forestry. Careful analysis of these data and graphs were made.

As is the case in any study of social phenomena, the development of knowledge is hampered by the inability to conduct experiments, because of the impossibility of holding constant the variables other than those which are under study. However, the careful collection and study of data may allow substantial progress.

Data needed. The data used here for this study were from 1935 through 1961. These data contain the following: production of grain, import of grain, change in yield of grain per acre, change in price of agricultural products, change in consumer's price and producer's price of grain, composition of staple food in urban and rural area, per capita consumption of grain, change in consumption of grain in urban and rural area, change in consumption of grain in rural and urban households according to the income classes, grain consumption in urban and rural area according to districts, marketing period of rice, school feeding, nutritive value of grain, consumption of milk and milk products, and consumed amount of food in urban and rural area according to the income classes.

Estimation of Income-Elasticity of Demand. An analysis was made to find out the relationships between income and consumption so that future movement of consumption can be predicted as income changes.

Income-elasticity of demand shows the way in which a consumer's purchases of any good changes as a result of a change in

his income. The calculation was made for various processed products of grain and related goods.

Data used. Japan was divided into six districts, Hokkaido, Tohoku, Tokai-Kinki, Chugoku and Kyushu, as can be seen in Fig. 3 on page 72. Each of the districts has many different characteristics, such as the way of life, the climate and the geographical make-up. The district was divided into rural and urban areas in order to make clear the difference between them. The source of data for the urban area for the period January 1958 - December 1958 was Report on the Family Income and Expenditure Survey by Bureau of Statistics, Office of the Prime Minister. (1,272 households were sampled.) The source of data for the rural area for the period April 1957 - March 1958 was Report on the Family Income and Expenditure Survey by Statistics and Survey Division, Ministry of Agriculture and Forestry. (5,500 households were sampled.)

Division of class. In the urban area, the classes were divided into 21 income brackets.

In the rural area, the classes were divided into 16 income brackets.

Districts. Data was collected from different districts of the country so that the nationwide tendency can be seen.

Calculation of the Income-Elasticity of Demand. Two methods of calculating income-elasticity of demand were considered for use in the study. They were the time series and the cross section methods. The time series method reflects the change in

consumption in time, but this method is easily influenced by the variables other than change in income. So to avoid this disadvantage, the cross section method was employed. Cross section method calculates the income-elasticity of demand from the data in which the consumption behavior of different income classes is shown within one year.<sup>1</sup>

The method of calculation. The correlation coefficient is considered to see whether this equation satisfies the characteristic present in data or not. The regression coefficient is computed by the least square method of analysis. This statistical measure was calculated by using IBM 1620 computer following the formulas:<sup>2</sup>

$$\text{Regression coefficient} \quad b = \frac{(X - \bar{X})(Y - \bar{Y})}{(X - \bar{X})^2}$$

$$\text{Interception point} \quad a = \frac{XY - b X^2}{X}$$

$$\text{Income-elasticity of demand} \quad e_y = \frac{b}{W}, \quad W = \frac{\bar{Y}}{\bar{X}}$$

$$\text{Correlation coefficient} \quad r = \frac{(X - \bar{X})(Y - \bar{Y})}{(X - \bar{X})^2 (Y - \bar{Y})^2}$$

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<sup>1</sup>Society for a Study of Grain. The Analysis of Wheat Consumption, (Tokyo: Society for a Study of Grain, 1960), pp. 20-21. Michael J. Brennan, Jr., Preface to Econometrics (Cincinnati: South-Western Publishing Company, 1960), pp. 345-347.

<sup>2</sup>Michael J. Brennan, Jr., Preface to Econometrics (Cincinnati, Ohio: South-Western Publishing Company, 1960), pp. 134, 157, 300-306 and 313.

where

- X = Total consumption expenditure in terms of dollars.  
 Y = Amount of single commodity purchased in various units.  
 W = Average propensity to consume.  
 $\bar{X}$  = The mean of the sample calculated by the process of dividing the sum of the observations, X, by their number.  
 $\bar{Y}$  = The mean of the sample calculated by the process of dividing the sum of the observations, X, by their numbers.  
 $e_y$  = Income-elasticity of demand.

The single regression equation, then, is

$$\hat{Y} = a + b\hat{X}.$$

The decision can then be made about the results of income-elasticity of demand. The positive values of elasticity obtained from the above computation show that as income goes up, consumption will also go up. In other words, changes in a consumer's income and in his expenditure on any good will be in the same direction. The negative values of elasticity represent the cases where a rise in income leads to a fall in the amount purchased. This may happen in case of inferior goods.

If the income-elasticity of demand for any product is equal to one, this means that the proportion of the consumer's income spent on the goods in question is exactly the same both before and after income rises. If the income-elasticity of demand for any goods is greater than one, it means that an increasing proportion of the consumer's income is spent on the goods in question as income goes up. Similarly, if a consumer's income

elasticity of demand for a good is less than one, the proportion of the income spent on that goods falls as income rises. A good with an income-elasticity greater than one is in some sense a luxury, and a good with an income-elasticity less than one is in some sense a necessity.

However, the correct judgment of those income-elasticities of demand should be done synthetically considering the economic situation, social situation, and the situation of demand and supply of that good at that time.

## THE MARKET STRUCTURE

### Changes in the Market Structure

Great changes have occurred between prewar and postwar conditions with respect to Japan's market structure. The following resume indicates the changes which have resulted.

The Marketing Pattern before World War II. Before the war rice occupied an overwhelming position in agricultural marketing. The marketing pattern was very peculiar because it reflected the structure of agricultural production under the landowner system at that time. That is, landowners possessed half of total cultivated land, rented these lands to tenants and collected rents equivalent to almost half the harvest from them.<sup>1</sup> Rice was used as payment in kind for taxes (or tribute) during the "Royal

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<sup>1</sup>Tatuo Midoro, "Marketing of Agricultural Products in Japan," Agriculture, Forestry and Fisheries Productivity Conference, Tokyo, 1960, p. 16.



Monarchical Age" (600-1200) and the "Feudal Age" (1200-1867), and also rice was used as agricultural tenant rent payment in kind thereafter until the end of World War II.<sup>1</sup> Therefore, the rice crop was the most important crop for the ruling classes throughout the various ages.

A continuously strong promotion policy for increasing rice production has long been maintained. Statesmen have emphasized policies to promote an increase in paddy field acreages, improvement of irrigation facilities of paddy fields, and research and experimental work in rice crop cultivation.

In Japan, agricultural experiment stations in the past might have been called rice crop experiment stations because almost all of the work done in the experiment station was concerned with rice crop experiments. Agricultural land improvement was primarily water control improvement for paddy fields; particularly, irrigation facilities.<sup>2</sup>

Before World War II the composition of the marketing pattern for rice was as follows: rice sold by landowners, 37.5 per cent, rice sold by producers, 62.5 per cent (1924 - 1928 average).<sup>3</sup>

Such a contrast also regulated the whole market structure, for two reasons: first, rice sold by each producer was in small

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<sup>1</sup>Ibid., p. 17.

<sup>2</sup>Masao Otsuki, Japanese Agriculture and the Direction of Its Development, Yokendo, Tokyo, May, 1960, p. 15.

<sup>3</sup>Tatuo Midoro, "Marketing of Agricultural Products in Japan," Agriculture, Forestry and Fisheries Productivity Conference, March, 1960, p. 17.



lots and often inferior in quality; second, rice marketed by producers was in the nature of "poverty sales" and shipments tended to be concentrated in the fall at harvest time, whereas, landowners could hold their rice for better prices in the off-crop season.

Table 1, showing the seasonal marketings of rice for the period 1926-30, indicates that producers sold 53 per cent of their rice within three months after the harvest (November, December and January), but landowners sold their rice at a more uniform rate throughout the year. That is, from November to January they sold 30 per cent of their rice; from February to April, 24.6 per cent; from May to July, 23 per cent; and from August to October, 22.2 per cent. This same situation can be observed for a period 1937 and 1939 as shown in Table 2. This seasonality of supply reflects the price of rice which is shown by Table 3.

As illustrated by these tables, because the landowner is able to sell as he does, he is more likely to receive a higher total revenue. The marketing pattern followed by producers made it easier for dealers to rule over farmers. Machinery and fertilizer dealers often supplied the farmer with his needs for production in advance and in return received a portion of the crop yet to be harvested as payment. Such a debt bore a very high rate of interest. Sometimes farmers agreed to sell their rice before it was planted in order to obtain money with which they purchased fertilizer and other needed supplies. Such was

Table 1. Marketing period by landowner and producer, average 1926-30.

	Number			Percentage Marketed		
	Producer	Landowner	Total	Pro- ducer	Land- owner	Total
	1,000 bushels			Percent		
November	16,942.1	3,604.5	20,546.6	15.9	5.7	12.1
December	24,437.8	7,936.0	32,373.8	22.9	12.6	19.0
January	14,643.2	7,480.3	22,123.5	13.7	11.8	13.0
Total	56,023.1	19,020.8	75,043.9	52.5	30.1	44.1
February	8,519.7	5,427.2	13,946.9	8.0	8.6	8.2
March	6,441.0	5,033.0	11,474.0	6.0	8.0	6.7
April	5,350.4	5,099.5	10,449.9	5.1	8.1	6.1
Total	20,311.1	15,559.7	35,870.8	19.0	24.6	21.1
May	4,843.5	5,099.5	9,943.0	4.5	8.1	5.8
June	4,357.1	4,567.0	8,924.1	4.1	7.2	5.2
July	4,147.2	4,889.6	9,036.8	3.9	7.7	5.3
Total	13,347.8	14,556.1	27,903.9	12.5	23.0	16.4
August	4,654.1	5,611.5	10,265.6	4.4	8.9	6.0
September	5,350.4	4,521.0	9,871.4	5.1	7.2	5.8
October	7,127.0	3,927.0	11,054.0	6.7	6.2	6.5
Total	<u>17,131.5</u>	<u>14,059.5</u>	<u>31,191.0</u>	<u>16.0</u>	<u>22.2</u>	<u>18.3</u>
Grand Total	108,813.5	63,196.1	170,009.6	100.0	100.0	100.0

Source: Calculated from Problem of Rice Price, by Masao Hazama, Kobundo, Tokyo, December, 1958, p. 124.

the dark of the situation, while the modernization of market was developing. Industrial capital was temporarily established and nationwide simplification of a capitalistic domestic market started around 1910.

Along with these developments, various laws and regulations were established concerning agricultural organization and the marketing of agricultural products. In April, 1922, the public rice inspection system was established. The food problem was given attention especially after World War I due to the high

Table 2. Marketing period by landowner and producer, 1937 and 1939.

	: Producer :		: Landowner :		: Total :	
	: 1937 :	: 1939 :	: 1937 :	: 1939 :	: 1937 :	: 1939 :
	%	%	%	%	%	%
November-February	52.2	51.2	38.6	39.5	48.1	48.0
March-June	23.1	23.1	33.4	33.3	26.2	25.9
July-October	24.7	25.7	28.0	27.3	25.7	26.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Masao Hazama, Problem of Rice Price, Kobundo, Tokyo, December, 1958, p. 124.

Table 3. Seasonal index of price of rice.

	: January 1912- : December 1921	: January 1922- : December 1930	: January 1901- : December 1930
January	98.8	95.7	97.4
February	97.3	96.5	98.1
March	97.4	97.4	98.1
April	97.6	99.4	98.3
May	97.8	100.1	98.8
June	99.7	101.2	100.1
July	103.0	103.3	102.8
August	106.1	105.4	104.7
September	103.1	104.2	103.3
October	101.3	102.6	101.9
November	99.0	98.9	99.9
December	98.9	95.3	97.5
Average	100.0	100.0	100.0

Source: Masao Hazama, Problem of Rice Price, Kobundo, Tokyo, December, 1958, p. 125.

degree of development of industry, concentration of workers in cities, and lagging of agricultural productivity. This brought about plans for modernization and stabilization of farm market through enactment of the Rice Law, Agricultural Storehouse Law, and Central Wholesale Market Law. Generally speaking, however,

landowners were the principal beneficiaries of the various systems for modernization and stabilization of markets. Though the role of these systems played in benefiting farmers cannot be ignored, it was landowners and dealers who profited most from price adjustment under the Rice Law and from storage and financing under the Agricultural Storehouse Law. However, the panic in 1928-1930 disclosed a contradiction existing between capitalism and small scale agriculture under the landowner system. About that time regulations concerning farm marketing were strengthened, followed by enactment of the Rice Control Law and the Rice Autonomy Control Law. As a result, a nationwide system of affiliated industrial associations was completed through Government aid. Of course, the existence of the landowner system was not denied, but its power to control farm markets gradually was restricted. This tendency was accelerated by the arrival of wartime controls. Finally, the dual price system for rice was adopted. This distinguished between rice sold by landowners and by farmers.<sup>1</sup>

The Marketing Pattern after the War. Immediately after World War II, the government, in co-operation with Occupation Authorities, carried out a drastic land reform program, transferring most of the tenanted lands to tenants. Less than 10 per cent remained as tenanted land. Absentee ownership was

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<sup>1</sup>Tatuo Midoro, "Marketing of Agricultural Products in Japan," Agriculture, Forestry and Fisheries Productivity Conference, Tokyo, 1960, p. 18.



completely abolished, the upper limit of ownership being set at less than one hectare for noncultivators. The compensation fee fixed at a more or less reasonable amount turned out to be an extremely low rate as a result of the galloping inflation that followed the land reform. Thus postwar agriculture started from a completely new owner-cultivator system without any burden of compensation debts.<sup>1</sup>

Mr. L. I. Hewes, Jr., stated

Land reform after the war has had two important effects; (1) incomes of farm families have increased, and (2) the status and political influence of farm families have been increased so that the opinions, needs, and wants of farm people are expressed more effectively. A principal long-range effect of land reform has been to enlarge the scope of decision making by individual farmers.<sup>2</sup>

Land reform affected not only agricultural marketing but also Japan's economic structure as a whole. Also, nationwide simplification of agricultural marketing under the wartime control, and establishment of various systems concerning the marketing of farm products brought structural changes on the markets. These changes can be summarized as follows:<sup>3</sup>

(a) completion of the agricultural cooperative system as the collecting or price-paying agency for farmers;

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<sup>1</sup>Kazushi Ohkawa, "Significant Changes in Japanese Agriculture since 1945," Journal of Farm Economics, December, 1961, p. 1104.

<sup>2</sup>L. I. Hewes, Jr., Journal of Farm Economics, December, 1956, p. 1215.

<sup>3</sup>Tatuo Midoro, "Marketing of Agricultural Products in Japan," Agriculture, Forestry and Fisheries Productivity Conference, Tokyo, 1960, p. 19.

- (b) completion of the inspection system for staple foods (Agricultural Products Inspection Law);
- (c) completion of a statistics and survey system for forecasting demand-supply relationships for farm products;
- (d) completion of the system of Government approved storehouses (Agricultural Storehouse Law);
- (e) monopoly of transportation (by the Nippon Express Company);
- (f) completion of a system for financing agricultural production, for facilitating government's payments to farmers for its purchased staple foods (Food Control Accounts, Finance Ministry, Bank of Japan, Central Cooperative Bank for Agriculture and Forestry, Prefectural Federations of Agricultural Credit Cooperative Associations, Individual Agricultural Cooperative Associations);
- (g) advance of a system for stabilizing prices of agricultural products, and enactment of Sericultural Industry Law, Dairy Farming Promotion Law, Law for Sugar Beet Production Improvement Temporary Measures, Livestock Transaction Law, Central Wholesale Market Law;
- (h) foreign exchange control and price adjustment for balancing the demand-supply.

By means of such various systems and conditions, postwar agricultural marketing appeared on the stage as an organized system.

Before the war, the agricultural marketing system existed



in the form of many isolated and incomplete markets, and prices paid to farmers were established according to the demand-supply conditions at individual markets (in points of time and space) and through market liaison. After the war, however, markets were simplified on a nationwide basis and unified prices came into being. This tendency was accelerated by development of a nationwide monopoly or oligopoly of milk, barley for brewing beer, hemp, tobacco and the like by huge enterprises.

In parallel with such changes in the economic structure, food control regarding rice, wheat and barley brought about great changes in the structure of agricultural marketing and the character of price formulation. The result was creation of great changes regarding the sphere of routes and times of shipping.<sup>1</sup> As to shipping time, there was a tendency for shipping to be concentrated at harvest time with respect to rice, wheat and barley whose prices fluctuate less by seasons because of the market regulations. Table 4 shows the changes in amount of rice marketed by seasons before and after the war. At the same time, the existence of control prices largely eliminated regional differences in price for staple foods. This, without doubt, helped the villages which were far from the consuming area.

Changes in the marketing system referred to above reflect changes in economic structure necessitated by development of a

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<sup>1</sup>Masao Hazama, Problem of Rice Price, Kobundo, Tokyo, December, 1958, p. 294.

Table 4. Changes in amounts of rice marketed by months, before and after the war.

	: Before : :the war :	After the war			
		1947 %	1952 %	1957 %	1959 %
October	6.5	16.0	26.6	38.2	41.9
November	12.1	17.4	39.7	23.3	21.4
December	19.0	34.8	23.7	26.9	19.8
January	13.0	12.5	5.1	1.7	1.1
February	8.2	7.7	2.0	0.7	0.3
March	6.7	1.6	1.4	0.1	0.1
April	6.1	---	0.9	0.1	---
May	5.8	---	---	0.1	---
June	5.2	---	0.9	---	---
July	5.3	---	0.3	---	---
August	6.0	---	---	---	0.2
September	5.8	---	---	8.9	15.2
Total	100.0	100.0	100.0	100.0	100.0

Sources: Tatsuo Midoro, "Marketing of Agricultural Products in Japan," Agriculture, Forestry and Fisheries Productivity Conference, Tokyo, 1960, p. 21.

Yearbook of Food Management, 1959, Food Agency, November, 1960, p. 168.

capitalistic system.<sup>1</sup> The character of market for individual agricultural products is regulated by the way in which a given product is exchanged for capital, and will be definitely affected by the number and scale of enterprise within the market concerned, together with the form of the product. Figure 1 shows the organization for marketing individual agricultural products from such a standpoint. It is arranged in the following order: agricultural products for direct consumption, where no processing

<sup>1</sup> See: William W. Lockwood, The Economic Development of Japan, Growth and Structural Change 1868-1938 (Princeton, New Jersey: Princeton University Press, 1954), ch. 1 and ch. 10.

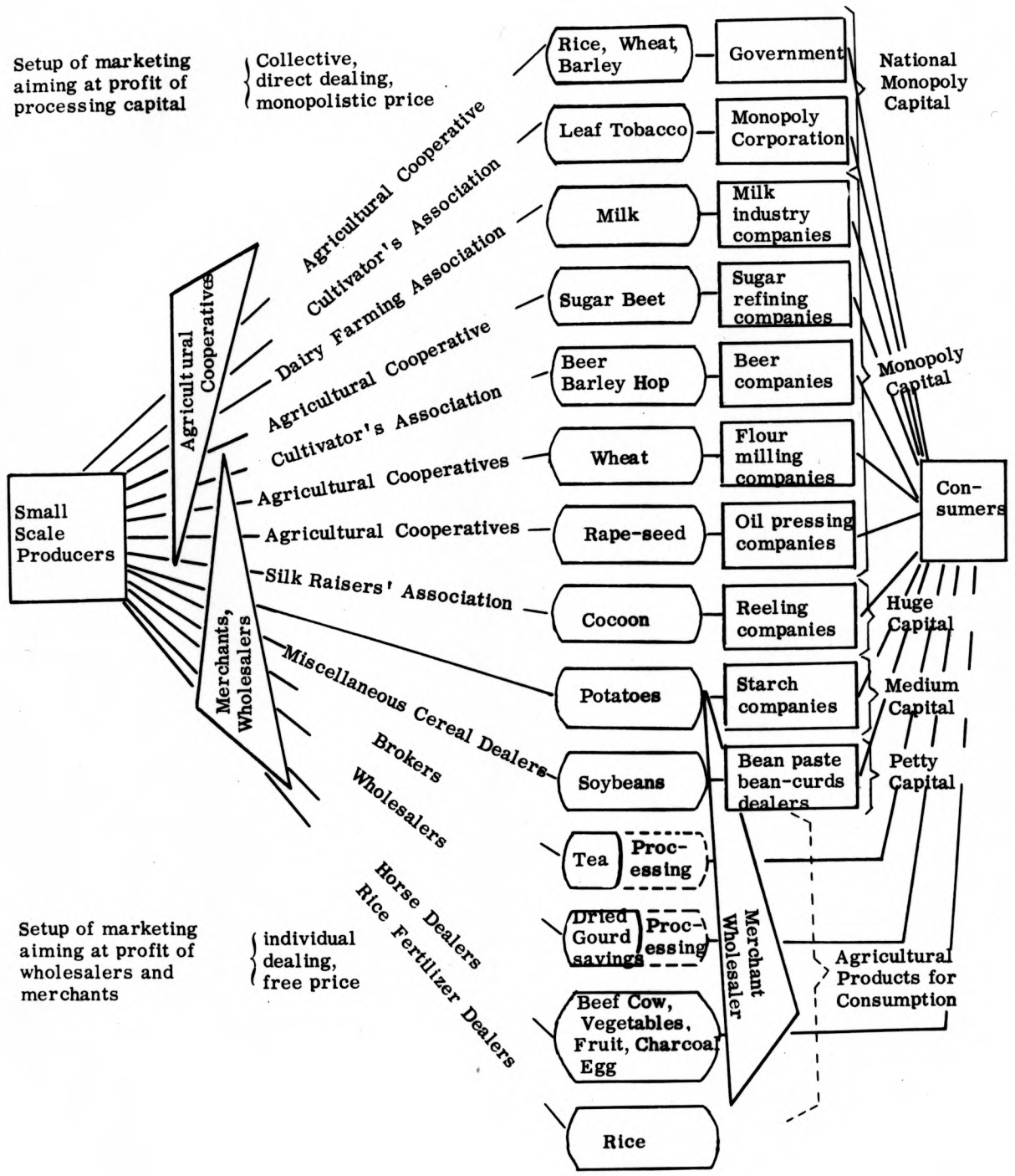


Fig. 1. Marketing channels of agricultural products.

capital intervenes, or those products whose processing remains in the agriculture sector; and those products that are to be processed, in order of the scale of processing capital.

The following tendencies will be noticed in Fig. 1.

(a) While merchants and dealers take charge of marketing products between smaller scale producers and small consumers, there is generally bulk marketing for the products processed in huge enterprises, namely transactions between agricultural co-operative associations and processing companies;

(b) Price formation varies from prices established by free competition at individual markets to monopolistic prices. This tends to make markets more complete, but on the other hand, competition is likely made incomplete.

(c) Nationwide simplification of individual markets will proceed as stated above, and even though distribution expenses will decrease. Farmers' net profit will, however, be reduced due to the existence of monopolistic prices paid to them for their products;

(d) Rice was marketed without government control before the war. However, since the war it has been under the government control system.

#### Price Stabilization for Agricultural Products

In the process of postwar decontrol, regulations concerning marketing of food products which once were under control remain in different forms. The agricultural product price stabilization

system is the most important. Following are the existing price stabilization systems:

Price Policy for Rice, Wheat and Barley, under the Food Control Law. The aim of this system is stabilization of the farm household economy and security of production by grain cultivating farmers. Regarding rice, there is the direct control method of delivery of their products to the Government in advance. The government purchases rice at a fixed price which is determined by parity account. At the same time, a producer is free to sell his wheat at a specified price to a broker. As to rice, the original objective was security of supply through fixed prices under food shortage conditions. Recently, however, this system has begun to include the partial function of price supports. As can be seen in the Table 5, due to lowering of prices of other agricultural products, rice is beginning to occupy a relatively profitable position.

Tobacco under the Monopoly Law. As the manufacture and sale of tobacco in Japan is a government monopoly, the Japan Monopoly Corporation buys all tobacco leaves grown by the farmers, processes them and sells the finished product. The aim of the tobacco monopoly is to provide government revenue. Revenues from the sale of cigarettes and tobacco turned over by the Corporation to the Government account for 8.5 per cent of the state revenue in the general account (1959 fiscal year). On the average, 65 per cent of the retail price of tobacco is tax.<sup>1</sup>

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<sup>1</sup>Tsuneta Yano Memorial Society, Nippon 1959, Kokusei-Sha, Tokyo, 1959, p. 109.



Table 5. Index number of price in rural village, 1951 fiscal year average = 100.<sup>1</sup>

	: 1953 :	1954 :	1955 :	1956 :	1957 :	1958
Agricultural products <sup>2</sup>	123.6	121.4	117.4	114.0	116.6	113.9
Edible farm products	124.4	124.4	120.7	116.3	119.3	117.6
Rice	135.6	133.3	133.9	128.2	133.4	132.5
Wheat	110.9	112.9	112.7	111.5	116.1	113.5
Barley	110.3	109.8	109.6	110.2	113.2	112.3
Miscellaneous cereals and pulses	99.3	116.2	98.3	98.5	94.9	95.2
Potatoes	92.9	111.3	85.6	80.1	90.8	86.2
Vegetables	136.4	143.3	113.5	121.4	127.2	135.6
Fruits	129.2	106.0	133.8	95.4	94.9	86.4
Industrial crops <sup>3</sup>	132.1	127.6	128.0	128.3	108.4	105.7
Livestock products <sup>3</sup>	99.9	100.1	94.7	99.4	96.9	88.5

<sup>1</sup>Calculated from Statistical Yearbook of Ministry of Agriculture and Forestry, 1958, pp. 280, 281, 583, and 584.

<sup>2</sup>This table is based on the result of "Farm Household Economy Survey" and "Survey on Price and Wage in Rural Village" by Statistics and Survey Division, Ministry of Agriculture and Forestry.

<sup>3</sup>Industrial crops include rapeseed and tea, and livestock products include pig for meat, milk and eggs.

Price support for Sweet Potatoes, Irish Potatoes (Including Starch), Soybeans and Rapeseed under the Agricultural Products Price Stabilization Law (1953). Financial measures are adopted from the Food Control Accounts every year, and minimum prices are fixed with the Diet approval. The aim of this law lies in "prevention of prices from falling below normal standards, thereby contributing to stabilization of the farm household economy."<sup>1</sup>

<sup>1</sup>"Agricultural Report," Statistical Institution of Agriculture and Forestry, Tokyo, February, 1962, p. 78.



Stabilization of Cocoon and Raw Silk Prices under the Silk Yarn Price Stabilization Law. The prices of cocoon and raw silk are subject to wide fluctuations, and it is said 80 per cent of the cause of fluctuations are something other than changes in commodity price level. It is recognized that "there is little correlation between prices of silk and the general price level. There are two determinants of raw silk price: one is the business cycle of the United States and the other is the lack of adjustability of supply for raw silk demand."<sup>1</sup> Silk Yarn Stabilization Law was enacted in 1951. The object of this law is to control price fluctuations within a stabilization zone by establishing an upper price limit to promote exports and a lower price limit for stabilization of silk-raising farmers.

Law for Sugar Beet Production Improvement Temporary Measure. This law was enacted in 1953. The objective is to support sugar beet producers and to increase sugar beet production. The Government purchases sugar refined by beet sugar companies at certain fixed prices that are determined by parity indices.<sup>2</sup>

Stabilization of Livestock Price. Livestock production registered the highest rate of growth after World War II among the branches of agriculture. Their annual growth rate is 9 per cent from 1955 to 1960, and their annual growth rate of

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<sup>1</sup>Yasuo, Kondo, Agricultural Policy, Seirin shoin, Tokyo, 1959, p. 356.

<sup>2</sup>"Agricultural Report," Statistical Institution of Agriculture and Forestry, Tokyo, February, 1962, p. 78.

consumption is 9.2 per cent in the same period.<sup>1</sup> The number of cows and the amount of milk produced are more than five times the prewar level. The annual growth rate is more than 10 per cent.

The consumption of milk has been increasing probably due to increased income of individuals after the war.<sup>2</sup> Dairy products other than milk, such as butter and cheese, have increased remarkably. Meat animal production has developed also, and the number of animals butchered increased to more than two times the prewar figure. Poultry production has increased also.<sup>3</sup>

In order to promote the production of livestock, the Livestock Price Stabilization Law was enacted in 1961. The object of this law is to prevent the price from falling below standard price, thereby contributing to stabilization of the farm economy. The Livestock Price Council of the Government decides the standard price each year, and advises the livestock packing houses to pay at least the standard price for beef to farmers.

As agricultural marketing becomes free and less stabilized, the objectives of these price stabilization systems are being expanded. If they are fully mobilized they will cover 70 per

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<sup>1</sup>"Economic Outlook of Agriculture, the Former Period of 1961," Ministry of Agriculture and Forestry, April, 1961, p. 31.

<sup>2</sup>Tsuneta Yano Memorial Society, Nippon 1959, Kokusei-Sha, Tokyo, 1959, p. 84.

<sup>3</sup>Statistical Yearbook of Ministry of Agriculture and Forestry 1958, Statistics and Survey Division Ministry of Agriculture and Forestry, Japan, December, 1959, p. 244.

cent of the market. To a large extent they are fulfilling their respective functions.<sup>1</sup>

Table 6 shows changes in prices of agricultural products on a free market and on a price-supported market. From this table, it is recognized that the latter is more stable. So at the time of deflation in 1957 agricultural villages did not receive as heavy a blow as that inflicted on other branches of the nation's economy.

Table 6. Change in Index Numbers of prices of agricultural products.

	: 1952 :	: 1953 :	: 1954 :	: 1955 :	: 1956 :	: 1957 :	: 1958 : : esti-:1958/ : mated: 57
General agricultural products	105.0	123.6	121.4	117.4	114.0	116.6	114.7 98.4
Rice	113.3	135.6	133.3	133.9	128.2	133.4	132.5 99.3
Price supported agricultural products (other than rice)	108.4	111.1	110.7	104.2	101.7	103.5	102.0 98.6
Non-price-supported agricultural products	94.9	118.8	115.4	107.6	107.2	107.5	98.6 91.7

Source: Tatu Midoro, "Marketing of Agricultural Product in Japan" Agriculture, Forestry and Fisheries Productivity Conference, Tokyo, 1960, p. 22.

<sup>1</sup>Tatu Midoro, "Marketing of Agricultural Products in Japan," Agriculture, Forestry and Fisheries Productivity Conference, Tokyo, 1960, pp. 22-23.

However, as these various farm price stabilization systems were not established systematically under a consistent policy, they present various contradictions. The main problems are as follows:<sup>1</sup>

(a) Measures should be adopted from the broader viewpoint of the national economy and not merely measures for adjusting problems existing in agriculture alone.

(b) Theoretical grounds for selection of objectives and price support standards are weak.

(c) Long-term forecasting of the effects of price supports or stabilization is incomplete.

The financial burden on the Government budget tends to increase and is becoming a problem. As a market for staple foods becomes less stabilized, farmers want their production costs and income to be secured more directly.

#### Marketing System of Wheat

The delivery system of wheat began in 1941, when the conditions of World War II became worse.<sup>2</sup> At that time agricultural production became short of hands as many young farm people went to the War and to the munitions industry. On the other hand, urban population went on increasing. Since rice had to be sent

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<sup>1</sup>Tatuo Midoro, "Marketing of Agricultural Products in Japan," Agriculture, Forestry and Fisheries Productivity Conference, Tokyo, 1960, pp. 22-23.

<sup>2</sup>Yasuo Kondo, Agricultural Policy, (Tokyo: Seirin Shoin, 1959), p. 304.



to overseas soldiers, the supply of rice and wheat became very short. If the government had not interfered, the economy would have broken with the rise in price of wheat and rice, so it became necessary to control the supply of rice and wheat.

Under this controlled system producers delivered their wheat to the government at a fixed price that was decided by the government, and the consumer received distribution of wheat and rice at a fixed price. After the end of the World War II, this system was continued because of the shortage of food.

But a few years after the War, the food situation took a favorable turn and it became needless to control wheat production and supply. So in 1952, the government control for wheat changed from direct to indirect. For rice, direct control is still carried out.

The mechanism of indirect control is as follows: The government holds the whole amount of imported wheat, and purchases indigenous wheat at a fixed price which is determined by parity account, and aims to establish minimum prices for producers to stimulate production and maximum prices for consumers to stabilize the household economy. In addition to the government purchase there is wheat which flows through commercial channels. But under the dual price system, the amounts of this sort are of special varieties and little enough to supplement the amounts sold by the government.

From 1952 onward, foreign wheat was cheaper than the domestic counterparts and imports increased. At present the

government sale price for home-grown wheat is lower than purchase prices, and the government purchase price is higher than market price, so domestic wheat sold to the government amounts to as much as 90 per cent of the total quantity that reaches consumers. In 1952 the amounts sold to the government were 45.9 per cent of the wheat marketed, in 1955 the amounts sold to the government were 84 per cent of the wheat marketed, and in 1957 nearly 93 per cent was sold to the government. (Table 7)

Table 7. Proportion of the government purchases to total sales, 1952-1957.

	: : Production : (1)	: Marketed : amount : (2)	: Government : purchased : amount (3)	: : (2)/(1) : %	: : (3)/(2) : %
	1,000 metric tons				
1952	1,537	761	349	49.5	45.9
1953	1,374	654	379	47.6	58.0
1954	1,516	701	535	46.3	76.3
1955	1,468	695	586	47.3	84.3
1956	1,375	654	535	47.5	81.8
1957	1,330	538	536	43.4	92.7

Source: "Recent Trend of Industrial Fluctuation and Market for Agricultural Products," p. 48.

The marketing channels of wheat is shown in Fig. 2.

In the first place, collectors who are designated by the government to collect threshed wheat from the producer. There are two kinds of collectors designated by the government. One is the agricultural cooperative association and the other is the



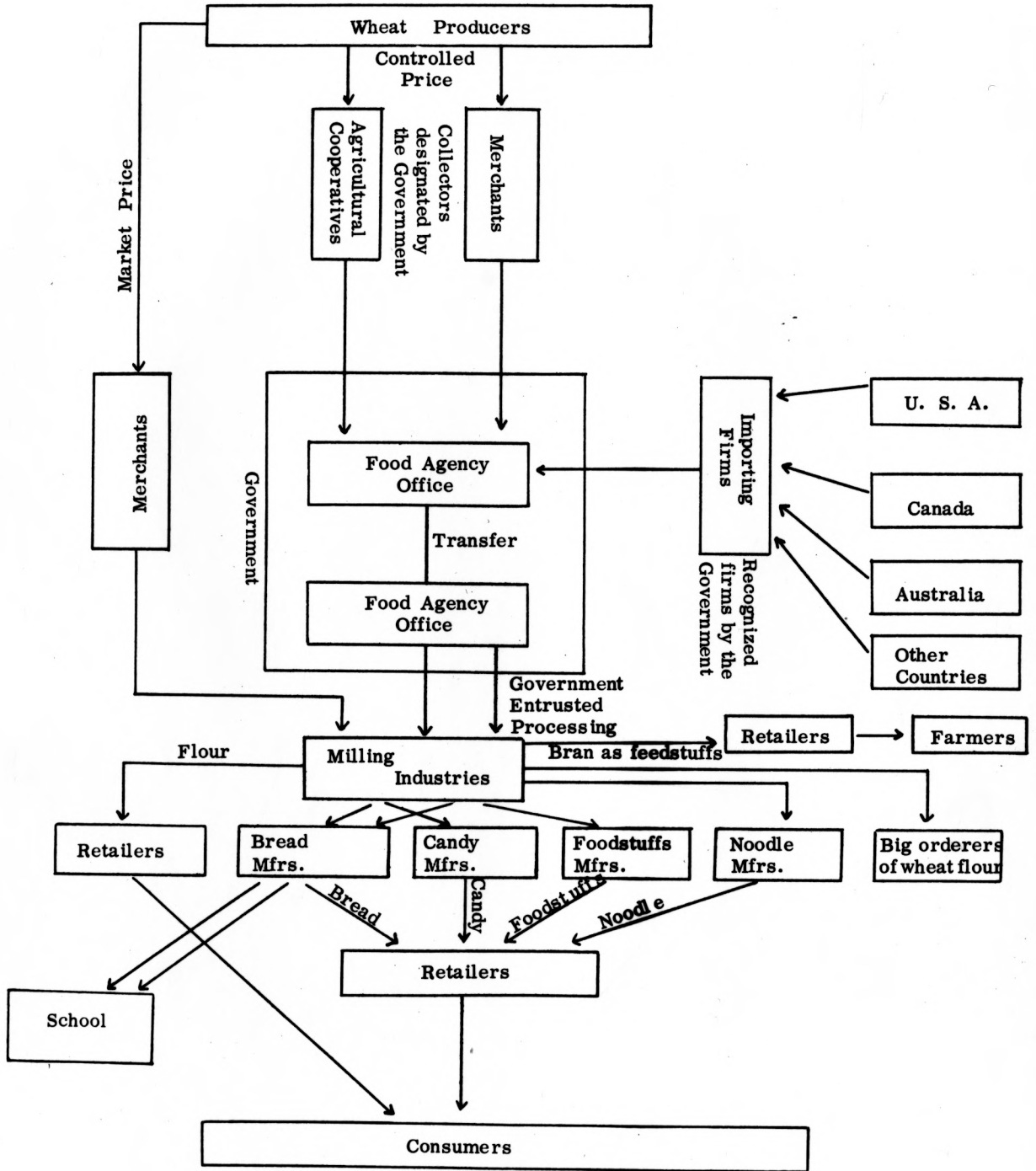


Fig. 2. The marketing channels of wheat.

merchant. After collection, the inspector of Food Agency, Ministry of Agriculture and Forestry examines the quality of the wheat and grades it. After grading, this wheat is stored in storehouses. At the same time, wheat is coming from abroad (U. S. A., Canada, Australia, and other countries) through trading companies chosen by the government.

Both imported and indigenous wheat is stored for a while, and according to the government shipment order, is sold to the milling industry. Milling industries, at the same time, purchase the wheat from the producer through merchants at a market price. After being ground, the flour is sold, at wholesale, to various processing industries and to retailers of flour. The flour is made into various products such as bread, noodles, candy, and foodstuffs, and sold wholesale to the retailer.

Wheat reaches the consumer through these processes. These stages will be discussed more detail.

Collection of wheat. Producers sell their wheat to the government, but collectors who are designated by the government to conduct the business for the government; the collectors receive the payment from the government. There are two kinds of collectors; one is the agricultural cooperative association, and the other one is the merchant. About 12,300 agricultural cooperatives and 2,300 merchants are designated by the government.<sup>1</sup> Table 8 shows the amount of wheat purchased by the agricultural

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<sup>1</sup>Ryoichiro Taguchi, Rice (Tokyo: Nihon Keizai Newspaper Co., 1960), p. 120.

Table 8. Government purchasing amount of wheat by collectors distinction, 1956-1959.

	: Agricultural coop. :		Merchant		Total
	: association :		:		:
	Metric tons	%	Metric tons	%	Metric tons
1956	442,281.0	82.8	92,365.6	17.2	534,646.6
1957	433,820.5	81.0	101,569.6	19.0	535,390.1
1958	472,085.4	81.8	105,107.4	18.2	577,192.8
1959	541,429.1	82.6	113,893.1	17.4	655,322.2

Sources: Statistical Yearbook of Food Management, Japan, 1958, p. 182.

Statistical Yearbook of Food Management, Japan, 1959, p. 199.

cooperative associations and merchants. In 1958, agricultural cooperative associations handled 472,080 tons and merchants handled 105,110 tons; so agricultural cooperative associations controlled about 82 per cent of the total compared with 18 per cent by merchants.

The wheat which is sold to collectors is inspected by an inspector of Food Agency of the Ministry of Agriculture and Forestry. After grading, the wheat is stored in storehouses until the shipment directed by the Food Agency.

At the same time, the government is purchasing wheat from abroad through recognized trading companies, and these receive a payment from the government. Thirty firms are recognized by the government. Those companies are selected by their experience of wheat trading and ability to meet capital requirement of

\$300,000.<sup>1</sup> This wheat is also stored until the shipment direction.

Milling Industry. Millers purchase wheat from the government at the fixed price and from merchants at market price. But as Table 9 shows, about 80 per cent of the processing wheat is imported wheat.

Table 9. Amount of wheat processed, 1952-1959.

	: Domestic wheat		: Imported wheat		: Total amount : processed : (tons)
	: amount : (tons)	: %	: amount : (tons)	: %	
1952	564,033	29.9	1,325,462	70.1	1,889,495
1953	778,182	30.6	1,763,040	69.4	2,541,222
1954	551,950	20.6	2,125,574	79.4	2,677,524
1955	687,628	24.9	2,075,994	75.1	2,763,622
1956	603,075	22.9	2,034,680	77.1	2,637,755
1957	574,556	20.9	2,178,201	79.1	2,752,757
1958	620,867	22.5	2,136,983	77.5	2,757,854
1959	759,871	26.5	2,104,907	73.5	2,864,778

Source: Statistical Yearbook of Food Management, Japan, 1959, p. 293.

Next consider the present situation and character of the milling industry. As Table 10 shows, in 1957 there were 748 milling factories in Japan, but 45 per cent of the production capacity was concentrated in 50 factories. That is, only 6.7

<sup>1</sup>Ryoichiro Taguchi, Rice (Tokyo: Nihon Keizai Newspaper Co., 1960), p. 183.

Table 10. Number of milling factories by scale distinction, 1957.

Scale	Factories		Production capacity per day	
	number	%	number (tons)	%
Above 100 tons	50	6.7	10,948	45.5
50 - 100	49	6.6	3,297	13.6
20 - 50	218	29.1	6,861	28.2
10 - 20	114	15.2	1,669	6.9
Below 10	317	42.4	1,511	6.2
Total	748	100.0	24,286	100.0

Source: Recent Trend of Industrial Fluctuation and Market for Agricultural Products, Economic Bureau, Ministry of Agriculture and Forestry, Japan, 1958, p. 162.

per cent of the total factories. That is to say, the leading positions of production were held by a big few companies. Only 6.7 per cent of the total factories control 45 per cent of the whole output, and 42 per cent of the factories supply only 6.2 per cent of the output. This monopolistic trend advanced rapidly during the first few years after the repeal of direct control, as can be seen by Table 11. In 1952, there were 3,194 factories, but it decreased to 744 in 1957; that is a 76 per cent decrease from 1952.

Processing Industry. Table 12 shows the quantity of wheat flour wholesaled from July, 1958 to June, 1959 according to their uses. According to this table, about 39 per cent of whole flour was purchased by noodle manufacturers and 25.3 per cent was purchased by bread manufacturers. Both of them make 64.2 per cent



Table 11. Changes in number of milling factories, 1952-1957.

	: Number of : factories	: :	Index
March 1, 1952	3,094		100.0
March 1, 1953	1,925		62.2
April 25, 1954	1,304		42.1
February 20, 1955	1,255		40.6
July 1, 1956	1,054		34.1
July 1, 1957	748		24.2
September 1, 1957	744		24.0

Source: Recent Trend of Industrial Fluctuation and Market for Agricultural Products, 1958, p. 161.

Table 12. Quantity of wheat flour wholesaled, July, 1958 - June, 1959.

	: Metric tons	: Per cent
Flour retailer	212,282	13.18
Bread manufacturer	407,976	25.34
Noodle manufacturer	625,311	38.84
Candy manufacturer	188,516	11.72
Foodstuffs manufacturer	64,874	4.03
Others	110,918	6.84
Total quantity wholesaled	1,609,877	100.0

Source: Calculated from Statistical Yearbook of Food Management, 1958, p. 258.

of the whole amount of wholesaled flour.

The Japanese processing industry is characterized by their

many minor enterprises. At present there are about 110,000 or more processing factories, but about 70 per cent of the factories employ less than five laborers each, and 25 per cent of the factories employ from five to twenty laborers each.<sup>1</sup>

#### THE MOVEMENT OF GRAIN CONSUMPTION

##### Changes in Production and Planted Area of Rice, Wheat, Barley and Naked Barley

Before analyzing the movement of wheat consumption, it is important to make clear the situation of production of rice, wheat, barley and naked barley that are the principal cereals produced in Japan.

The change in production and planted area of those cereals from 1935 to 1960 is shown in Tables 13 through 15. The planted areas of paddy rice has increased slightly. In 1935 the planted area of paddy rice had been 3,043,700 hectares, however, it had decreased gradually and in 1946 the planted area was 2,719,400 hectares. After 1946 the planted area increased again, and in 1960 the figures show 3,124,000 hectares, 3 per cent over that of 1935.

The planted area of upland rice has increased. In 1935 it was 133,900 hectares but by 1960, it became 184,100 hectares. As a whole, the planted area of rice has increased from 3,177,600 hectares in 1935 to 3,308,100 in 1960, a 4.1 per cent increase.

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<sup>1</sup>Society for a Study of National Economy, Japanese Food (Tokyo: Toyo Keizai Shinposha, 1959), pp. 137-138.



Table 14. Changes in production, 1935-36 to 1960-61.

Year	Rice			Wheat and barley			
	Paddy rice	Upland rice	Total	Wheat	Barley	Naked barley	Total
1,000 metric tons							
1935-36	8,413.8	204.7	8,618.5	1,321.6	792.6	918.0	3,032.2
1936-37	9,833.8	265.1	10,100.9	1,226.6	691.1	810.0	2,727.7
1937-38	9,765.7	182.3	9,948.0	1,368.2	748.1	827.0	2,943.3
1938-39	9,628.4	251.9	9,880.3	1,228.0	687.9	709.6	2,625.5
1939-40	10,052.3	299.4	10,351.7	1,658.1	844.3	933.9	3,436.3
1940-41	8,955.5	175.6	9,131.1	1,792.2	817.7	869.5	3,479.4
1941-42	8,111.1	152.2	8,263.3	1,459.8	706.8	937.0	3,103.6
1942-43	9,859.4	157.0	10,016.4	1,384.4	733.6	919.2	3,037.2
1943-44	9,273.3	159.7	9,433.0	1,093.7	572.7	732.7	2,399.1
1944-45	8,665.7	118.1	8,783.8	1,384.0	781.0	912.6	3,077.6
1945-46	5,823.3	49.1	5,872.4	943.3	535.3	720.4	2,199.0
1946-47	9,124.4	83.5	9,207.9	615.4	417.2	450.8	1,483.4
1947-48	8,745.8	52.1	8,797.9	766.5	514.6	642.2	1,923.3
1948-49	9,792.2	173.7	9,965.9	1,206.9	845.0	972.8	3,024.7
1949-50	9,242.5	140.5	9,383.0	1,304.2	954.4	1,041.2	3,299.8
1950-51	9,412.5	238.4	9,650.9	1,338.3	896.8	1,063.4	3,298.5
1951-52	8,887.8	153.8	9,041.6	1,489.9	1,057.7	1,111.0	3,658.6
1952-53	9,675.8	247.0	9,922.8	1,537.3	1,078.0	1,080.1	3,695.4
1953-54	8,038.0	200.5	8,238.5	1,374.1	1,098.8	992.1	3,465.0
1954-55	8,895.3	218.0	9,113.3	1,515.8	1,260.7	1,321.6	4,098.1
1955-56	12,073.2	311.6	12,384.8	1,467.7	1,147.6	1,259.9	3,875.2
1956-57	10,646.5	252.2	10,898.7	1,375.2	1,132.4	1,208.1	3,715.7
1957-58	11,188.2	276.1	11,464.3	1,330.0	1,128.8	1,031.4	3,490.2
1958-59	11,689.0	304.0	11,993.0	1,281.0	1,132.0	934.6	3,347.6
1959-60	12,158.0	343.1	12,501.1	1,416.0	1,241.0	1,067.0	3,724.0
1960-61	12,539.0	319.9	12,858.9	1,531.0	1,206.0	1,095.0	3,832.0

Source: Calculated from Statistical Yearbook of Food Management, 1959, pp. 2, 8, 12, and 16.



Table 15. Changes in yields per hectare, 1935-36 to 1960-61.

Year	Rice		Wheat and barley		
	Paddy rice	Upland rice	Wheat	Barley	Naked barley
Kilograms per hectare					
1935-36	2,764.3	1,528.8	2,007.0	2,336.7	2,103.6
1936-37	3,233.0	1,909.9	1,795.1	2,043.5	1,856.1
1937-38	3,207.6	1,241.8	1,902.9	2,285.7	1,943.6
1938-39	3,159.3	1,727.7	1,707.9	1,937.8	1,724.0
1939-40	3,333.1	1,986.7	2,241.3	2,404.7	2,296.9
1940-41	2,981.2	1,188.1	2,148.7	2,417.8	2,164.6
1941-42	2,693.9	1,051.1	1,782.0	1,991.0	2,010.3
1942-43	3,285.4	1,146.8	1,617.5	1,868.1	1,820.9
1943-44	3,125.2	1,365.0	1,361.5	1,507.9	1,523.3
1944-45	3,038.3	1,145.5	1,667.3	1,844.2	1,811.4
1945-46	2,081.5	687.7	1,302.9	1,335.9	1,510.3
1946-47	3,355.3	1,357.7	974.2	1,134.0	1,012.4
1947-48	3,111.7	719.6	1,325.7	1,517.1	1,545.6
1948-49	3,416.6	1,904.6	1,624.8	1,884.9	1,813.2
1949-50	3,214.6	1,253.4	1,714.5	2,167.6	1,841.9
1950-51	3,271.6	1,780.4	1,752.6	2,088.5	1,799.0
1951-52	3,089.3	1,106.5	2,027.4	2,515.3	1,989.6
1952-53	3,369.0	1,791.2	2,134.8	2,644.8	2,066.8
1953-54	2,804.5	1,347.5	2,002.2	2,716.0	1,920.1
1954-55	3,080.2	1,332.5	2,254.3	2,824.8	2,329.6
1955-56	3,965.5	1,755.5	2,212.1	2,647.9	2,240.6
1956-57	3,479.8	1,374.4	2,091.6	2,661.3	2,171.3
1957-58	3,639.1	1,687.7	2,152.5	2,716.7	1,992.3
1958-59	3,795.9	1,751.2	2,138.6	2,692.0	1,877.1
1959-60	3,915.5	1,880.0	2,355.3	2,944.3	2,264.9
1960-61	4,013.8	1,737.6	2,543.2	3,000.0	2,511.5

Source: Calculated from Statistical Yearbook of Food Management, 1959, pp. 2, 8, 12, and 16.

1 hectare = 107,639.2 square feet (U. S.)

1 hectare = 2.471 acre

was 591,100 hectares at that time, but it decreased after that and in 1960 it dropped to the same level as in 1935.

Production of those grains has increased since 1935. The production of paddy rice was 8,413,800 tons in 1935 but in 1960 it was 12,539,000 tons. The production of upland rice was 204,700 tons in 1935 but it became 319,900 tons in 1960. As a



whole, rice production has increased 49.2 per cent over the 1935 level.

Wheat production has increased in spite of decreased planted areas. This increase in production, because of the increased yield per hectare is due to the development of agricultural techniques such as plant breeding, agricultural chemicals and chemical manure. As shown in Table 14, the production of wheat was 1,321,600 tons in 1935, but it increased to 1,531,000 tons in 1960, a 16 per cent increase over 1935 production.

The yield hectare of rice, wheat, barley, and naked barley has increased very much. The yield per hectare of paddy rice was 2,764.3 kilograms in 1935 but it became 4,013.8 kilograms in 1960, which is 45 per cent over the 1935 figure. The yield of upland rice has increased from 1,528.8 kilograms per hectare in 1935 to 1,737.6 kilograms in 1960.

Yield, per hectare of wheat has increased from 2,007.0 kilograms to 2,543.2 kilograms during the same period, a 27 per cent increase from 1935 figure.

Over the same period, the yield per hectare of barley has increased from 2,336.7 kilograms to 3,000.0 kilograms which is 28 per cent increase. The yield per hectare of naked barley has increased from 2,103.6 kilograms to 2,511.5 kilograms, which is 19 per cent increase.

Up to now we have looked the situation of production of grains in Japan. As a summary, both planted area and yield of rice has increased; planted areas of wheat has decreased, however,

yields and production have increased; for barley, both planted areas and yields have increased; and for naked barley, planted area has decreased, and yields have increased.

#### Changes in Import of Wheat

The change in imports into Japan is shown in Table 16. In 1946, Japan imported only 594,330 tons of wheat, but it increased to 2,628,161 tons in 1960; this was a 440 per cent increase. The imports were 2,132,161 tons for food wheat and 496,000 tons for feed wheat for animals.

Table 16. Import of wheat, 1934-36 to 1960.

Year	Food wheat	Feed wheat	Total
Metric tons			
1934-36	385	-	385
1946	594,330	-	594,330
1947	950,948	-	950,948
1948	810,843	-	810,843
1949	2,048,341	-	2,048,341
1950	1,459,273	-	1,459,273
1951	1,530,077	-	1,530,077
1952	1,595,506	-	1,595,506
1953	1,796,703	97,779	1,894,482
1954	2,039,850	96,440	2,136,290
1955	2,175,863	60,196	2,236,059
1956	2,187,865	28,265	2,216,130
1957	2,200,844	171,137	2,371,981
1958	2,096,483	170,004	2,266,487
1959	2,168,121	357,553	2,525,674
1960	2,132,161	486,000	2,628,161

Source: Statistical Yearbook of Food Management, p. 204; "Present Condition of Imported Agricultural Products," p. 56; "Marketing of Agricultural Products Under Growing Economy," p. 267.

As to food wheat import (Table 17) in 1960, 976,000 tons out of 2,132,161 tons came from the United States; that is 154,550 tons larger than that of the previous year. A total of 1,029,100 tons came from Canada, 41,373 tons less than that of the previous year; 63,000 tons came from Australia, 190,017 tons less than that of the previous year; 54,000 tons from U. S. S. R.; 30,819 tons larger than that of the previous year.

The degree of dependence upon imported wheat is 63.2 per cent in 1960 as can be seen in Table 18.

The proportion of imported wheat of total government purchase has been decreasing as can be seen in Table 19. According to the table, 82.2 per cent of the government handled wheat was imported wheat in 1952, but in 1960 it decreased to 73.4 per cent.

Indigenous wheat is soft wheat, and mainly used for noodle and cake. Consequently, the increase of indigenous wheat production in 1959 and 1960 led to the decrease of imported amounts of soft wheat that were used for noodle and cake as can be seen in Table 20.

From 1955 to 1958, Japan imported about 1,000,000 tons of soft wheat annually, but in 1959 it was only 817,099 tons and in 1960 it was 809,000 tons.

Once semi-hard wheat was used as a substitute for hard wheat. So Japan was importing a considerable quantity of semi-hard wheat. But with the change in consumer's preferences, semi-hard wheat has been replaced by hard wheat. In 1955, it was

Table 17. Japan imports of wheat (food & feed), fiscal year April 1 to March 31, 1952 to 1960.

Year	United States			Canada		
	Food	Feed	Total	Food	Feed	Total
	Metric tons					
1952	1,136,438	---	1,136,438	407,481	---	407,481
1953	---	---	963,521	---	---	826,860
1954	---	---	1,147,278	---	---	738,349
1955	1,126,508	9,456	1,135,964	752,523	9,713	762,236
1956	1,114,799	---	1,114,799	911,067	---	911,067
1957	1,221,109	---	1,221,109	829,095	171,137	1,000,232
1958	1,112,415	---	1,112,415	859,920	169,699	1,029,619
1959	821,450	---	821,450	1,070,473	179,247	1,249,720
1960	976,000	---	976,000	1,029,100	277,000	1,306,000

Year	Australia			Others		
	Food	Feed	Total	Food	Feed	Total
	Metric tons					
1952	49,953	---	49,953	1,634	---	1,634
1953	---	---	18,321	---	---	85,780
1954	---	---	18,375	---	---	231,830
1955	234,056	41,027	275,083	62,776	---	62,776
1956	120,270	28,265	148,535	41,729	---	41,729
1957	150,640	---	150,640	---	---	---
1958	121,527	305	121,832	2,621	---	2,621
1959	253,017	178,306	431,323	23,181	---	23,181
1960	63,000	208,000	270,000	54,000	---	54,000

Sources: "Recent Trend of Industrial Fluctuation and Market for Agricultural Products," p. 107.

Statistical Yearbook of Food Management, 1959, pp. 204-205.

Present Condition of Imported Agricultural Products, pp. 58-59.

Table 18. Degree of dependence upon imported wheat, 1934-36 to 1960.

Year	Production (1)	Imported amount (2)	Total (1)+(2)	Percentage (2)/(1)+(2)
	1,000 metric tons			%
1934-36	1,280	385	1,665	23.1
1950	1,338	1,459	2,798	52.5
1951	1,490	1,530	3,020	50.7
1952	1,537	1,596	3,133	50.9
1953	1,374	1,894	3,269	58.0
1954	1,516	2,136	3,652	58.5
1955	1,468	2,236	3,604	60.4
1956	1,375	2,216	3,591	61.7
1957	1,330	2,372	3,702	64.1
1958	1,281	2,267	3,548	63.9
1959	1,416	2,526	3,942	64.1
1960	1,531	2,628	4,159	63.2

Sources: Calculated from "Recent Trend of Industrial Fluctuation and Market for Agricultural Products," p. 48.  
Statistical Yearbook of Food Management, p. 204.

Table 19. Proportion of imported wheat of total Government purchase, 1952-1960.

Year	Indigenous (1)	Imported (2)	Total (1)+(2)	Percentage imported (2)/(1)+(2)
	1,000 metric tons			%
1952	349	1,611	1,960	82.8
1953	379	1,796	2,175	82.6
1954	536	2,040	2,576	79.2
1955	586	2,178	2,764	78.8
1956	535	2,188	2,723	80.4
1957	536	2,200	2,736	80.4
1958	574	2,087	2,661	78.4
1959	655	2,159	2,814	76.7
1960	768	2,122	2,890	73.4

Sources: Calculated from Recent Trend of Industrial Fluctuation and Market for Agricultural Products, p. 48  
 "Economic Outlook of Agriculture, the Former Period of 1961," p. 60.



Table 20. Import of wheat for food by variety distinction, 1955-1960.

Country:	Variety <sup>1</sup> :	1955	1956	1957	1958	1959	1960
Metric tons							
United States	S	1,038,740	930,426	883,708	895,249	614,117	756,000
	S.H	87,768	184,373	237,282	182,633	134,201	194,000
	H	---	---	100,119	34,533	73,132	26,000
	Total	<u>1,126,508</u>	<u>1,114,799</u>	<u>1,221,109</u>	<u>1,112,415</u>	<u>821,450</u>	<u>976,000</u>
Canada	H	752,523	911,067	829,095	859,920	1,070,473	1,029,000
Australia	S	---	---	150,640	109,802	202,982	53,000
	S.H	234,056	120,270	---	11,725	50,035	10,000
	Total	<u>234,056</u>	<u>120,270</u>	<u>150,640</u>	<u>121,527</u>	<u>253,017</u>	<u>63,000</u>
Argentina	S.H	62,776	41,729	---	---	---	---
Italy	S	---	---	---	521	---	---
U.S.S.R.	S.H	---	---	---	2,100	23,181	54,000
Total	S	1,038,740	930,426	1,034,348	1,005,572	817,099	809,000
	S.H	384,600	346,372	237,282	196,458	207,417	258,000
	H	752,523	911,067	929,214	894,453	1,143,605	1,055,000
	Total	<u>2,175,863</u>	<u>2,187,865</u>	<u>2,200,844</u>	<u>2,096,483</u>	<u>2,168,121</u>	<u>2,122,000</u>

<sup>1</sup>Varieties are designated by the following code: (1) U. S. A., S---Western-White and Soft-White; S.H---Hard-Winter and Dark-Hard-Winter; H---Dark-Northern-Spring. (2) Canada, H---Red-Spring-Wheat No. 2, No. 3, and No. 4. (3) Australia, S---Western-Australia, Victorian, South-Australia, and New-South-Wales; S.H---Queensland, and New-South-Wales.

Sources: Statistical Yearbook of Food Management, 1959, p. 205.  
 "Present Condition of Imported Agricultural Products," p. 58.

384,600 tons and it was the highest year after the War.<sup>1</sup> In 1959, it was 207,417 tons and 258,000 tons in 1960.

The demand for hard wheat goes on increasing because of the impossibility to substitute for it by indigenous wheat. Recently people's preferences for noodle having high mixed ratio of hard wheat is increasing, and so imports are increasing for hard wheat. It was 752,523 tons in 1955, 911,067 tons in 1956, 1,143,605 tons in 1959, and 1,055,000 tons in 1960.

As to the imports of feed wheat for animals, the increase of milch cows and milk production are among the branches of agriculture that registered the highest rate of growth after World War II. The number of cows and the amount of milk produced are more than five times the prewar level.<sup>2</sup> Their annual growth rate is 15 per cent and the present milk production amounts to 1,939,000 tons (1960 figure).<sup>3</sup> Also meat production such as hog and poultry is developing very rapidly. Accordingly the demand for feed wheat is increasing. In 1958, the import of feed wheat was 170,004 tons; in 1959, it was 357,553 tons, increased by 110 per cent over 1958; and in 1960, 485,000 tons of feed wheat was imported of which 277,000 tons came from Australia

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<sup>1</sup>Present Condition of Imported Agricultural Products, p. 62.

<sup>2</sup>"Marketing of Agricultural Products in Japan," p. 45, and Marketing of Agricultural Products under Growing Economy, p. 143.

<sup>3</sup>Japan Statistics and Survey Division, Ministry of Agriculture and Forestry, Marketing of Agricultural Products Under Growing Economy (Tokyo: Statistical Institution of Agriculture and Forestry, 1961), p. 143.

and 208,000 tons from Canada. About 20 per cent of the feed wheat imported was used directly as feed, and the rest of it (about 80 per cent) was milled into flour and brans by milling firms. Of the 388,000 tons that is milled, about 40 per cent is a wheat flour used for food in human consumption. This flour is of low quality used in blending. The remaining 60 per cent of the feed wheat milled was used as bran for feeding animals.<sup>1</sup> So an increase in import of feed wheat for animals means a decrease in import of food wheat to some extent.

#### Changes in Price of Grain

Table 21 shows the price comparisons between the government purchase of domestic wheat and imported wheat, the government wholesale prices of domestic wheat, imported wheat and the free market price. From 1955 onward, the government purchase price of domestic wheat became higher than the government wholesale price of domestic wheat.

In 1960, the government purchase price of domestic wheat was \$6.29, although the government wholesale price of domestic wheat was \$5.62. The Government is losing money on domestic wheat. This situation made it possible for dealers to make a profit by selling the government wholesale wheat to the government again. In order to prevent this surge back, the government designated the period of purchasing wheat through a collector

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<sup>1</sup>Japan Trade Promotion Association. Present Condition of Imported Agricultural Products (Tokyo: Japan Trade Promotion Association, 1961), p. 62.

Table 21. Government purchase and wholesale price of domestic wheat and imported wheat.

	: 1952	: 1953	: 1954	: 1955	: 1956	: 1957	: 1958	: 1959	: 1960
	¢ per 60 kilograms								
Government purchase domestic wheat (1)	\$5.58	\$5.70	\$5.97	\$5.94	\$5.87	\$6.13	\$6.13	\$6.13	\$6.29
Government wholesale domestic wheat (2)	5.80	5.80	6.03	5.93	5.76	5.71	5.71	5.62	5.62
Margin (2) - (1)	+0.22	+0.10	+0.06	-0.01	-0.11	-0.42	-0.42	-0.51	-0.67
Market price (3)	5.61	5.67	5.92	5.87	5.74	5.88	5.68	5.53	5.46
Margin (3) - (1)	+0.03	-0.03	-0.05	-0.07	-0.13	-0.25	-0.45	-0.60	-0.83
Government purchase imported wheat U.S.A. <sup>1</sup>	6.11	4.65	4.49	4.22	4.22	4.37	3.98	3.80	3.76
Canada <sup>2</sup>	6.48	5.00	4.38	4.59	4.68	4.41	4.23	4.26	4.15
Government wholesale price of imported wheat	6.36	6.21	6.21	6.12	6.20	6.30	6.26	6.26	6.28

<sup>1</sup>Western-White No. 1, No. 2.

<sup>2</sup>Manitoba No. 2, No. 3.

Sources: Calculated from Recent Trend of Industrial Fluctuation and Market for Agricultural Products, pp. 34, 50, 188, and Marketing of Agricultural Products under Growing Economy, pp. 49, 268, and 269.

until September of a year and the wholesale of wheat from October of the year.

As to imported wheat, the government purchase price of imported wheat for 1952 was \$6.11 for the U. S. wheat and \$6.48 for Canadian wheat. At that time, imported wheat was more expensive than domestic wheat. But since then the price of imported wheat became lower. In 1960, the government purchase price of domestic wheat was \$6.29 per 60 kilograms and imported price was \$3.76 for the U. S. wheat and \$4.15 for Canadian wheat. So the U. S. wheat is \$2.53 and the Canadian wheat is \$2.14 cheaper than the domestic wheat. If quality is taken into consideration the price margin between imported wheat and domestic wheat becomes larger. On the other hand, the government wholesale price of imported wheat has been staying around \$6.30 since 1952, in spite of the reduced purchase price. In 1960, the government wholesale price of imported wheat was \$6.28 per 60 kilograms, while the government purchase price of imported wheat was \$3.76 for the U. S. wheat and \$4.15 for Canadian wheat, as has been seen. This is to say, the government is making large money from the dealings in imported wheat.

Table 22 shows the government purchase and wholesale price of rice. According to this table, the government purchase price was \$10.84 and wholesale price was \$12.09 in 1960. However, handling cost of rice such as collection fees, storage costs, freight, management costs and interest costs about \$1.71 per



Table 22. Government purchase and wholesale price of rice, 1952-1960.

	: Government : purchase price \$ per 60 kilograms	: Government : wholesale price
1952	\$8.33	\$9.00
1953	9.40	9.91
1954	10.29	11.16
1955	10.83	11.16
1956	10.52	11.16
1957	10.83	11.19
1958	10.78	12.04
1959	10.79	11.19
1960	10.84	12.09

Source: Calculated from Statistical Yearbook of Food Management, 1959, pp. 26, 27, 29, 30, and 31.

60 kilograms,<sup>1</sup> therefore the government is losing money from its dealings in rice.

According to the balance sheets of the Food Agency in the Ministry of Agriculture and Forestry for the year 1957, the purchase and selling of domestic rice showed a loss of \$78,000,000, dealings in imported rice showed a loss of \$3,900,000, dealings in domestic wheat showed a loss of \$24,722,222 and other agricultural products, such as starch, showed a loss of \$2,200,000. On the other hand, the government

<sup>1</sup>Nobuo Danno, Agriculture and Policy, Yuwanami Shinsho, Tokyo, 1958, p. 122.

made a profit of \$38,055,555 from the dealing in imported wheat.<sup>1</sup> Over all, we could say the government is supplying rice to consumers at a low price, while supplying wheat at a very much higher price than should be. This is a serious obstacle to an increased consumption of wheat products.

#### Changes in Grain Consumption (Macro Analysis)

At the stage of low productivity of provisions, the first consideration is to secure enough food to satisfy one's hunger rather than to consider the nature of food such as the nutritive value, problem of digestion, and taste.

As the productivity increases, however, selection of the variety of food became a consideration and varied consumption of food based upon nutritive value, digestion, and taste became possible.

When one looks at the development of food productivity, one is able to define two stages.<sup>2</sup> The first stage was the development of agricultural productivity as evidenced by improvement of livestock and plant breeding, improvement of fertilizer and foodstuffs, development of insect and disease controls, and the development of improved crop and livestock production techniques.

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<sup>1</sup>Nobuo Danno, Agriculture and Policy, Yuwanami Shinsho, Tokyo, 1958, p. 114.

<sup>2</sup>Society for a Study of National Economy. Japanese Food. Tokyo: Toyo Keizai Shinposha, 1959, p. 4.

The second stage of the development of food productivity was the development of the processing industry that changed agricultural products into highly commercialized products. Raw agricultural products were changed into nutritious, tasty, and digestible foods that could be transported long distances.

Development in both of these stages was made possible by the improvement of scientific methods and techniques.

Ninety years has passed since Japan became a capitalistic society.<sup>1</sup> Its economic development delayed almost one century by the time Japan started to become a capitalistic society. At that time the United States and the advanced nations in Europe had entered into the second stage of development. Many of the scientific techniques for the development of agricultural productivity were discovered and applied already. It was not difficult for Japan to gain upon the other developed countries since the improved techniques were imported into Japan. Since then, Japan has made rapid progress in many areas. However, the question arises, "Has Japan approached the other developed countries with regard to food consumption?"

The Food and Agricultural Organization Production Yearbook contains data on the per capita consumption of food per year for major countries in the world. The United States of America, the United Kingdom, France, and West Germany are countries whose

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<sup>1</sup>See: William W. Lockwood, The Economic Development of Japan, Growth and Structural Change 1868-1938. Princeton, New Jersey: Princeton University Press, 1954, ch. 1.

capitalism developed early. Japan and Italy are countries whose capitalism developed late but are now regarded as highly capitalistic countries. Turkey and Portugal are representative of the capitalistic countries which are not as highly developed as the first two groups. The countries whose capitalism developed early may be classified as Class I. The countries whose capitalism developed later but are now highly capitalistic may be classified as Class II. The capitalistic countries whose economic development lagged behind may be classified as Class III.

Each class has a definite consumption characteristic.

Class I tends to consume more meat, eggs, fish, milk, and oil and fat in relation to its grain consumption (Table 23). The per capita consumption per year of the former foods is 130.5 kilograms while consumption of the latter is 85.5 kilograms. This is a difference of 52.6 per cent.

Class II consumes 71 per cent more grains than Class I, however, the consumption of meat, eggs, fish, milk, and oil and fat are only 51 kilograms, 35 per cent of its grain consumption. If only Japan is compared with Class I, the consumption of grain in Japan is 77 per cent more than that of Class I, and the consumption of meat, eggs, fish, milk, and oil and fat is only 29 per cent of that of Class I. Class III has the same consumption tendency as Class II. Grain consumption in Turkey is 2.3 times that of Class I, and in Portugal it is 38 per cent more than that of Class I. The consumption of meat, eggs, fish, milk, and oil and fat in Turkey is 24 per cent, and in Portugal 42 per cent of

Table 23. Per capita consumption of food per year, 1958-60.

	Class I					Class II			Class III			Index (I = 100)		
	United States : 1959	United Kingdom : 1959/60	France : 1959/60	West Germany : 1959/60	Average : 1959/60	Italy : 1959/60	Japan : 1959	Average : 1958/59	Turkey : 1958/59	Portugal : 1959	Average	I	II	III
	Kilograms per year													
Cereals	66	84	107	85	85.5	142	151	146.5	199	118	158.5	100	171.4	185.4
Meat	94	71	74	54	73.3	27	6	16.5	13	16	14.5	100	22.5	19.8
Eggs	20	15	11	13	14.8	8	4	6.0	2	3	2.5	100	40.5	16.9
Fish	5	10	5	7	6.8	4	23	13.5	2	19	10.5	100	198.5	154.4
Milk														
Fat	8	7	6	6	6.8	4	1	2.5	3	1	2.0	100	36.8	29.4
Protein	9	7	7	7	7.5	4	1	2.5	3	1	2.0	100	33.3	26.7
Oil & fat	21	22	17	25	21.3	16	4	10.0	8	15	11.5	100	44.7	49.4
Sugar	41	50	32	27	37.5	20	14	17.0	10	18	14.0	100	41.3	34.7
Pulses & nuts	6	6	7	4	5.8	13	18	15.5	14	11	12.5	100	373.9	200.0
Potatoes & other starchy roots	47	88	100	139	93.5	53	66	59.5	39	86	62.5	100	63.6	66.8
Vegetables	97	59	128	40	81.0	138	72	105.0	78	105	91.5	100	128.8	113.0
Calories per day (number)	3130	3290	2940	2890	3062	2710	2210	2460	2830	2350	2590	100	80.3	84.6
Total protein per day (grams)	93	87	98	78	89.0	79	68	73.5	90	68	79.0	100	82.6	88.8
Animal protein per day (grams)	66	52	52	46	54.0	27	18	22.5	14	25	19.5	100	41.7	36.1
Percentage of animal protein (per cent)	71	59.8	53.1	59.0		34.2	26.5		15.6	36.8				

Source: Calculated from Production Yearbook 1960, Vol. 14, Food and Agricultural Organization, pp. 245-249.



that of Class I.

When per capita consumption of food in pre-war level and 1959 level are compared, one is able to observe a tendency of decreased consumption of cereals and increased consumption of animal protein foods (meat, eggs, fish, milk, and oil and fat) in each country. In Class I, the pre-war consumption of cereals was 105.8 kilograms but in 1959 it decreased to 85.5 kilograms (Table 24). Consumption of animal protein foods increased from 112.2 kilograms to 130.5 kilograms in the same period. In Class II, the pre-war consumption of cereals was 159.0 kilograms but in 1959 it decreased to 146.5 kilograms. Animal protein food consumption increased from 32 kilograms to 49 kilograms during this period. In Class III, the cereal consumption increased from 149.0 kilograms to 158.5 kilograms, and consumption of animal protein food increased from 41 kilograms to 43 kilograms. This increase in cereal consumption in Turkey and Portugal indicates the increase in per capita income in the countries. As income increased from a very low level, it became possible to meet the need of basic hunger. But as a higher level of development is attained, further increases of per capita income will tend to result in a decrease of grain consumption since other forms of food will be substituted for grains.

It can be concluded that there is higher animal protein food consumption in a country which experienced early capitalistic development. On the other hand, in a country whose capitalistic development occurred at a later time, the tendency is for the

Table 24. Per capita consumption of food per year, prewar level.

	Class I					Class II			Class III			Index (I = 100)		
	United States	United Kingdom	France	West Germany	Average	Italy	Japan	Average	Turkey	Portugal	Average	I	II	III
	Kilograms per year													
Cereals	91	95	124	113	105.8	160	158	159.0	193	105	149.0	100	150.3	140.8
Meat	72	67	55	53	61.8	20	3	11.5	15	115	15.0	100	18.6	24.3
Eggs	16	13	9	7	11.3	7	2	4.5	2	3	2.5	100	39.8	22.1
Fish	5	12	6	7	7.5	4	10	7.0	---	17	8.5	100	93.3	113.3
Milk														
Fat	8	5	4	6	5.8	2	---	1.0	2	1	1.5	100	17.2	25.9
Protein	7	5	5	7	6.0	3	---	1.5	4	---	2.0	100	25.0	33.3
Oil & Fat	21	21	16	21	19.8	12	1	6.5	8	15	11.5	100	32.8	58.1
Sugar	44	42	24	25	22.8	8	13	10.5	5	10	7.5	100	46.1	32.9
Pulses & nuts	7	5	8	3	5.8	22	33	27.5	10	10	10.0	100	474.1	172.4

Source: Statistical Yearbook of Food Management, 1959, p. 405.

people to consume more cereals than animal protein foods.

This can be made more clear by comparing protein utilization of the respective countries. The utilization amount of protein per person in Japan is 68 gram per day. Of this, 18 gram (26.5 per cent) of the total protein is animal protein and the remainder (50 gram) is obtained from cereals and other foods. American people, in contrast, utilize 93 grams of protein each day of which 66 grams (71 per cent) are animal protein. The United Kingdom, France and West Germany have the same tendency as the United States; that is, the greater part of protein utilization is from animal protein. But in Italy, Japan, Turkey, and Portugal the greater part of protein utilization comes from cereal sources.

Wheat and rice are the two most important cereal grains for human consumption. Of these, wheat is the more important for European and American consumption, while rice is the more important for Asian consumption.

There is a difference in the nutritive values of rice and wheat. Table 25 shows the nutritive values of rice and wheat products. Rice has 3,407 calories, 64.1 grams protein, and 8.1 grams fat per one kilogram. Wheat flour has 3,500 calories, 96.2 grams protein, and 19.2 grams fat per kilogram. Apparently, wheat flour is far more superior to rice in regard to the nutritive value. Bread, caked bread, and dried noodles also have higher protein and fat contents, though the calorie content is lower than rice.

Table 25. Nutritive value per kilogram of grain products, 1959.

	: Calorie no.	: Pro- tein g.	: Fat g.	: Carbo- hydrate g.	: Calcium mg.	: Phos- phorus mg.	: Iron mg.	: Vitamin				
								: A I.U.	: Caro- tene I.U.	: B1 mg.	: B2 mg.	: C mg.
Rice	3,407	64.1	8.1	770.5	62.6	1,573.8	3.0	--	0	1.1	0.4	0
Wheat flour	3,500	96.2	19.2	750.0	192.3	1,539.0	19.2	--	0	1.9	0.1	0
Bread	2,748	81.5	14.8	566.7	148.2	888.9	0	--	0	1.5	1.1	0
Caked bread	2,551	69.0	17.2	552.0	162.0	689.6	0	--	0	0.2	0.2	0
Soft noodle	1,293	31.9	5.3	281.9	53.2	372.3	0	--	0	1.1	0.5	0
Dried noodle	3,212	88.5	17.7	690.3	177.0	1,593.0	0	--	--	1.8	0.1	0
Barley	3,428	96.2	14.4	735.6	288.5	2,452.0	0	--	0	2.4	1.0	0

Source: Calculated from "Present Condition of National Nutrition," p. 87.

In addition to being inferior to wheat with respect to the nutritive values of calories, protein, and fat, a diet composed largely of rice is inferior for many other reasons. In the book named Japanese Food, written by the Society for Study of National Economy, several of these shortcomings of rice are listed.<sup>1</sup>

(1) Vitamin A, D, and E are dissolved and contained in a fat. Since rice does not contain a high level of fat, we can not expect much vitamin A, D, and E from rice. A lack of vitamin A causes night blindness and weakens the resistance to infections and diseases. A lack of vitamin D retards the growth of bones and teeth. Shortage of vitamin E causes sterility and hastens senility.

(2) Due to the cleaning of rice, vitamin B<sub>1</sub> is diminished to one-fourth and B<sub>2</sub> is diminished to one-third of its original value. A lack of vitamin B<sub>1</sub> causes beriberi, a numbness of the limbs. A lack of B<sub>2</sub> retards growth and causes sore tongue.

(3) Due to an insufficient amount of calcium content (rice contains 62.6 milligram of calcium per kilogram, whereas wheat flour contains 192.3 milligram of calcium, bread 148.2 milligram, caked bread 172.0 milligram and dried noodle 177.0 milligram of calcium), rice is not an adequate food for physical growth.

(4) The protein of rice does not contain large enough level of lysine, a basic amino acid, to maintain a normal rate of growth.

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<sup>1</sup>Society for a Study of National Economy. Japanese Food, Tokyo: Toyo Keizai Shinposha, 1959, pp. 9-10.



When the change in the consumption of staple foods in the last 20 years is considered, as shown in Table 26, we notice that the consumption of wheat per capita per year has increased by 2.7 times more than the 1934-36 average. Wheat consumption was only 9.6 kilograms per year per person in 1934-36, but in 1959 it increased to 25.8 kilograms. On the other hand, the consumption of rice showed a 13 per cent decrease. In 1934-36 consumption per capita per year was 131.5 kilograms, but it decreased to 114.4 kilograms in 1959. Such a change in staple foods has resulted in an increase in consumption of livestock products such as meat, eggs, milk and oils.

As observed already, cereal consumption per person becomes less and less as a society develops. In Japan, cereal consumption as a whole is also decreasing though at a slow rate. But within the cereal foods, the consumption of wheat products have been increasing concurrent with decreasing rice consumption.

Though the good rice harvest in recent years has increased rice consumption to a certain extent, there is a remarkable tendency that rice is being replaced by wheat, and Western-style dishes are increasingly introduced. This fact can not be neglected when the future movement of wheat consumption is discussed.

School Feeding. Between 1926 and 1928 there was a severe depression in Japan which resulted in wide spread undernourishment of school age children due to the forced use of poorer quality foods. Therefore, a School Feeding Program was initiated in order to provide a more nutritious diet for the needy children.

Table 26. Per capita consumption of major foods per year, 1934-36 and 1952-1959.

	:	:	:	:	:	:	:	:	:	:	Index
	:	:	:	:	:	:	:	:	:	:	1934-36=100
	:1934-36:	1952:	1953 :	1954 :	1955 :	1956:	1957:	1958:	1959:		1959
	Kilograms										
Rice	131.5	107.2	106.2	104.9	109.0	110.8	119.3	116.5	114.4		86.8
Wheat	9.6	24.9	24.6	26.6	25.2	23.9	24.8	24.8	25.8		268.8
Barley & Naked barley	12.5	20.3	17.4	18.1	17.6	15.7	15.1	13.3	11.0		88.0
Vegetables	74.1	70.6	61.8	63.0	67.9	70.0	89.4	72.5	74.6		100.7
Fruits	20.4	15.0	11.5	13.7	14.6	19.7	20.2	21.1	22.6		110.8
Fish	20.4	21.2	20.1	20.0	21.3	20.0	22.9	21.8	22.7		111.3
Meat	1.8	2.2	2.4	2.9	3.4	3.8	4.4	5.0	5.1		283.3
Eggs	2.3	2.6	2.8	3.3	3.4	3.4	3.8	3.9	4.0		173.9
Milk	3.1	8.4	8.4	11.3	12.0	14.1	16.6	17.9	19.8		638.7
Oil	0.9	1.5	2.0	2.0	2.5	3.0	3.2	3.4	3.8		422.2
Sugar	13.6	10.0	13.0	11.6	12.2	12.8	12.7	13.8	14.2		104.4

Sources: Japanese Food, p. 56.  
 "White Paper of National Life," pp. 176-205.

In the beginning, the School Feeding Program was conducted as a social work program sponsored by charitable organizations and benevolent persons.

In 1932 the Japanese Government took over major responsibility under "The Temporary School Feeding Act," with aid limited to needy and undernourished children. Many people pointed out that this system would produce an inferiority complex of children and undesirable educational effect. Thus in 1940, "The School Feeding Promotion Act" was proclaimed, and all school children were brought into the School Feeding Program. Shortly thereafter Japan entered World War II, and the Program was reduced to secondary priority in relation to the military needs. At the end of the war, the School Feeding Program was barely in existence.

After the war, the School Feeding Program spread very rapidly with the help of commodities from Licensed Agencies for Relief in Asia, United States released goods, Counterpart Fund, donated skim milk from the United Nations International Childrens Emergency Fund, and donated wheat from the United States of America. As can be seen in the Table 27, in 1926 when the School Feeding Program started, there were only 57 schools that participated in the program and the number of students involved in the program was only 8,127. The program was promoted until 1936. At that time, 12,264 schools participated in the program and 622,584 students were involved. The program then fell off because of the war.

In 1946, only 276 schools participated and 251,629 students

Table 27. Changes in the participation in the School Feeding Program.

	: Number of schools : participating in : School Feeding : Program	: : : :	: Number of students : involved in the : Program
1926	57		8,127
1927	93		15,602
1928	130		21,249
1929	204		21,638
1932	11,047		308,507
1933	12,329		559,812
1934	12,792		632,575
1935	12,938		654,362
1936	12,264		622,584
1937	11,128		542,765
1938	10,522		566,930
1939	9,246		---
1940	8,359		731,707
1941	6,990		794,240
1946	276		251,629
1947	5,467		4,137,975
1948	9,036		6,292,311
1949	10,882		7,178,557
1950	11,046		7,461,320
1951	11,595		7,916,785
1952	7,462		5,857,457
1953	7,152		5,708,557
1954	9,877		6,866,372
1955	10,275		7,242,575
1956	10,112		7,512,539
1957	11,002		7,990,559

Source: Japanese Food, p. 168.

were involved. But from 1947 it began to increase again, and in 1951 11,595 schools participated in the program. In 1952, the assisting funds from the sources previously listed were no longer forthcoming because Japan became independent. As a result, the School Feeding Program declined again. But in 1954, "School Feeding Act" came into existence and the program was promoted again. In 1957, as can be seen in Table 28,

Table 28. Condition of school feeding, September, 1957.

	: Complete meal : prepared at : school	: Part of meal by : school supple- : mented by food : from home	: Total
Grade school:			
Number of schools	8,000	1,951	9,951
Number of students	6,755,383	880,931	7,636,314
Junior high:			
Number of schools	830	221	1,051
Number of students	254,587	99,658	354,245
Part-time high school:			
Number of schools	30	42	72
Number of students	5,980	7,056	13,036
Total:			
Number of schools	8,860	2,214	11,074
Number of students	7,015,950	987,645	8,003,595

Source: Japanese Food, Society for a Study of National Economy, Toyo Keizai Shinposho, Tokyo, March, 1959, p. 169.

11,074 schools participated in the School Feeding Program and 8,120,919 students were involved in this program. The foods provided by the Program are bread, milk, meat and vegetables. Therefore, we can not overlook the effect of school feeding as a factor which may change the food consumption structure in the future.



### Changes in Grain Consumption (Micro analysis)

In the preceding section, the changes in grain consumption were analysed from the macroscopic view. The changes of grain consumption will be considered next by distinguishing urban area from rural area.

Urban Areas. Table 29 shows the movements in the structure of staple food per person, per year since 1951. As can be seen, the consumption of rice has increased from 83.2 kilograms in 1951 to 97.9 kilograms in 1960, this being due to the good rice harvest in those years. The consumption of barley and naked barley has decreased very much. It was 14.4 kilograms in 1951 but in 1960 it was only 3.6 kilograms. As to bread, the consumption has decreased from 9.9 kilograms in 1951 to 8.3 kilograms in 1960. Noodle and wheat flour consumption has decreased also. But in the case of the consumption of wheat products, one has to consider the amounts that were taken outside of the home, since this table does not contain the figures of dining out. In urban areas many people are taking bread and noodles as a lunch at the office, factory or workshop without coming back to their homes. As can be seen in Table 30, the production of noodles has been increasing since 1956. Macaroni and spaghetti production has increased very much since 1954 (Table 31). In 1954 the production of macaroni and spaghetti was only 1,932 tons but in 1959 it became 17,183 tons, which is 15,251 tons greater than the production of 1954.

Table 29. Changes in the per capita consumption of grain products per year, 1951-1960.

: Unit :	Quantity purchased										
	1951 :	1952 :	1953 :	1954 :	1955 :	1956 :	1957 :	1958 :	1959 :	1960	
<b>Urban Area:</b>											
Rice	Kg.	83.2	89.6	95.2	93.1	95.2	101.0	97.7	97.6	97.3	97.9
Cleaned Barley & Naked Barley	Kg.	14.4	14.7	14.2	13.8	13.3	8.9	8.1	6.8	5.4	3.6
Bread	Kg.	9.9	9.8	10.9	12.4	10.5	8.1	8.5	8.6	8.8	8.3
Noodles	Kg.	13.4	11.1	13.0	12.0	10.6	8.4	8.0	7.7	7.5	7.2
Wheat Flour	Kg.	--	2.0	2.0	2.0	1.9	1.5	1.4	1.4	1.3	1.2
<b>Rural Area:</b>											
Rice	Kg.	167.0	163.5	158.8	157.2	159.7	158.8	155.5	156.2	158.3	156.9
Cleaned Barley & Naked Barley	Kg.	24.8	24.4	24.0	24.2	23.3	21.6	21.9	20.3	19.0	16.7
Bread	Kg.	0.5	0.6	0.7	0.5	0.5	0.4	0.5	0.5	0.4	0.5
Noodles	Kg.	1.4	3.3	4.8	4.8	5.0	5.0	5.0	5.5	5.1	7.7
Wheat Flour	Kg.	9.6	9.1	8.6	8.3	8.1	7.5	7.2	6.9	7.3	6.6
Index number, 1951 = 100											
<b>Urban Area:</b>											
Rice		100.0	107.7	114.4	111.9	114.4	121.4	117.4	117.3	117.0	117.7
Cleaned Barley & Naked Barley		100.0	102.1	98.6	95.8	92.4	61.8	56.3	47.2	37.5	25.0
Bread		100.0	99.0	110.1	125.3	106.1	81.8	85.9	86.9	88.9	83.8
Noodles		100.0	82.8	97.0	89.6	79.1	62.7	59.7	57.5	56.0	53.7
Wheat Flour		--	100.0	100.0	100.0	95.0	75.0	70.0	70.0	65.0	60.0
<b>Rural Area:</b>											
Rice		100.0	97.9	95.1	94.1	95.6	95.1	93.1	93.5	94.8	94.0
Cleaned Barley & Naked Barley		100.0	98.4	96.8	97.6	94.0	87.1	88.3	81.9	76.6	67.3
Bread		100.0	120.0	140.0	100.0	100.0	80.0	100.0	100.0	80.0	100.0
Noodles		100.0	271.4	342.9	342.9	357.1	357.1	357.1	392.9	364.3	550.0
Wheat Flour		100.0	94.8	89.6	86.5	84.4	78.1	75.0	71.9	76.0	68.8

Sources: Calculated from: Statistical Yearbook of Ministry of Agriculture and Forestry 1958, pp. 354, 576-581; Japanese Food, p. 181; and Marketing of Agricultural Products Under Growing Economy, pp. 263-268.

Table 30. Noodle production, 1956-1958.

Year	Production Metric tons	Index
1956	1,152,000	100.0
1957	1,200,000	104.2
1958	1,219,000	105.8

Source: "White Paper of National Life," Economic Planning Agency, Japan, February, 1961, p. 66.

Table 31. Production of macaroni and spaghetti, 1954-1959.

Year	Production Metric tons	Index
1954	1,932	100.0
1955	3,769	195.1
1956	6,564	339.8
1957	8,808	455.9
1958	12,079	625.2
1959	17,183	889.4

Source: "White Paper of National Life," Economic Planning Agency, Japan, February, 1961, p. 66.

From these evidences, consumption of wheat products appears to have been increasing. Since the amount of dining out is not included in the Table 29, the consumption of wheat products is supposed to be increased, if the amount of dining out is considered.<sup>1</sup>

<sup>1</sup>"White Paper of National Life," Economic Planning Agency, Japan, February, 1961, p. 66.

Rural Areas. In comparison with urban areas, rural areas consume much more rice, barley and naked barley. In 1960, the quantity of rice and barley purchased per person, per year in rural areas was 173.6 kilograms. On the other hand, the consumption of rice and barley in the urban areas was 101.5 kilograms. On the other hand, the consumption of bread is very low in rural areas as compared with that of urban areas. However, the consumption of noodles in rural areas has been increasing since 1951. In 1951 noodle consumption per person per year was only 1.4 kilograms, but in 1960 it became 7.7 kilograms per person which was 0.5 kilogram more than that in urban areas in the same year.

The Analysis of Cereal Consumption by Different Income Classes in Urban Areas. Table 32 shows the per capita consumption of grain by different income classes in urban areas. As to domestic rice, the demand shows proportionate increase from class 1 to class 3 as income goes up. However, from class 4 upwards, there cannot be observed any certain connection with class. That means up to class 3 the consumption will increase as income goes up, but beyond class 4 it is not certain whether or not consumption will go up as income goes up. Consequently, the calculated value of income elasticity of demand for domestic rice is only (+) 0.124. Imported rice gives an evidence of decreasing consumption as income goes up. As indicated by the income elasticity of demand (-)1.597, with high correlation coefficient (-)0.86, imported rice has a character of inferior goods.

Table 32. Per capita consumption of grain products per year in urban areas, by income classes, 1959.

Class no.	Income classes (per month)	Domestic rice	Imported rice	Polished barleys	Wheat flour	Soft noodle	Dried noodle	Other vermicelli	Bread
Kilograms									
1	\$ 22.2- 33.3	89.2	1.3	15.2	1.6	5.4	1.7	2.6	4.3
2	33.3- 44.4	88.5	1.2	9.4	1.7	6.2	1.7	2.2	6.0
3	44.4- 55.6	104.8	1.2	9.5	1.8	6.2	1.7	2.3	7.3
4	55.6- 66.7	102.9	1.2	9.3	1.8	7.3	2.2	2.8	10.4
5	66.7- 77.8	97.9	1.0	7.4	1.7	6.3	1.9	3.1	10.0
6	77.8- 88.9	102.0	0.8	6.8	1.8	5.8	1.6	2.2	8.4
7	88.9-100.0	102.0	0.6	6.6	1.6	6.1	1.6	2.1	8.9
8	100.0-111.1	100.8	0.3	5.2	1.9	4.8	2.3	2.4	9.4
9	111.1-122.2	96.3	0.2	4.9	1.7	5.3	1.5	2.5	8.5
10	122.2-133.3	101.9	0.3	4.8	1.5	5.3	1.3	2.5	9.7
11	133.3-144.4	110.4	0.4	4.6	1.7	3.9	2.8	2.8	8.7
12	144.4-155.6	103.6	0.4	3.7	1.7	5.3	2.1	0.9	9.3
13	155.6-166.7	103.9	0.4	3.6	1.4	4.9	1.4	2.2	9.3
14	166.7-177.8	104.4	0.4	2.8	1.2	4.0	1.5	3.6	8.7

Source: Calculated from The Analysis of Wheat Consumption, pp. 48-49.



Barley also has a character of inferior goods, as income elasticity of demand is  $(-)$ 1.43, with high correlation coefficient  $(-)$ 0.931. During the period of postwar food shortage and low income, Japan's dependence on barley was very high. But recently the consumption of barley has been decreasing and is expected to decrease more.

As to wheat flour, there is not great vertical difference by income classes as to consumption. Each income class is consuming almost the same amount. Although income elasticity of demand for wheat flour is  $(-)$ 0.177, correlation coefficient is only  $(-)$ 0.516. Elasticity for soft noodles was  $(-)$ 0.356 with  $(-)$ 0.685 correlation coefficient. As to dried noodles, although elasticity is  $(-)$ 0.0124, correlation coefficient of  $(-)$ 0.018 indicates that there is no linear relation. However, as we have seen already, dining out consumption of noodles and breads have been increasing very rapidly, and the consumption of noodles including dining out can be considered to have an increasing tendency.

The consumption of bread goes up proportionately with a rise in income class. Accordingly, the income elasticity of demand for bread is  $(+)$ 0.560 with  $(+)$ 0.859 correlation coefficient. The elasticities for butter, eggs, meat and milk that are consumed with bread are very high. The income elasticity of demand for meat is  $(+)$ 0.437 with  $(+)$ 0.714 correlation coefficient. The elasticity for eggs is  $(+)$ 0.439, with  $(+)$ 0.712 correlation coefficient. The elasticity for milk is  $(+)$ 0.775 with  $(+)$ 0.848

correlation coefficient. The elasticity for butter is (+)1.703 with (+)0.931 correlation coefficient. Those positive elasticities for butter, eggs, meat and milk support the fact that the positive elasticity for wheat is not an unexpected thing.

As a summary the following can be said regarding consumption of grain in urban areas: consumption of domestic rice and wheat flour are stable regardless of income. Barleys and imported rice have a characteristic of inferior goods and their consumption will decrease as income goes up. Noodle and bread consumption will increase steadily as income goes up.

The Analysis of Cereals Consumption by Different Income Classes in Rural Areas. Table 33 shows per capita consumption of grain in rural areas. The consumption of rice increases in proportion as income increases. The income elasticity of demand is (+)0.261 with high correlation coefficient (+)0.952. The elasticity of (+)0.261 indicates that rice still has a characteristic of superior goods in rural areas. As to imported rice, one cannot assume linear relationship since the correlation coefficient is only (-)0.146.

The elasticity for barley and naked barley is (-)0.694 with (-)0.918 correlation coefficient. Wheat flour has a negative elasticity (-)0.552 with (-)0.899 correlation coefficient and noodles also have a negative elasticity (-)0.146, though it is not so high, with (-)0.627 correlation coefficient. In case of urban areas, the amount of dining out had to be taken into account when considering noodle consumption. However, in case

Table 33. Per capita consumption of grain products per year in rural areas, by income classes, 1958.

Class no.	Income classes (per year)	Domestic Rice			Barley & naked- barley	Wheat flour:	Noodle:	Bread
		Self-support:	Purchased:	Total:				
1	\$ 277.78-416.67	118.9	16.4	135.3	29.7	9.3	6.3	0.3
2	416.67-555.56	143.9	12.7	156.6	28.4	8.4	5.9	0.2
3	555.56-694.44	133.0	11.5	144.5	26.7	8.4	5.8	0.3
4	694.44-833.33	146.2	10.5	156.7	24.2	8.6	5.9	0.3
5	833.33-972.22	151.5	9.1	160.6	24.0	8.4	5.7	0.4
6	972.22-1,111.11	154.6	7.5	162.1	22.2	8.0	5.5	0.4
7	1,111.11-1,250.00	161.9	7.9	169.8	18.4	7.8	5.7	0.4
8	1,250.00-1,388.89	161.8	7.6	169.4	15.6	7.3	5.6	0.6
9	1,388.89-1,527.78	163.0	7.6	170.6	20.8	6.2	5.7	0.5
10	1,527.78-1,666.67	164.2	8.1	172.3	19.6	5.3	5.8	0.5
11	1,666.67-1,805.56	160.1	14.2	174.3	18.3	5.6	5.8	0.5
12	1,805.56-1,944.44	169.1	8.5	177.6	13.9	4.5	4.5	0.4
13	1,944.44-2,083.33	179.9	6.4	186.3	12.7	5.6	4.8	0.5
14	2,083.33-2,222.22	186.4	10.6	197.0	14.8	6.0	5.6	0.4

Source: Calculated from The Analysis of Wheat Consumption, pp. 67-68.

of rural areas, the amount of dining out is very little. As to bread, although the absolute amount consumed is not much, there is a potentiality for increased consumption since the elasticity of demand is (+)0.499 with (+)0.661 correlation coefficient.

As summarization in rural areas, the following can be said: Barley, naked barley and wheat flour have a characteristic of inferior good, noodle consumption is comparatively stable, rice and bread have a characteristic of superior good and consumption will increase if incomes continue to increase.

Grain Consumption in Urban Areas by Regions. In the preceding section, the difference in grain consumption between urban and rural areas was observed, but even within urban or rural areas there may exist a considerable difference. Table 34 shows the consumption of grain per person per year in urban areas, based on regional distinctions.

According to this table, the towns that are close to large rice producing regions (Tohoku, Chubu, Setonai, and Kyushu) consume more rice than the other towns. In Keihin and Keihanshin districts, which are two big urban areas in Japan, areas where people's incomes are higher than those in other regions, the consumption of bread is high and consumption of barleys is very low. Districts are shown in Fig. 3.

Table 35 shows the income elasticity of demand for domestic rice, barleys, wheat flours, noodles and bread in those districts. The elasticities for barleys are negative in all regions except Tohoku district. However, in Tohoku district the correlation



Table 34. Consumption of grain per person per year in urban areas by regional distinction, 1959.

	: Domestic :	: Barleys :	: Wheat :	: Noodles :	: Bread :
	: rice :	: Barleys :	: flour :	: Noodles :	: Bread :
	Kilograms				
The Whole Country	100.6	6.9	1.7	9.7	8.5
Hokkaido	104.6	4.7	2.1	10.3	6.2
Tohoku	101.5	6.3	2.0	9.0	5.2
Kanto	93.3	4.6	1.8	11.7	9.7
Keihin	82.2	3.8	1.5	10.7	12.8
Chubu	111.2	9.7	1.8	12.0	6.6
Keihanshin	104.1	3.9	1.4	10.0	9.5
Setonai	105.3	8.2	1.9	6.8	5.7
Kyushu	108.0	12.2	3.2	7.7	9.5

Source: The Analysis of Wheat Consumption, pp. 48-65.

Table 35. Income elasticity of demand in urban areas by regional distinction, 1959.

	: Domestic :	: Barleys :	: Wheat :	: Noodles :	: Bread :
	: rice :	: Barleys :	: flour :	: Noodles :	: Bread :
The Whole Country	+0.124	-1.431	-0.177	-0.356	+0.560
Hokkaido	+0.404	-0.878	+1.214	+0.103	+0.532
Tohoku	+0.109	+0.185	+0.539	-0.176	+0.767
Kanto	+0.445	-0.991	-0.198	+0.949	+1.237
Keihin	+0.319	-1.484	+0.125	-0.611	+0.539
Chubu	+0.137	-1.084	-0.616	-0.346	+0.516
Keihanshin	+0.397	-0.420	+0.489	+0.784	+0.917
Setonai	+0.190	-1.449	+0.461	-0.220	-0.262
Kyushu	+0.099	-1.648	+0.787	-0.329	+0.893

coefficient for the elasticity is only (+)0.087, so we cannot assume linear relationship between income and barley consumption. As to noodles, elasticities of demand are negative values except for Hokkaido, Kanto, and Keihanshin. However, those negative values are not so large except in the Keihin district. The elasticities of demand for bread are positive values in all regions except Setonai district. However, the negative elasticity



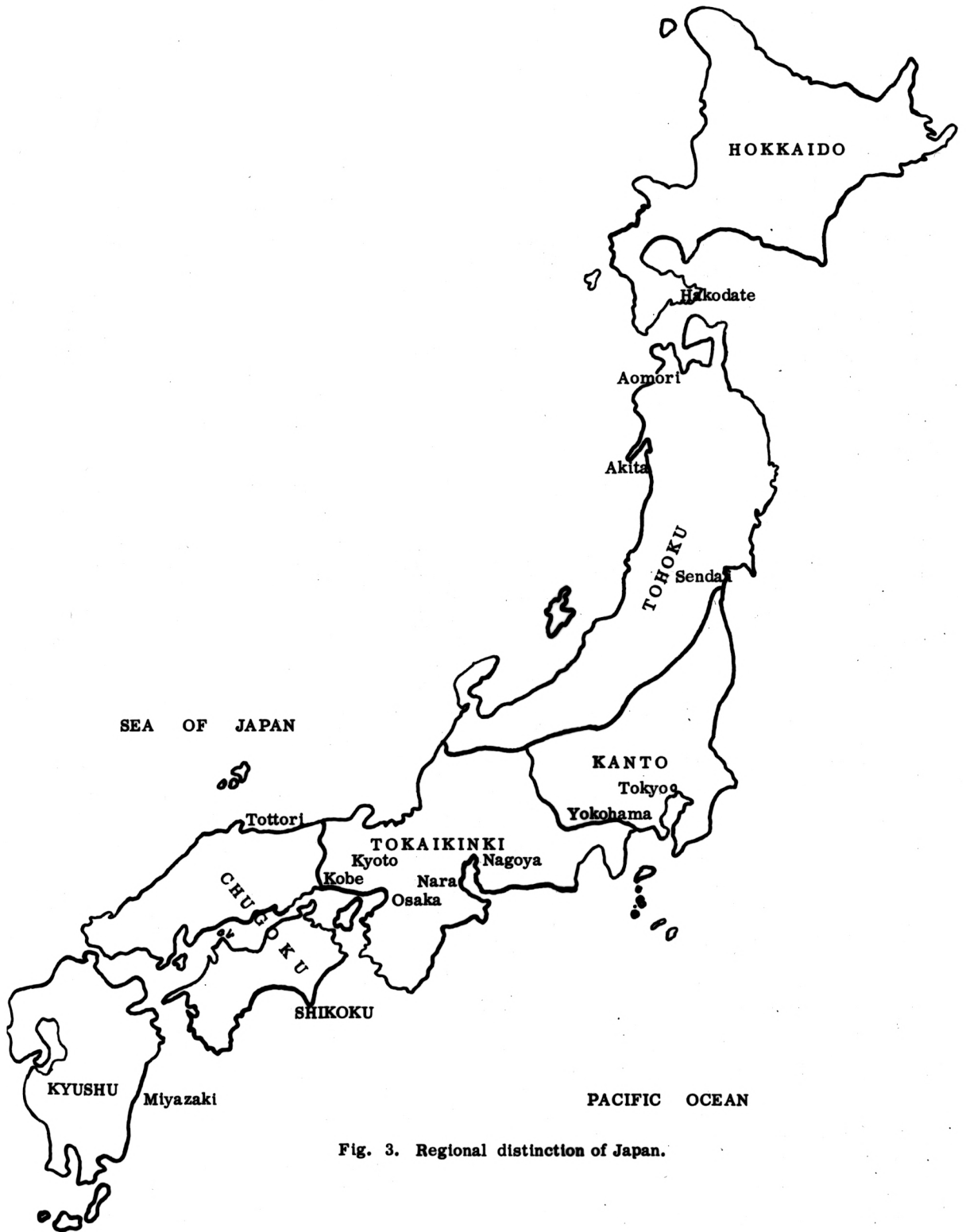


Fig. 3. Regional distinction of Japan.

in Setonai is only (-)0.262.

Grain Consumption in Rural Areas by Regions. Table 36 shows the consumption of grain per person per year in rural areas classed by regional distinction. According to this table, there is inverse relationship between barley and rice consumption. That is, in areas where a large quantity of rice is consumed, barley consumption is little and vice versa. This is indicated most typically in Tohoku and Hokkaido districts. Kanto and Kyushu districts consume much wheat flour and Tohoku, Tokai and Kinki districts consume very little wheat flour. As to noodle and bread consumption, there is not so much regional difference.

Table 37 shows the income elasticity of demand in rural areas by regional distinction. The elasticities for rice are positive values in all regions, though values are not so large except for Hokkaido. On the other hand, the elasticities for barleys and wheat flour are negative values. Elasticities of demand for noodles also have negative values except for Kanto and Kyushu districts. As to bread, the elasticities of demand are positive in all regions (Hokkaido has a negative elasticity of (-)0.388, however, as correlation coefficient is only (-)0.163, this value would not be accepted).

#### Changes in eating habits

One of the important factors which is affecting the consumption of staple food is the change in human eating habits. The following three points can be listed as the characteristics

Table 36. Consumption of grain per person per year in rural areas, 1958.

	: Domestic :	: Wheat :			
	: rice	: Barley	: flour	: Noodles	: Bread
	Kilograms				
Rural Area as a Whole	166.7	20.7	7.1	5.6	0.4
Hokkaido	136.5	27.7	5.7	5.6	0.2
Tohoku	199.2	7.7	3.3	4.6	0.3
Kanto	148.2	22.9	13.8	6.8	0.6
Tokai Kinki	167.3	21.4	3.4	5.9	0.5
Chugoku	174.6	24.5	4.9	5.1	0.3
Kyushu	149.5	31.7	10.3	4.4	0.2

Source: The Analysis of Wheat Consumption, pp. 68-93.

Table 37. Income elasticity of demand in rural areas by regional distinction, 1958.

	: Domestic:				
	: rice	: Barleys:	: flour	: Noodles	: Bread
Rural Area as a Whole	+0.261	-0.694	-0.552	-0.146	+0.499
Hokkaido	+0.536	-1.223	-0.988	-0.435	-0.388
Tohoku	+0.321	-0.142	-0.370	-0.238	+0.371
Kanto	+0.239	-0.192	-0.184	+0.131	+0.378
Tokai Kinki	+0.198	-0.848	-0.016	-0.458	+0.433
Chugoku	+0.146	-0.525	-0.046	-0.199	+0.135
Kyushu	+0.052	-0.403	-0.043	+0.250	+0.521

of the recent change in the eating habits.<sup>1</sup> (1) Progress of compounded food consumption form. (2) Progress of simplification, and (3) Popularization of dining out.

As observed before, the structure of food consumption of the present day is significantly different from that of the

<sup>1</sup>Japan Economic Planning Agency, "White Paper of National Life, 1960," (Tokyo: The Printing Bureau, The Ministry of Finance, 1961), p. 70.

pre-war period. For example, per capita milk consumption is 6.4 times the pre-war level (Table 26). The consumption of meat, eggs, and oil have increased also. After World War II, a movement to abolish the monodiet form of eating has become evident. At the same time, the method of cooking has been changing from the monotonous way of before to a more complex way. Miso (bean paste) and soy were the main condiments before, but now oils, fats and other flavors are being introduced in addition to miso and soy. The increased popularity of cooking school and television cooking programs is proof of the transition to more complex methods of cooking.<sup>1</sup> Those tendencies seem to have been accelerated by the increased leisure of housewives that resulted from the popularization of electric machines. Professor Kazushi Okawa<sup>2</sup> pointed out that this change in eating habits of Japanese people would result in increased consumption of wheat products (especially bread).<sup>3</sup>

Another characteristic of the change in eating habits which has been occurring recently is the tendency of simplification. In other words, this is the tendency of preparing meals without devoting a large amount of time. Good examples of this trend are the increased consumption of canned foods and increased

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<sup>1</sup>Society for a Study of Grain. The Analysis of Wheat Consumption. (Tokyo: Society for a Study of Grain, 1960), p. 16.

<sup>2</sup>Professor of the Hitotsubashi University.

<sup>3</sup>Society for a study of Grain. The Analysis of Wheat Consumption. (Tokyo: Society for a Study of Grain, 1960), p. 16.

consumption of processed meat and fish such as ham, sausage, and bacon rather than raw meat and raw fish.<sup>1</sup> These two tendencies, variability and simplification, appear to conflict with each other, but they indicate the importance of the differentiation between the various meals of the day. For instance, breakfast and lunch are typically meals of simplified foods while the evening meal is generally a more complex meal to prepare. This tendency of simplification will increase the consumption of wheat without doubt. Rice requires much time to cook and does not combine well with canned foods. The other tendency of the change in eating habits is the increased amount of dining out. Many people eat lunch at the office, factory or workshop without coming back to their homes. Increased leisure hours give more occasion of dining out.<sup>2</sup> This increased amount of dining out is believed to increase the consumption of wheat products, especially, bread, noodle, spaghetti, and macaroni.<sup>3</sup>

Over all, the consumption of wheat products are believed to increase as a result of a changing habit of eating.

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<sup>1</sup>Japan Economic Planning Agency. "White Paper of National Life, 1960," (Tokyo: The Printing Bureau, The Ministry of Finance, 1961), p. 70.

<sup>2</sup>Ibid., p. 13.

<sup>3</sup>Society for a Study of Grain. The Analysis of Wheat Consumption. (Tokyo: Society for a Study of Grain, 1960), p. 17.



## CONCLUSION

The pattern of food consumption after World War II differs greatly from its pre-war counterpart. The greatest change with regard to staple foods has been the decreased rice consumption and the increased consumption of wheat. The per capita consumption of wheat has increased to three times that of the pre-war level because of the popularization of powdered foods. Such a change in the consumption of staple foods has resulted in an increased consumption of animal products such as meat, eggs, milk and fats and oils. The dominant factors that caused those changes are: (1) an increased level of national income; (2) an increased urban population and an urbanization of rural areas; (3) diffusion of the knowledge about nutrition; and (4) change in a habit of life. However, the good rice harvests in recent years have increased rice consumption to a certain extent. But yet calculation of income elasticity of demand for rice by the Statistics and Survey Division of Ministry of Agriculture (in which the same calculation method had been used being based on the 1957 year data which is one year older data from that which we used here.) shows the income elasticity of demand for rice in urban area was (+)0.3 in 1957.<sup>1</sup> From our calculation based on 1958 year data, the elasticity of (+)0.1 was derived. The elasticity of demand for rice has dropped remarkably within a year. Consequently, we can conclude that the increase in per

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<sup>1</sup>The Analysis of Wheat Consumption, Society for a Study of Grain, Tokyo, April, 1960, p. 18.

capita consumption of rice in recent years is a temporary one and will decrease in the future. As shown by the negative elasticities of demand for barleys in both urban and rural areas, barley consumption will decrease in the future. As for noodle consumption, it was observed that per capita consumption would likely increase in the future in urban areas but in the rural areas it is unlikely to show much increase. Per capita consumption of bread will increase steadily both in rural and in urban areas as income goes up. So wheat consumption as a whole will definitely increase owing to both per capita consumption increase and population increase.

According to the Ministry of Public Welfare, the predicted value of food composition per person per day by 1962 is such as in the Table 38.<sup>1</sup> The government has been making several efforts to realize this value. When data in Table 38 is compared with Table 39, that shows the per capita consumption of major foods in 1959, considerable difference can be observed. The consumption of rice is expected to decrease from 314 grams per person per day in 1959 to 300 grams in 1962. On the contrary, the consumption of wheat is expected to increase from 71 grams per person per day to 80 grams in 1962. The consumption of animal products such as meat, eggs, milk, fish, and oils and fats are also expected to increase.

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<sup>1</sup>Public Sanitation Bureau, Ministry of Welfare. "Present Condition of National Nutrition" (Tokyo: Daiichi Shuppan Co., 1961), p. 37.

Table 38. Predicted value of food consumed in 1962.

Unit per person per day

	: Amount :	: Calorie :	: Protein :	: Fat :	: Calcium :	: Vitamin			
						: Caro- : tene :	: B <sub>1</sub> :	: B <sub>2</sub> :	: C :
	g.	no.	g.	g.	mg.	I.U.	mg.	mg.	mg.
Rice	300	1,118.0	21.1	2.8	21	0	0.37	0.13	0
Barley, Naked barley & Other cereals	42	142.8	4.0	0.6	11	0	0.11	0.04	0
Wheat	80	208.9	5.8	0.9	12	0	0.11	0.04	0
Sweet potato	30	35.3	0.4	0.1	7	20	0.04	0.01	9
White potato	40	31.1	0.8	0.0	2	0	0.04	0.01	6
Other potato	20	17.1	0.4	0.2	3	4	0.01	0.01	1
Sugar	30	116.4	0.2	0.0	20	0	0.00	0.00	0
Oils & fats	12	103.0	0.0	11.4	0	30	0.00	0.00	0
Soybean	2	7.9	0.8	0.4	4	0	0.01	0.00	0
Bean paste (miso)	28	44.7	3.3	0.9	28	0	0.01	0.03	0
Soybean manufactures	40	48.1	3.9	3.1	69	0	0.01	0.02	0
Other beans	7	22.6	1.3	0.4	4	2	0.02	0.01	0
Fish & shellfishes	80	116.7	18.5	3.8	77	55	0.07	0.11	1
Meat	20	34.4	4.1	1.9	2	28	0.07	0.03	0
Eggs	16	24.2	2.1	1.7	10	121	0.03	0.05	0
Milk	70	41.3	2.1	2.2	70	84	0.03	0.11	1
Fruits & vegetables	321	99.2	4.5	0.9	112	5,148	0.21	0.24	86
Seaweeds	3	-	-	-	25	83	0.00	0.01	0
Soy	30	-	-	-	-	-	-	-	-
					Vitamin A	318			
					Carotene	5,257			
Total	1,171	2,211.7	72.9	31.3	477	5,575	1.14	0.85	104

Source: "Present Condition of National Nutrition," p. 37.

Table 39. Per capita consumption of major foods in 1959.

	Unit per person per day gram
Rice	313.7
Barley & naked barley	30.1
Wheat	70.7
Sugar	38.9
Oil	10.4
Fish	62.2
Meat	14.0
Eggs	11.0
Milk	54.3
Vegetables	204.4
Fruits	61.9

Source: Calculated from Table 26.

Staple food consumption in Japan is under the strong influence of government policy and the future demand may vary in any direction according to the movement of the policy. From the viewpoint of national health, encouragement of wheat consumption has been a long established policy. In December, 1954, a resolution was made in the Diet calling for a change in the people's eating habits. They urged the use of wheat as a staple food and the increased use of dairy and fishery products.<sup>1</sup> In July, 1960, the resolution was made by the Nutrition Council of Japan urging the use of wheat as a staple food and the reduction of rice ration.<sup>2</sup>

Efforts are being made by the government and other agencies

<sup>1</sup>David E. Lindstrom, "Japanese Needs U. S. Surplus Food," Journal of Farm Economics, Volume XXXVII, Feb., 1955, pp. 125-127.

<sup>2</sup>The Analysis of Wheat Consumption, Society for a study of Grain, Tokyo, April, 1960, p. 19.

to increase the use of wheat. Those efforts include instruction in cookery, nutrition, and health guidance. That is to say, the policy of promotion of wheat consumption from psychological, cultural, and health aspects is well established. On the contrary, the promotion policy from the economic aspect is in the opposite direction. As we have seen, the government is keeping rice prices at a low and imported wheat prices at a high level. This means that the government is trying to promote rice consumption and restrain wheat consumption. The consumption of wheat will increase more rapidly if the present price situation is changed.



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## BIBLIOGRAPHY

## Books

- Brennan, Michael J., Jr. Preface to Econometrics. Cincinnati, Ohio: South-Western Publishing Company, 1960.
- Danno, Nobuo. Agriculture and Policy. Vol. 296 of Yuwanami Shinsho. Tokyo: Yuwanami Shoten, 1958.
- Hazama, Masao. The Problem of Rice Price. Tokyo: Kobundo, 1958.
- Hewes, L. I., Jr. "United States Technical Assistance to Foreign Agriculture," Journal of Farm Economics, Volume XXXVIII (December, 1956), 1214-1215.
- Kawakami, Masamichi. Agriculture in Japan. Tokyo: Shiseido, 1959.
- Kondo, Yasuo. Agricultural Policy. Tokyo: Seirin Shoin, 1959.
- Lindstrom, David E. "Japan Needs U. S. Surplus Food," Journal of Farm Economics, Volume XXXVII (February, 1955), 125-127.
- Lockwood, William W. The Economic Development of Japan, Growth and Structural Change 1868-1938. Princeton, New Jersey: Princeton University Press, 1954.
- Ohkawa, Kazushi. "Significant Changes in Japanese Agriculture Since 1945," Journal of Farm Economics, Volume XXXVIII (December, 1961), 1103-1111.
- Otsuki, Masao. Japanese Agriculture and the Direction of Its Development. Tokyo: Yokendo, 1960.
- Present Condition of Imported Agricultural Products. Tokyo: Japan Trade Promotion Association, 1961.
- Recent Trend of Wheat Consumption. Tokyo: Society for a Study of Grain, 1958.
- Society for a Study of National Economy. Japanese Food. Tokyo: Toyo Keizai Shinposha, 1959.
- Taguchi, Ryoichiro. Rice. Tokyo: Nihon Keizai News Paper Co., 1960.
- The Analysis of Wheat Consumption. Tokyo: Society for a Study of Grain, 1960.
- The Tsuneta Yano Memorial Society. Nippon 1959. Tokyo: Kokuseisha, 1960.

## Government Bulletins and Publications

- Japan Statistics and Survey Division, Ministry of Agriculture and Forestry. Statistical Yearbook of Ministry of Agriculture and Forestry, 1958. Tokyo: Statistical Institution of Agriculture and Forestry, December, 1959.
- Japan Food Agency. Statistical Yearbook of Food Management, 1958. Tokyo: Institution of Agriculture and Forestry, 1959.
- Japan Food Agency. Statistical Yearbook of Food Management, 1959. Tokyo: Institution of Agriculture and Forestry, 1960.
- Japan Statistics and Survey Division, Ministry of Agriculture and Forestry. Statistical Survey of Agriculture and Forestry. Tokyo: Statistical Institution of Agriculture and Forestry, Monthly Publication, Sept., 1961-June, 1962.
- Japan Economic Bureau, Ministry of Agriculture and Forestry. Recent Trend of Industrial Fluctuation and Market for Agricultural Products. Tokyo: Statistical Institution of Agriculture and Forestry, August, 1958.
- Japan Statistics and Survey Division, Ministry of Agriculture and Forestry. Marketing of Agricultural Products under Growing Economy. Tokyo: Statistical Institution of Agriculture and Forestry, September, 1961.
- Japan Economic Planning Agency. "White Paper of National Life, 1960." Tokyo: The Printing Bureau, the Ministry of Finance, 1961.
- Japan Ministry of Agriculture and Forestry. "Economic Outlook of Agriculture, the Former Period of 1961." Tokyo: Statistical Institution of Agriculture and Forestry, August, 1958.
- Midoro, Tatsuo. "Marketing of Agricultural Products in Japan." Agricultural Development Series. Tokyo: Agriculture, Forestry and Fisheries Productivity Conference, March, 1960.
- Public Sanitation Bureau, Ministry of Welfare. "Present Condition of National Nutrition." Tokyo: Daiichi Shuppan Co., February, 1961.
- Statistical Institution of Agriculture and Forestry. "Agricultural Report." Tokyo: Statistical Institution of Agriculture and Forestry, February, 1962.

APPENDIX

Calculations for Income-Elasticity of Demand

The results of the calculations for income-elasticity of demand are placed here.

The calculation method described on page 5 was used.

The symbols are:

b = regression coefficient

a = interception point

$e_y$  = income-elasticity of demand

r = correlation coefficient.



Regression Analysis  
(Urban Area)

	b	a	ey	r	Regression equation
Domestic rice	(+).0532	(+) 88.0264	(+) .1251	(+).6789	Y = 88.0264+.0532X
Imported rice	(-).0046	(+) 1.7741	(-)1.5980	(-).8639	Y = 1.7741-.0046X
Barley	(-).0405	(+) 16.2739	(-)1.4308	(-).9306	Y = 16.2739-.0405X
Wheat flour	(-).0013	(+) 1.9507	(-) .1792	(-).5253	Y = 1.9507-.0013X
Soft noodle	(-).0082	(+) 7.4275	(-) .3561	(-).6851	Y = 7.4275-.0082X
Dried noodle	(-).0001	(+) 1.8231	(-) .0124	(-).0177	Y = 1.8231-.0001X
Other					
vermicellis	(-).0001	(+) 2.4472	(-) .0065	(-).0083	Y = 2.4472-.0001X
Plain bread	(+).0111	(+) 2.0792	(+) .5590	(+).8642	Y = 2.0792+.0111X
Variety of					
bread	(+).0019	(+) 3.3202	(+) .1198	(+).1632	Y = 3.3202+.0019X
Fresh &					
shell fish	(+).1576	(+)142.2504	(+) .2076	(+).6417	Y = 142.2504+.1576X
Dried &					
salted fish	(+).0176	(+) 41.7968	(+) .0905	(+).3430	Y = 41.7968+.0176X
Meat	(+).0904	(+) 27.5182	(+) .4372	(+).7135	Y = 27.5182+.0904X
Cow milk	(+).0326	(+) 2.2415	(+) .7745	(+).8481	Y = 2.2415+.0326X
Butter	(+).0132	(-) 1.2907	(+)1.7026	(+).9310	Y = -1.2907+.0132X
Hen egg	(+).0951	(+) 29.4528	(+) .4330	(+).7124	Y = 29.4528+.0951X
Edible oil	(+).0018	(+) .9378	(+) .3068	(+).4253	Y = .9378+.0018X
Margarine	(-).0037	(+) 2.9477	(-) .4230	(-).3427	Y = 2.9477-.0037X

Regression Analysis  
(Rural Area)

Y is taken in amount

	b	a	e <sub>y</sub>	r	
Domestic rice	(+).2376	(+)123.2297	(+) .2605	(+) .9521	Y=123.2297+.2376X
Imported rice	(-).0003	(+) .2674	(-) .2907	(-) .1457	Y= .2674-.0003X
Barley and Naked barley					
Purchased	(-).0160	(+) 6.2366	(-) .8817	(-) .7950	Y= 6.2366-.0160X
Self-support	(-).0632	(+) 28.8790	(-) .6672	(-) .9194	Y= 28.8790-.0632X
Total	(-).0784	(+) 35.0008	(-) .6938	(-) .9178	Y= 35.0008-.0784X
Wheat flour					
Purchased	(-).0026	(+) 1.4805	(-) .4700	(-) .6039	Y= 1.4805-.0026X
Self-support	(-).0183	(+) 9.4395	(-) .5475	(-) .8343	Y= 9.4395-.0183X
Total	(-).0214	(+) 11.0191	(-) .5520	(-) .8985	Y= 11.0191-.0214X
Miscellaneous cereals					
Purchased	(-).0007	(+) .2647	(-) .9502	(-) .5336	Y= .2647-.0007X
Self-support	(-).0032	(+) 1.9709	(-) .4150	(-) .7301	Y= 1.9709-.0032X
Total	(-).0039	(+) 2.2312	(-) .4665	(-) .7526	Y= 2.2312-.0039X
Fish					
Fresh fish & shell fish	(+).3486	(+) 73.6582	(+) .4638	(+) .8882	Y= 73.6582+.3486X
Dried and salted fish	(+).0373	(+) 25.6941	(+) .2096	(+) .8376	Y= 25.6941+.0373X
Total	(+).3775	(+)100.4990	(+) .4071	(+) .8889	Y=100.4990+.3775X
Meat	(+).0393	(+) 6.0094	(+) .5445	(+) .9480	Y= 6.0094+.0393X
Milk					
Purchased	(+).0069	(+) .8858	(+) .5880	(+) .7457	Y= .8858+.0069X
Self-support	(+).0033	(+) 3.4220	(+) .1506	(+) .2234	Y= 3.4220+.0033X
Total	(+).0110	(+) 4.1344	(+) .3270	(+) .4993	Y= 4.1344+.0110X
Butter	(+).0012	(-) .0557	(+)1.3390	(+) .8251	Y= -.0557+.0012X

Regression Analysis  
(Rural Area Concl.)

Y is taken in amount

	b	a	$e_y$	r	
Eggs					
Purchased	(+).0042	(+) 2.1849	(+) .2612	(+).4993	Y= 2.1849+.0042X
Self-support	(+).0682	(+) 16.3270	(+) .4331	(+).9009	Y= 16.3270+.0682X
Total	(+).0723	(+) 18.5656	(+) .4157	(+).9182	Y= 18.5656+.0723X
Edible oil					
Purchased	(+).0018	(+) .4384	(+) .4264	(+).9338	Y= .4384+.0018X
Self-support	(-).0008	(+) .8041	(-) .2371	(-).4917	Y= .8041-.0008X
Total	(+).0004	(+) 1.3405	(+) .0522	(+).2974	Y= 1.3405+.0004X
Margarine	(+).0001	(+) .1301	(+) .0893	(+).0688	Y= .1301+.0001X
Noodles and Other					
Vermicellis	(-).0045	(+) 6.4313	(-) .1455	(-).6272	Y= 6.4313-.0045X
Bread	(+).0011	(+) .2039	(+) .4991	(+).6606	Y= .2039+.0011X

Income-Elasticity of Demand in Rural Areas by Regional Distinction.

Rural Area	Hokkaido				
	b	a	$e_y$	r	Regression equation
Domestic rice	(+).4242	(+) 63.3343	(+) .5358	(+) .8336	Y = 63.3343+.4242X
Barleys	(-).1968	(+) 61.6629	(-) 1.2227	(-) .9171	Y = 61.6629-.1968X
Wheat flour	(-).0324	(+) 11.2465	(-) .9880	(-) .7544	Y = 11.2465-.0324X
Noodle	(-).0140	(+) 7.9763	(-) .4353	(-) .6025	Y = 7.9763-.0140X
Bread	(-).0005	(+) .2937	(-) .3876	(-) .1634	Y = .2937-.0005X

Rural Area	Tohoku				
	b	a	$e_y$	r	Regression equation
Domestic rice	(+).3596	(+) 135.2902	(+) .3208	(+) .8970	Y = 135.2902+.3596X
Barleys	(-).0061	(+) 8.7395	(-) .1424	(-) .3118	Y = 8.7395-.0061X
Wheat flour	(-).0069	(+) 4.5105	(-) .3698	(-) .4980	Y = 4.5105-.0069X
Noodle	(-).0061	(+) 5.6317	(-) .2377	(-) .6038	Y = 5.6317-.0061X
Bread	(+).0007	(+) .2128	(+) .3711	(+) .4503	Y = .2128+.0007X

Rural Area	Kanto				
	b	a	$e_y$	r	Regression equation
Domestic rice	(+).2069	(+) 112.7795	(+) .2391	(+) .9447	Y = 112.7795+.2069X
Barleys	(-).0256	(+) 27.2639	(-) .1917	(-) .5829	Y = 27.2639-.0256X
Wheat flour	(-).0149	(+) 16.3894	(-) .1840	(-) .4640	Y = 16.3894-.0149X
Noodle	(+).0052	(+) 5.9417	(+) .1308	(+) .3991	Y = 5.9417+.0052X
Bread	(+).0013	(+) .3557	(+) .3776	(+) .3770	Y = .3557+.0013X

Income-Elasticity of Demand in Rural Areas by Regional Distinction.

Rural Area (Concl.)

Tokaikinki

	b	a	$e_y$	r	Regression equation
Domestic rice	(+).1634	(+)134.2178	(+) .1976	(+) .8332	$Y = 134.2178 + .1634X$
Barleys	(-).0899	(+) 39.6340	(-) .8484	(-) .9370	$Y = 39.6340 - .0899X$
Wheat flour	(-).0003	(+) 3.4460	(-) .0157	(-) .0271	$Y = 3.4460 - .0003X$
Noodle	(-).0134	(+) 8.6031	(-) .4582	(-) .8249	$Y = 8.6031 - .0134X$
Bread	(+).0010	(+) .2672	(+) .4332	(+) .3544	$Y = .2672 + .0010X$

Chugoku

	b	a	$e_y$	r	Regression equation
Domestic rice	(+).1297	(+)149.0724	(+) .1461	(+) .3981	$Y = 149.0724 + .1297X$
Barleys	(-).0653	(+) 37.3107	(-) .5251	(-) .8845	$Y = 37.3107 - .0653X$
Wheat flour	(-).0011	(+) 5.0861	(-) .0456	(-) .1537	$Y = 5.0861 - .0011X$
Noodle	(-).0052	(+) 6.1322	(-) .1990	(-) .4345	$Y = 6.1322 - .0052X$
Bread	(+).0002	(+) .2411	(+) .1345	(+) .1452	$Y = .2411 + .0002X$

Kyushu

	b	a	$e_y$	r	Regression equation
Domestic rice	(+).0463	(+)141.7619	(+) .0520	(+) .2445	$Y = 141.7619 + .0463X$
Barleys	(-).0760	(+) 44.4816	(-) .4026	(-) .6422	$Y = 44.4816 - .0760X$
Wheat flour	(-).0026	(+) 10.7379	(-) .0432	(-) .0704	$Y = 10.7379 - .0026X$
Noodle	(+).0066	(+) 3.3065	(+) .2497	(+) .6280	$Y = 3.3065 + .0066X$
Bread	(+).0007	(+) .1068	(+) .5212	(+) .4075	$Y = .1068 + .0007X$



Income-Elasticity of Demand in Urban Areas by Regional Distinction.

Urban Area					Hokkaido
	b	a	ey	r	Regression equation
Domestic rice	(+) .1873	(+) 62.3209	(+) .4040	(+) .9070	Y = 62.3209+.1873X
Barleys	(-) .0187	(+) 8.7992	(-) .8783	(-) .4952	Y = 8.7992-.0187X
Wheat flour	(+) .0115	(-) .4557	(+) 1.2139	(+) .5490	Y = -.4557+.0115X
Noodle	(+) .0047	(+) 9.2829	(+) .1026	(+) .0913	Y = 9.2829+.0047X
Bread	(+) .0145	(+) 2.8838	(+) .5316	(+) .5167	Y = 2.8838+.0145X

					Tohoku
	b	a	ey	r	Regression equation
Domestic rice	(+) .0450	(+) 90.4844	(+) .1088	(+) .3587	Y = 90.4844+.0450X
Barleys	(+) .0049	(+) 5.1036	(+) .1845	(+) .0868	Y = 5.1036+.0049X
Wheat flour	(+) .0047	(+) .9272	(+) .5389	(+) .3806	Y = .9272+.0047X
Noodle	(-) .0065	(+) 10.6395	(-) .1763	(-) .2244	Y = 10.6395-.0065X
Bread	(+) .0162	(+) 1.2061	(+) .7666	(+) .5589	Y = 1.2061+.0162X

					Kanto
	b	a	ey	r	Regression equation
Domestic rice	(+) .1868	(+) 51.8165	(+) .4448	(+) .8356	Y = 51.8165+.1868X
Barleys	(-) .0210	(+) 9.2162	(-) .9909	(-) .4290	Y = 9.2162-.0210X
Wheat flour	(-) .0016	(+) 2.1463	(-) .1981	(-) .2046	Y = 2.1463-.0016X
Noodle	(+) .0501	(+) .5966	(+) .9491	(+) .6510	Y = .5966+.0501X
Bread	(+) .0543	(-) 2.3136	(+) 1.2374	(+) .6208	Y = -2.3136+.0543X

**Income-Elasticity of Demand in Urban Areas by Regional Distinction.**

**Urban Area (Cont.)**

**Keihin**

	<b>b</b>	<b>a</b>	<b>e<sub>y</sub></b>	<b>r</b>	<b>Regression equation</b>
Domestic rice	(+).1119	(+)55.9815	(+) .3191	(+).7674	Y = 55.9815+.1119X
Barleys	(-).0242	(+) 9.5211	(-)1.4836	(-).9105	Y = 9.5211-.0242X
Wheat flour	(+).0008	(+) 1.3448	(+) .1247	(+).1665	Y = 1.3448+.0008X
Noodle	(-).0277	(+)17.1565	(-) .6109	(-).7060	Y = 17.1565-.0277X
Bread	(+).0295	(+) 5.9024	(+) .5393	(+).8371	Y = 5.9024+.0295X

**Chubu**

	<b>b</b>	<b>a</b>	<b>e<sub>y</sub></b>	<b>r</b>	<b>Regression equation</b>
Domestic rice	(+).0668	(+)95.9809	(+) .1372	(+).4391	Y = 95.9809+.0668X
Barleys	(-).0458	(+)20.1314	(-)1.0840	(-).9174	Y = 20.1314-.0458X
Wheat flour	(-).0047	(+) 2.8271	(-) .6155	(-).5982	Y = 2.8271-.0047X
Noodle	(-).0181	(+)16.1446	(-) .3455	(-).5398	Y = 16.1446-.0181X
Bread	(+).0150	(+) 3.2087	(+) .5162	(+).7214	Y = 3.2087+.0150X

**Setonai**

	<b>b</b>	<b>a</b>	<b>e<sub>y</sub></b>	<b>r</b>	<b>Regression equation</b>
Domestic rice	(+).0897	(+)85.3555	(+) .1897	(+).6709	Y = 85.3555+.0897X
Barleys	(-).0533	(+)20.0684	(-)1.4493	(-).8611	Y = 20.0684-.0533X
Wheat flour	(+).0040	(+) 1.0470	(+) .4607	(+).5126	Y = 1.0470+.0040X
Noodle	(-).0067	(+) 8.2863	(-) .2204	(-).3223	Y = 8.2863-.0067X
Bread	(-).0067	(+) 7.1773	(-) .2619	(-).4079	Y = 7.1773-.0067X

Income-Elasticity of Demand in Urban Areas by Regional Distinction.

Urban Area (Concl.)

Keihanshin

	b	a	$e_y$	r	Regression equation
Domestic rice	(+).1773	(+)62.7904	(+) .3970	(+) .9215	$Y = 62.7904 + .1773X$
Barleys	(-).0071	(+) 5.5875	(-) .4202	(-) .8149	$Y = 5.5875 - .0071X$
Wheat flour	(+).0029	(+) .7040	(+) .4893	(+) .5470	$Y = .7040 + .0029X$
Noodle	(+).0337	(+) 2.1689	(+) .7835	(+) .8103	$Y = 2.1689 + .0337X$
Bread	(+).0374	(+) .7865	(+) .9173	(+) .8811	$Y = .7865 + .0374X$

Kyushu

	b	a	$e_y$	r	Regression equation
Domestic rice	(+).0413	(+)97.3175	(+) .0987	(+) .6620	$Y = 97.3175 + .0413X$
Barleys	(-).0800	(+)32.1852	(-)1.6483	(-) .8203	$Y = 32.1852 - .0800X$
Wheat flour	(+).0099	(+) .6912	(+) .7868	(+) .5747	$Y = .6912 + .0099X$
Noodle	(-).0098	(+)10.1676	(-) .3291	(-) .4847	$Y = 10.1676 - .0098X$
Bread	(+).0341	(+) 1.0137	(+) .8933	(+) .8112	$Y = 1.0137 + .0341X$

AN ANALYSIS OF GRAIN CONSUMPTION IN JAPAN

by

TETUSI YAMADA

B. S., Osaka Prefectural University, 1960

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AN ABSTRACT OF A MASTER'S THESIS

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Today, wheat, barley and naked barley are the principal cereals consumed in Japan, aside from rice. The objectives of this study were (1) to analyse the current consumption of grain, and (2) to predict probable future trends in grain consumption.

Data were collected which related to the probable reasons for changes in the consumption of grain. These were (1) the change on the supply side, such as change in production and import, (2) changes in production and consumption of the related goods, and (3) the change caused by the change in income, population, taste, and price. These data are published by the Ministry of Agriculture and Forestry, the Ministry of Welfare, the Economic Planning Agency, the Food Agency, and the Statistical Institution of Agriculture and Forestry. Careful analysis of these data were made.

An analysis was also made to find out the relationships between income and consumption so that future movement of consumption can be predicted as income changes.

The pattern of food consumption after World War II differs greatly from its pre-war counterpart. The greatest change with regard to staple foods has been the decreased rice consumption and the increased consumption of wheat. The per capita consumption of wheat has increased three times that of the pre-war level because of the popularization of powdered foods. Such a change in the consumption of staple foods has resulted in an increased consumption of animal products such as meat, eggs, milk and fats and oils. The dominant factors that caused those changes are:



(1) an increased level of national income; (2) an increased urban population and urbanization of rural areas; (3) diffusion of knowledge about nutrition; (4) change in a habit of life. However, the good rice harvest in recent years has increased rice consumption to a certain extent. But yet calculation of income-elasticity of demand for rice by the Statistics and Survey Division of Ministry of Agriculture (in which the same calculation method had been used being based on the 1957 year data which is one year older data from that which we used here) shows the income-elasticity of demand for rice in urban area was (+)0.3 in 1957. From our calculation based on 1958 data, the elasticity of (+)0.1 was derived. The elasticity of demand for rice has dropped remarkably within a year. Consequently, we can conclude that the increase in per capita consumption of rice in recent years is a temporary one and will decrease in the future. As shown by the negative elasticities of demand for barleys in both urban and rural areas, barley consumption will decrease in the future. As for noodle consumption, it was observed that per capita consumption would likely increase in the future in urban areas but in the rural areas it is unlikely to show much increase. Per capita consumption of bread will increase steadily both in rural and urban areas as income goes up. So wheat consumption as a whole will definitely increase owing to both per capita consumption increase and population increase.