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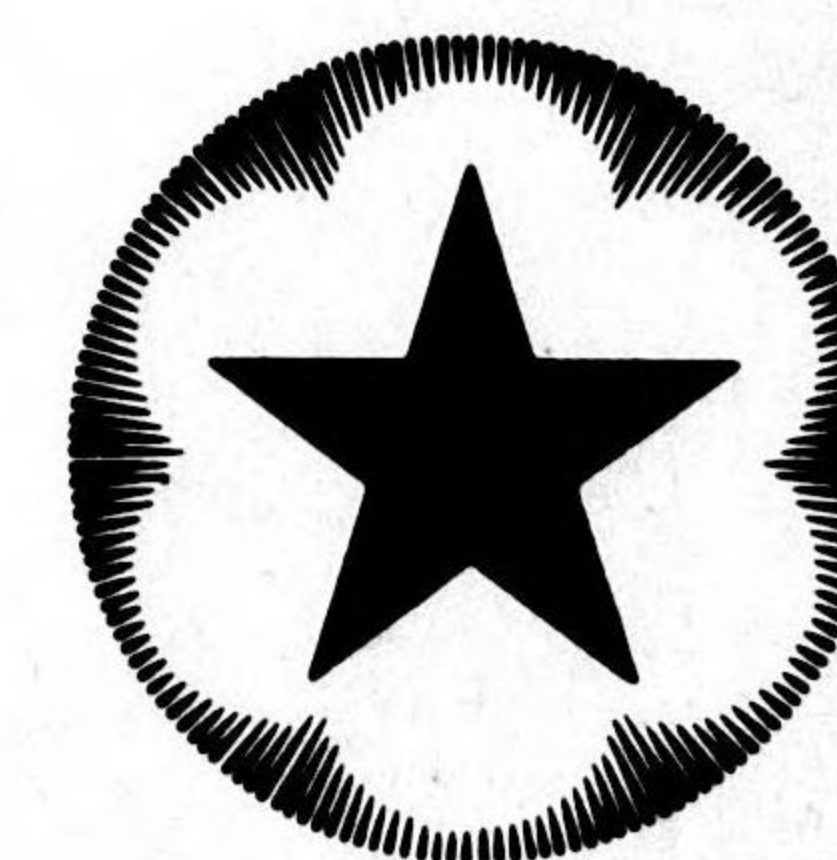
ARMY SERVICE FORCES MANUAL

M 354-7

CIVIL AFFAIRS HANDBOOK

JAPAN

SECTION 7: AGRICULTURE



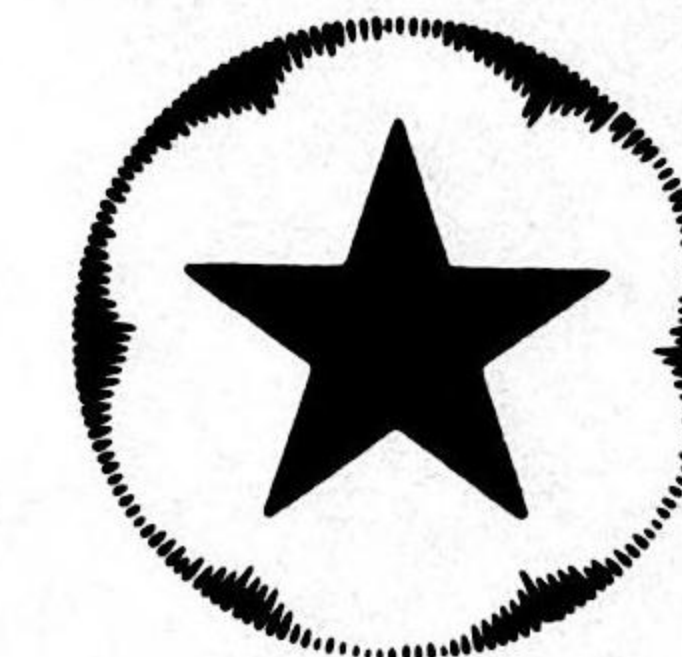
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CIVIL AFFAIRS HANDBOOK

JAPAN

SECTION 7: AGRICULTURE



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M1 - M99 Basic and Advanced Training
M100 - M199 Army Specialized Training Program and Pre-
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M500 - M599 Fiscal
M600 - M699 Procurement and Production
M700 - M799 Administration
M800 - M899 Miscellaneous
M900 up Equipment, Materiel, Housing and Construction

* * *

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Section 7, Agriculture, has been prepared under the supervision of

The Provost Marshal General, and is published for the information and guidance
of all concerned.

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This study on Agriculture in Japan was prepared for the
MILITARY GOVERNMENT DIVISION, OFFICE OF THE PROVOST MARSHAL GENERAL
by the

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

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INTRODUCTION

Purposes of the Civil Affairs Handbook.

The basic purposes of civil affairs officers are (1) to assist the Commanding General by quickly establishing those orderly conditions which will contribute most effectively to the conduct of military operations, (2) to reduce to a minimum the human suffering and the material damage resulting from disorder and (3) to create the conditions which will make it possible for civilian agencies to function effectively.

The preparation of Civil Affairs Handbooks is a part of the effort to carry out these responsibilities as efficiently and humanely as is possible. The Handbooks do not deal with plans or policies (which will depend upon changing and unpredictable developments). It should be clearly understood that they do not imply any given official program of action. They are rather ready reference source books containing the basic factual information needed for planning and policy making.

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CIVIL AFFAIRS HANDBOOKS
TOPICAL OUTLINE

1. Geographical and Social Background
2. Government and Administration
3. Legal Affairs
4. Government Finance
5. Money and Banking
6. Natural Resources
7. Agriculture
8. Industry and Commerce
9. Labor
10. Public Works and Utilities
11. Transportation Systems
12. Communications
13. Public Health and Sanitation
14. Public Safety
15. Education
16. Public Welfare
17. Cultural Institutions

This study on Agriculture in Japan was prepared for the MILITARY GOVERNMENT DIVISION, OFFICE OF THE PROVOST MARSHAL GENERAL by the OFFICE OF FOREIGN AGRICULTURAL RELATIONS, UNITED STATES DEPARTMENT OF AGRICULTURE.

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Introduction

Today, as in the past, agriculture remains the backbone of Japan's economic life. The unprecedented progress of industrialization in Japan, particularly in the past decade, has tended to obscure this fact. In reality, however, the importance of agriculture in modern Japan is still very great. The rural population constitutes approximately 40 percent of the total. Agriculture before the war continued to provide most of the nation's food, while in terms of capital invested and net value of output, agriculture in the early 1930's was the country's leading industry.

All this agricultural structure rests upon not more than 15,000,000 acres of cultivated land, made up of minute, well-tilled farms and gardens producing 80 percent of the rice, and all the wheat consumed, in addition to considerable quantities of other grains and tuber and root crops. The mulberry acreage made Japan into the world's largest silk producer, providing 90 percent of all silk entering international trade. By the same token, cocoons became Japan's principal cash crop, as well as the country's principal export of domestic origin. There are also the tea-gardens with an output of some 120 million pounds, of which about one-third is exported.

Despite its importance in Japan's economy, agriculture has not been in a sound, economic state for years past. In recent

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years it has not been able to provide even the frugal needs of a great number of its farmers.

The reasons underlying this state of affairs are implicit in Japan's agricultural economy, described and analyzed in the pages that follow. Suffice it to say here that topography, the pressure of population on the land, and governmental policies shaping Japan's industrialization, and a number of other factors - all these have had much to do with the relatively small area under cultivation, small farm units, widespread tenancy and a very low standard of living of the mass of Japanese farmers. At the same time the unrelenting official efforts toward food self-sufficiency has resulted in the expansion of the crop acreage and in a proportionately larger increase in output.

Since 1880 there has been an increase of over 90 percent in the production of rice, three-fourth of which has been due to a higher yield per acre and only one-quarter to an increase in area under cultivation. This is a remarkable record, but it doesn't contain much promise for the future development of Japanese agriculture. In the past decade or so, yields have remained more or less stationary, notwithstanding the ever increasing application of fertilizers; while the annual increase of arable land has been only 39,000 acres. According to Japanese sources this represents only one-fourth of the new acreage required to meet Japan's rising food requirements. But to achieve even this relatively small increase, it has become necessary to cultivate mountainsides and, in some cases, the summits of hills.

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While in peacetime Japanese farmers on the whole were shouldering numerous burdens, they nevertheless were producing by far the greater part of the food consumed in the country. There were, to be sure, some glaring food deficiencies. Practically all of the sugar had to be imported from Formosa; two-thirds of the soy beans from Manchuria and Korea; and 20 percent of the rice from Korea and Formosa. All other crops, however, were supplied by Japan's agriculture in large enough quantities to satisfy domestic requirements.

Since Japanese invasion of China in 1937, various factors have come to lower the productive power of the land, such as the drafting for the army and navy of able-bodied young farmers, the flow of farm labor into the munition industry, the commandeering of horses, and the inadequate or defective supply of fertilizer and other materials necessary to maintain production. Prior to the attack on Pearl Harbor, the effects of these shortages were not very pronounced, especially with respect to farm labor and animal power. The crowded Japanese villages paid dividends, as it were, for once. In the past two years the factors have grown more formidable, while the war itself demands a rising scale of agricultural production.

Thus, the keynote of all official exhortation to the farmers is to increase the production of important agricultural crops, chiefly staple food. Under Japanese conditions the expansion of cultivated land can hardly be taken into account. The main reliance is upon the converting of land under fruit trees and perhaps some of the less concentrated vegetables to the production of rice, wheat, and potatoes.

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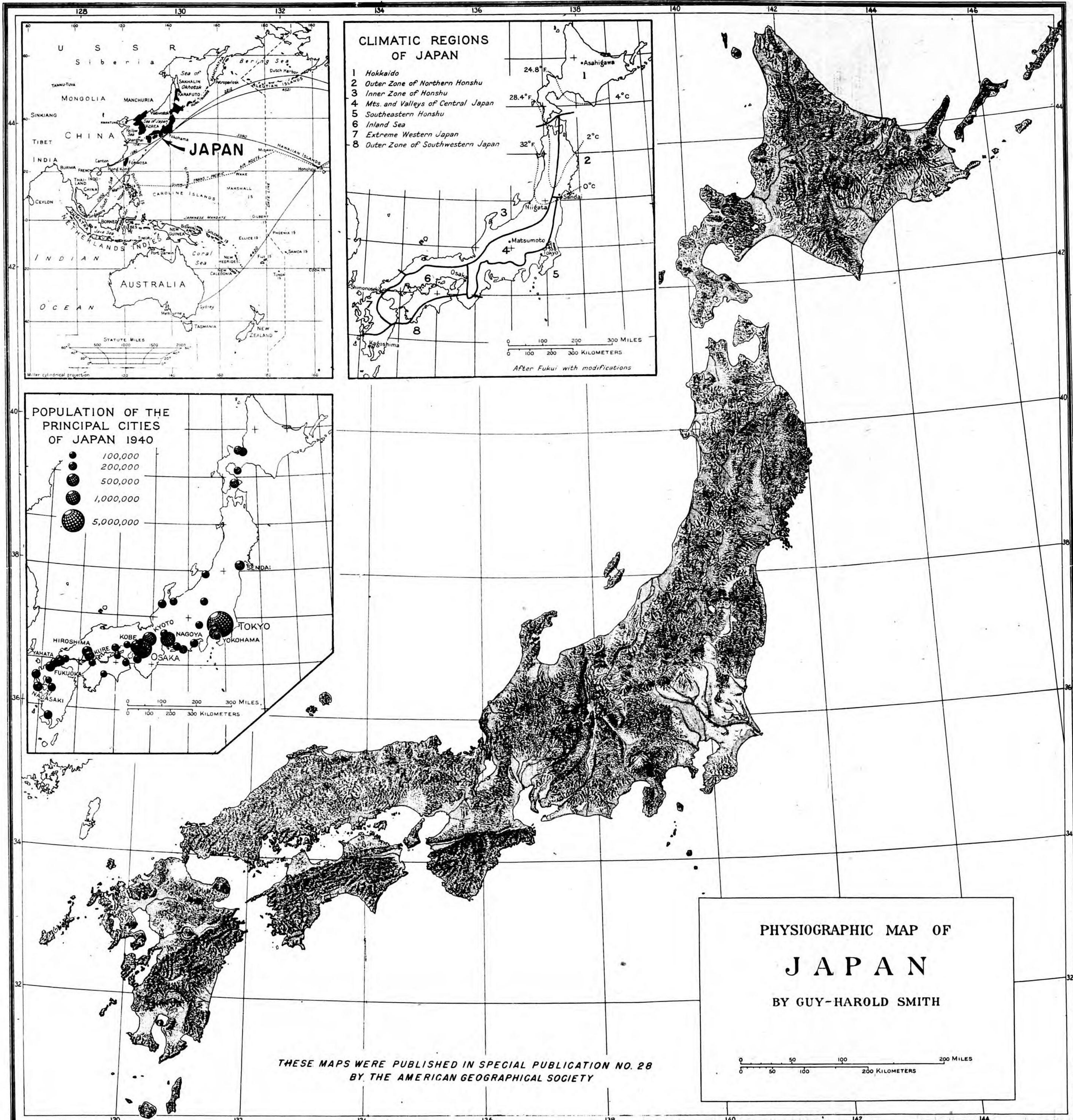
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which yield more calories per acre, even at the danger of impairing the quality of the diet in respect to vitamins and minerals. Manchuria, Korea and Formosa and the newly overrun countries are included in the scheme of increased production.

Judging by the food consumption in Japan in 1943, the problem of how to produce more food is far from a solution, although the estimated potato production has shown a marked rise. Early in the spring of 1943 the Japanese Minister of Agriculture urged the farmers to produce more rice, despite the fact that Burma, Thailand and French Indo-China (now dominated by Japan), are large surplus rice producers. Considering that the exportable surplus of these countries amounts to about six million tons annually, Japan's 1943 takings of one million tons of rice is rather small. Shipping hazards, lack of shipping, great distances, and the possibility of being cut off altogether from these distant sources, are the principal reasons behind the policy that calls for production of the requisite amount of rice and other foodstuffs at home and in the nearby colonies.

In order to effectuate this policy, Japan at least must have sufficient supplies of fertilizer and farm labor. Yet the same minister who insisted upon a greater rice output, confirmed, what has been suspected for some time, that little or nothing could be done to relieve the admitted shortage of fertilizer and farm labor, and especially fertilizer. The prospects, therefore, for an increased agricultural output and consumption in the year or two immediately ahead are not promising, unless, of course, Japan should be able to find sufficient shipping and keep her sea lanes open.

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CLIMATIC REGIONS OF JAPAN

- 1 Hokkaido
- 2 Outer Zone of Northern Honshu
- 3 Inner Zone of Honshu
- 4 Mts. and Valleys of Central Japan
- 5 Southeastern Honshu
- 6 Inland Sea
- 7 Extreme Western Japan
- 8 Outer Zone of Southwestern Japan

POPULATION OF THE PRINCIPAL CITIES OF JAPAN 1940

- 100,000
- 200,000
- 500,000
- 1,000,000
- 5,000,000

PHYSIOGRAPHIC MAP OF
JAPAN
 BY GUY-HAROLD SMITH

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PART I. THE LAND AND THE PEOPLE

Physical Factors in Agriculture

Topography

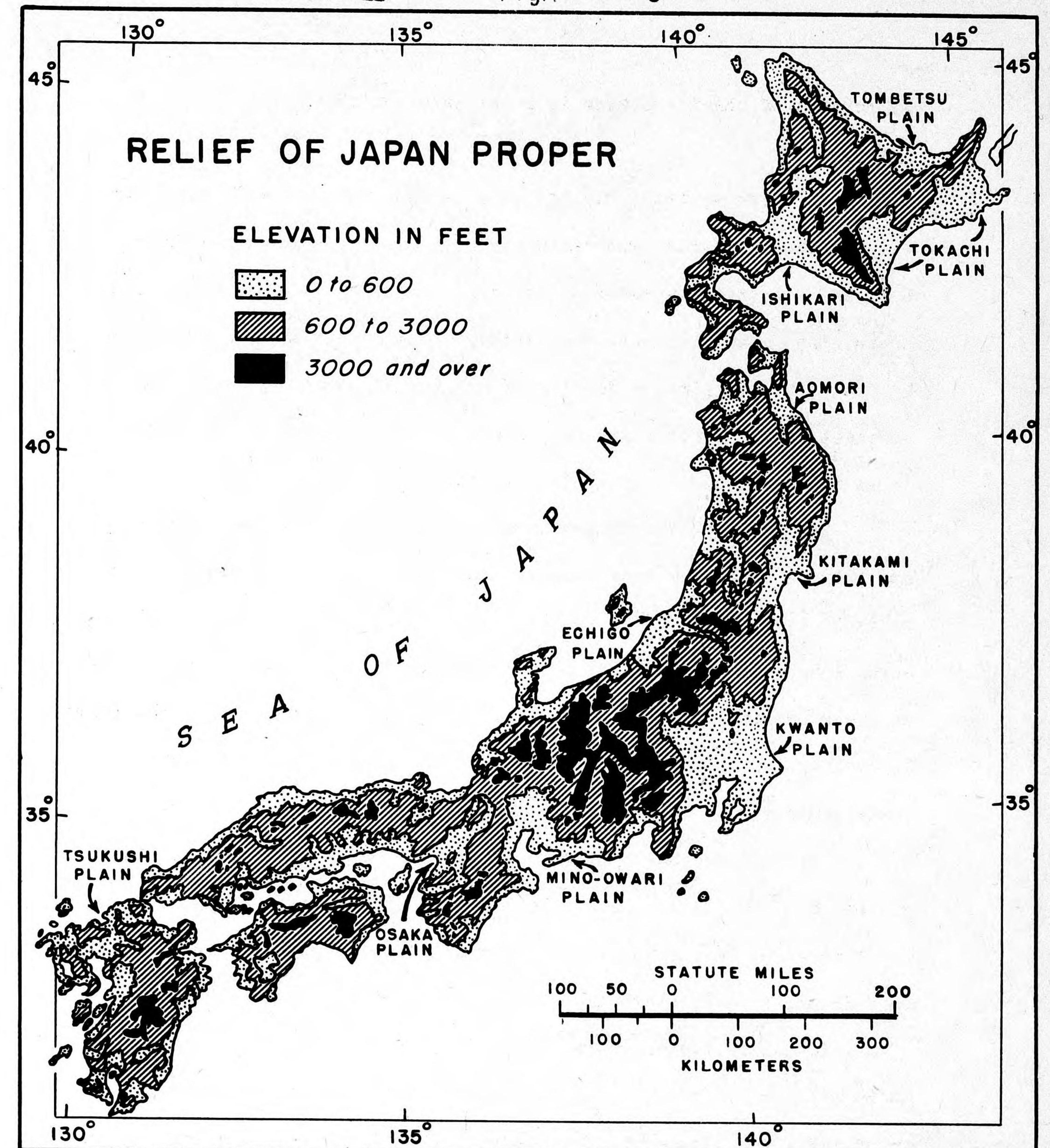
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Japan Proper consists of the mainland, or the Island of Honshu, the northern Island of Hokkaido, the southerly Islands of Kyushu and Shikoku, a chain of small islands (Ryukyu) to the south of Shikoku. Despite climatic and other differences, all of these islands are closely related topographically, economically and administratively, and may therefore be treated as one unit. The total area of Japan as thus defined is 147,416 square miles, which is almost exactly equal to that of the State of Montana. The maximum length from north to south is 2,100 miles and from west to east 200 miles.

From the point of view of topography, climate and soil, Japan may be classified among the poorer agricultural countries. The topography of the country is generally steep and mountainous. A range of high mountains traverses Japan and divides it into two principal parts; one sloping to the Pacific Ocean on the east, the other sloping westward to the Sea of Japan. Notwithstanding the narrowness of the mainland, the mountains rise to a height of 12,000 feet (Fuji), and there are 18 important peaks more than 8,000 feet in height. Roughly, 75 percent of the area of Japan is hilly or mountainous country in which slopes are usually too steep and soils too thin for ordinary cultivation.
1/ Hereafter referred to as Japan.

Since the mountain regions occupy the central and greater part of the country, there are no extensive plains in Japan such as are found in continental countries. The typical plains of Japan are mainly narrow coastal lowlands; they are found also along the banks of some of the larger rivers or along the bottoms of narrow, steep-sided valleys. The most important level tract of land is the Kwantō Plain, but it comprises an area of only 3.5 million acres. It contains more than 80 cities with populations of more than 10,000 each, among them the two largest, Tokyo and Yokohama. The Mino-Owari, surrounding Nagaya; the Kinai, surrounding Osaka; the Echigo on the Sea of Japan; the Kitakami north of the Kwantō, and the Ishikari in Hokkaido are the other plains of importance. (Figure 1.)^{1/} These comprise the most valuable agricultural districts of Japan. Large tracts of the lowlands are rendered practically unfit for tillage because of the abundance of coarse sediment deposited by the swollen mountain streams.

This preponderance of highlands with steep slopes and rock wastes sets definite and striking limits to the cultivated area. The area of level land is small. The small percentage of cultivated land as given in Japanese agricultural statistics includes not only the plains but the lower slopes of many hills and mountains as well. The topography of the country explains why not more than 15 million acres, or less than 16 percent of the total estimated land area of Japan, is cultivated. Compared with other countries the ratio is small; before the war Italy cultivated 41 percent; Germany 40 percent; France 39 and Great Britain 22 percent of the total land area. Even in continental United States, where a considerable area of arable land has not yet been put to use.^{1/} Bergsmark, David R. Economic Geography of Asia, 1942, p. 375.



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18 percent of the total area is under cultivation.

Climate

The wide variation in latitude between the northern and southern extremes of Japan (approximately mid-Maine to extreme southern Georgia) suggests a variety of climatic zones. In addition, the monsoons, the ocean currents, topography, and the proximity to the mainland of Asia - all these have fashioned the climate of Japan. The nearness to Asia, for instance, is one of the reasons why the climate of so insular a country as Japan is not purely oceanic.

Temperature. The temperature in Asahigawa, Hokkaido averages annually 41.5°F., the mean temperature in January, the coolest month, being 14.2°F., and 68.5°F. in August, the warmest month. (Table 1). For a long time the severity of the climate in Hokkaido was looked upon as a serious deterrent to the expansion of agricultural activities there. In reality, for certain crops, and over the greater part of Hokkaido, the climate is not unfavorable notwithstanding the long, cold winter, and the frost-free season of only 120 days. Generally speaking, the winters of Hokkaido are much like those of northeastern United States, where freezing temperatures may be expected shortly after the first of October and snowfall late in the same month.

In central Japan (Tokyo station) the average annual temperature is 56.8°F., while the mean temperature of the coolest month (January) is 37.4°F., and of the warmest (August) 77.7°F. The respective figures for Kagoshima (southernmost part of Japan) are 61.9° 45.0° and 79.9°F. The latter has seasonal temperatures similar to Montgomery, Alabama, while for Tokyo in mid-Japan, Raleigh, North Carolina is the counterpart. The frost-free season along the extreme southern and eastern

littoral is about 260 days, which explains the wide variety of crops grown there.

Snow, frosts and typhoons, by-products of Japan's climate, handicap to a certain extent the utilization of farm land. In northern Japan, where the snowfall is heavy, a second crop on rice fields is very difficult, if not impossible. Where it is practiced, damages are very often extensive. Somewhat the same is true of frost in the northern and in some other regions of the country. The typhoon, too, contributes its share of damage. It is almost a yearly occurrence, usually taking place in August and September. The typhoons are accompanied by severe rainstorms that bring in their wake floods and damage to crops.

Efforts have been made through afforestation, the utilization of trees as wind belts, and improvement in irrigation facilities to lessen the effects of natural disasters, but they continue to be severe. (Table 2). The Imperial Agricultural Society estimated that in 1938 the damage sustained by 25 prefectures due to floods and typhoons amounted to 108 million yen.

Precipitation. From the point of view of proper land utilization, Japan enjoys ample precipitation. The amount of precipitation for the entire country ranges from 45 to 100 inches. From north to south, and through the entire northern and some of the central coast of Japan the precipitation ranges from 40 to 60 inches. The heavier rainfall lies to the west and south of that belt. (Figure 2).^{1/} The seasonal rains in June and July, together with the fairly dry weather in August, are peculiarly suited to the growing of irrigated rice.

^{1/} Adapted from: Bergsmark, Daniel R., Economic Geography of Asia, 1942, p. 381.

Table 1. - Mean Temperatures at Eight Representative Stations in Japan
Annual 1897 through 1926. 1/

Regional station	Temperature				
	Mean (Annual)	Mean A (Warmest Month)	Mean B (Coolest Month)	Range A to B	
Asahigawa	41.5° F.	68.5° F. (Aug.)	14.2° F. (Jan.)	54.3° F.	
Sendai	51.8	74.8 (Aug.)	30.7 (Feb.)	44.1	
Niigata	54.7	77.7 (Aug.)	34.7 (Jan.)	43.0	
Matsumoto 2/	50.5	73.0 (Aug.)	28.2 (Jan.)	44.8	
Tokyo	56.8	77.7 (Aug.)	37.4 (Jan.)	40.3	
Osaka	59.2	81.1 (Aug.)	39.9 (Jan.)	41.2	
Shimonoseki	59.4	79.5 (Aug.)	41.5 (Feb.)	38.0	
Kagoshima	61.9	79.9 (Aug.)	45.0 (Jan.)	34.9	

Source: Smith, Guy-Harold and Good, Dorothy, *Japan: A Geographical View*, Published by American Geographical Society, 1943, p. 16. Quoted from Okada: *The Climate of Japan*.

1/ Observations cover the years 1927 through 1929.

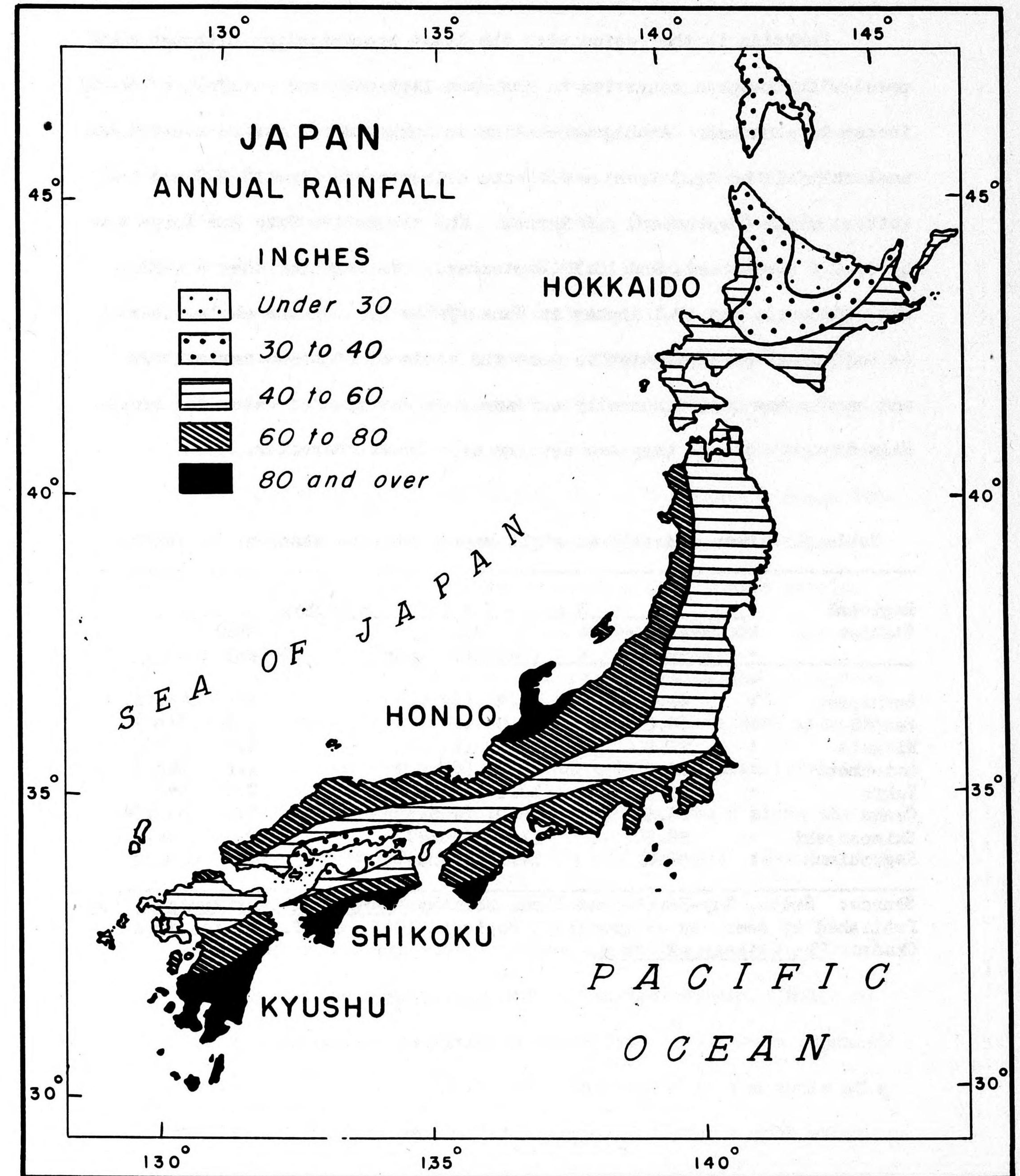
2/ Observations cover the years 1898 through 1929.

Table 2. - Damage to Agricultural Crops in Japan from Natural Disasters.
Acreage and Average 1926 to 1934

Damage from	Rice		Mulberry		Others	
	Area	Value	Area	Value	Area	Value
	1,000	1,000	1,000	1,000	1,000	1,000
	acres	yen	acres	yen	acres	yen
Typhoons	352.9	1,325	32.3	1,002	189.2	7,133
Floods	175.3	1,137	23.5	757	82.4	3,288
Droughts	176.7	15,451	23.4	681	175.4	7,927
Insects	140.7	5,836	2,239.1	824	64.8	1,998
Others	321.0	22,974	119.2	8,337	488.7	13,567
Total annual average	1,166.6	46,723	2,437.5	11,601	1,000.5	33,913

Office of Foreign Agricultural Relations. Compiled from data of the Bureau of Statistics, Japanese Ministry of Agriculture and Forestry.

Fig. 2 RESTRICTED



Hokkaido is the region with the least precipitation although compared with European countries in the same latitude, the rainfall of 40-50 inches is abundant. Asahigawa station in Hokkaido records an average annual rainfall of 42.3 inches, with the driest month (April) 2.0 and the wettest month (September) 5.8 inches. The respective data for Tokyo are 64.0, 2.2 (December), and 10.1 (September). In Kagosima they are 88.3, 3.4 (January), and 17.1 inches in June (Table 3). On the whole, there is sufficient precipitation to meet the needs of Japanese agriculture and hardly any region normally suffers from shortage of water for crops. When droughts occur, they are usually of a local character.

Table 3. - Mean rainfall at eight representative stations in Japan

Regional Station	Rainfall (in inches)		
	Mean (Annual)	Mean (Wettest month)	Mean (Driest month)
Asahigawa	42.3	5.8 (Sept.)	2.0 (April)
Sendai	44.5	6.0 (April)	1.3 (Feb.)
Niigata	72.9	9.1 (Dec.)	3.7 (May)
Matsumoto	44.0	6.9 (Sept.)	1.6 (Dec.)
Tokyo	64.0	10.1 (Sept.)	2.2 (Dec.)
Osaka	54.5	8.2 (June)	1.9 (Dec.)
Shimonoseki	66.6	11.7 (June)	2.7 (Nov.)
Kagosima	88.3	17.1 (June)	3.4 (Jan.)

Source: Smith, Guy-Harold and Good, Dorothy, Japan: A Geographical View. Published by American Geographical Society, 1943, p. 17. Quoted from Okada: The Climate of Japan.

Soils

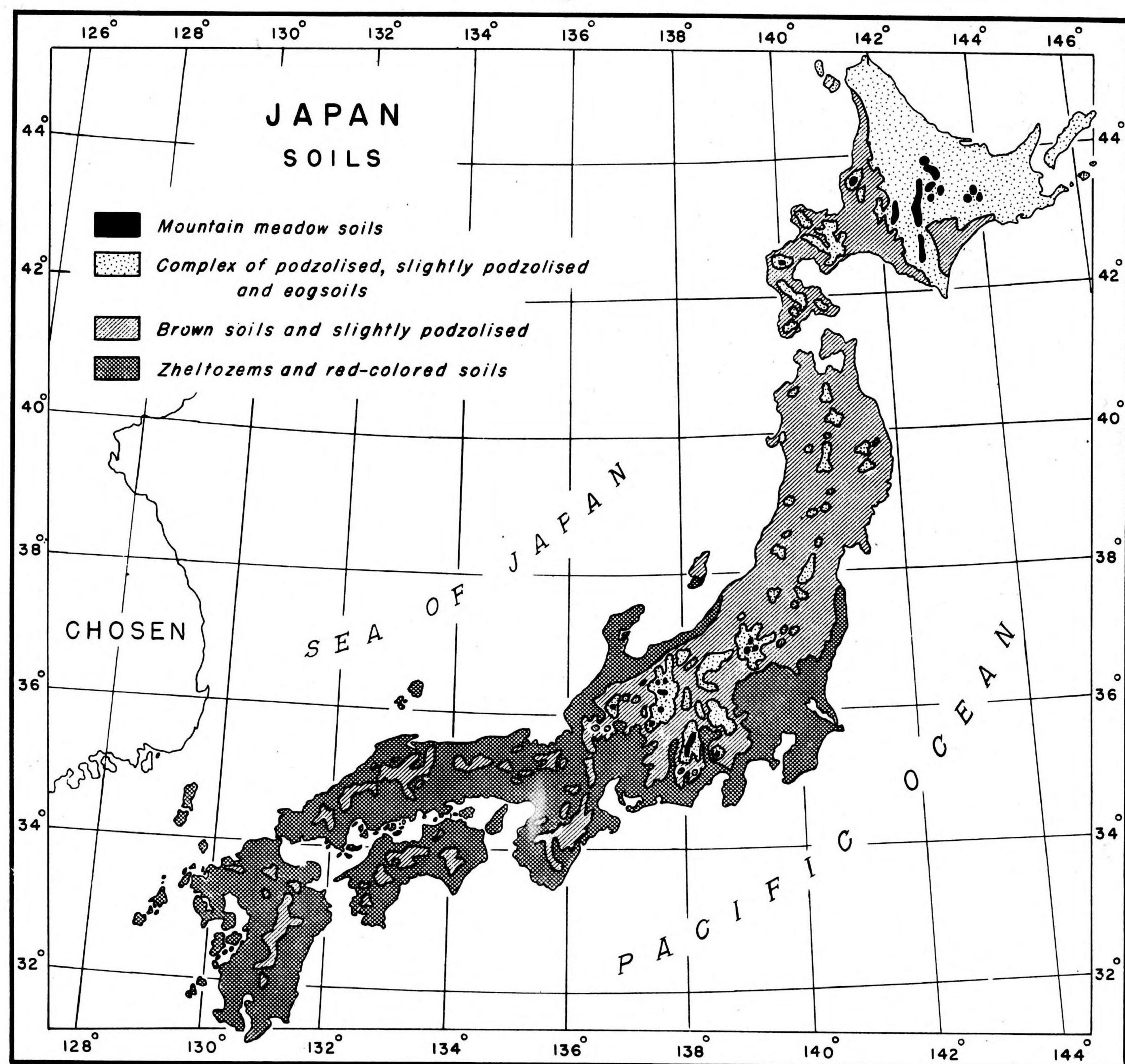
The soils of Japan have developed under a wide variety of influences. Materials from which they are derived include both igneous and sedimentary rocks, as well as volcanic ash and unconsolidated deposits of Pleistocene times. Soils themselves, in some cases, have developed in place, into what are spoken of as residual soils. In other cases, especially in valleys and on the plains, they have originated from deposits by rivers and streams. Climatic influences also, vary considerably, from cold temperate conditions in the extreme north to semi-tropical conditions in the south. As would be expected, therefore, the soils themselves are of many kinds, with different characteristics. For purposes of description, three regions may be defined, (Figure 3) in each of which soil characteristics are broadly similar.

The first of these regions includes Japanese Sakhalin, and a large portion of Hokkaido. Soils of this region are mainly podsolized soils, derived from sedimentary and igneous rocks. Developed mineral soils, derived from these materials, are of moderately high fertility. However, there are important areas of volcanic ash, found along the southeastern coast of Hokkaido, where soils are coarse in texture, highly porous and of low inherent fertility.

The second region includes southwestern Hokkaido, the northern part of Honshu and the mountainous part of central Honshu. Soils of this region are classified as slightly podsolized or as brown (Ramann) soils. While volcanic ash forms a major constituent in the soils of a small part of this region, and a minor constituent over a much wider

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Fig. 3



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area, the parent material of soils for the most part is of rock, of which more than half is sedimentary. A noteworthy feature of the soils in this region is the area of strongly acid soils, found in its southwestern portion.

The third region includes the remaining part of Honshu, together with all of Shikoku and Kyushu. Soils in this region are yellow and red earths, formed under the action of a high temperature and an abundant rainfall. Included within this region are some of the most important agricultural soils of Japan, those of the coastal plains area of central Honshu. A lateritic type of weathering tends to remove the silica and to leave a higher proportion of the oxides of iron and aluminum than are in the remaining soils of Japan. A large part of these soils are near neutral in reaction; but they are, nevertheless, largely leached of their bases, including calcium.

An important group of soils within this region are what have been called "Onji" soils. These appear to be made up of soils of this general type of weathering, but soils in which the weathering has proceeded to an unusual degree. It is stated that they are widely distributed over the central and southern parts of Kyushu, and they are generally regarded as being inherently very infertile.

In each of these three regions there exist small areas of quite sandy soils along the seacoast. With heavy fertilization they produce good yields of upland crops, but they are not suitable for rice. A much higher proportion of all soils are of clay texture, which readily hold water in the paddies but in which aeration is so poor that organic materials do not easily decompose, and the percolation of water is too

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slow for best results. More than half the land, however, appears to be of a loamy texture, which provides a suitable degree of both water and air percolation.

Taking all factors into consideration, therefore, one cannot say that most of the soils of Japan possess a high degree of natural fertility. It appears, rather, that the larger part are inferior in this respect, and that high production has been obtained in most cases only upon careful attention to the needs of each particular soil situation. In upland soils, and in paddy soils where a legume is grown as a winter crop, lime must be applied to make up the deficiency of calcium. The application of phosphorous is often found profitable, and in certain cases potash is necessary. Nearly all soils are strongly deficient in nitrogen; and particularly large amounts of lime, nitrogen and phosphorus are necessary for good yields on the "Onji" soils. To lighten soils of heavy texture green manures and organic farm manures are very helpful; and sandy soils are also benefited by an application of the same materials. Painstaking efforts to meet the needs for these materials may be taken as the most important reason behind the success Japanese farmers have had in securing the present high level of production.

Human Factor in Agriculture-Population

The population of Japan: density.

For a long time prior to the Meiji Restoration (1868), the country's population remained more or less constant. In 1872 it was estimated at about 35 million. The rapid industrialization that followed the opening of Japan went hand-in-hand with a striking rise in the growth of population. By 1918 the population of Japan stood at 55 million. In the period 1913-1918 the annual increase was 687,000. Between 1920-1924 it amounted to 754,800. Since then, particularly in the past decade, it has amounted to some 900,000 per year. As of October 1, 1940, the total population of Japan was estimated at 73,000,000.

Although outstripped by Java and Madaira, Netherlands, United Kingdom and Belgium, Japan is clearly one of the world's most densely populated countries, as indicated by the number of inhabitants in relation to the total land area. (Table 4). A better measure of comparison is found in the ratio of population to cultivated land. On this basis, only, Formosa has the highest density with 6.5 persons per cultivated acre. Japan's density of 4.8 persons is equal to that of the United Kingdom and is higher than any other country listed in the table.

The significance of this ratio between cultivated land and the population of a country can, however, be over-emphasized since an acre of cultivated land as a factor of production often varies from one country to another. England and Belgium have a very high population density per acre of land, but they are called upon to feed only part of their population through their own agricultural resources. Being highly

Table 4. - Inhabitants per square mile and per acre of cultivated land.
Japan compared with specified countries, 1938

Specified Countries	Total Area : 1.000 : sq. miles	Number of inhabitants : 1.000	Inhabitants : per sq. mile	Total Cultivated : 1.000 acres	Inhabitants : per acre of : cultivated land
Japan	148	72,223	488	14,895	4.8
Korea	85	a/ 22,355	263	10,873	2.0
Formosa	14	a/ 5,609	401	857	6.6
Australia	2,974	b/ 6,930	2	32,594	.2
Belgium	12	8,387	699	c/ 2,527	3.3
Canada	3,695	11,209	3	c/ 59,541	.2
China	3,811	d/ 424,001	111	c/ 215,709	2.0
England and Wales	58	41,215	711	c/ 8,585	4.8
France	213	41,980	197	49,905	.8
Germany and Austria	214	74,827	350	c/ 54,932	1.4
India	1,905	e/ 352,757	195	396,719	.9
Burma	234	f/ 14,667	63	g/ 21,858	.7
British Prov.:	859	f/ 256,779	299	290,748	.9
Indian States:	712	f/ 81,311	114	h/ 84,113	1.0
Italy	120	43,430	362	32,152	1.4
Manchuria	503	i/ 36,933	73	i/ 41,503	.9
Netherlands	14	8,727	623	g/ 2,443	3.6
Java and Madura	51	i/ 41,718	818	k/ 19,449	2.1
Philippine Is:	114	13,685	120	7,615	1.8
United States:	2,977	130,215	44	g/ 329,595	.4
U.S.S.R.					
(Empire and Asia) l/	8,168	m/ 170,467	21	n/ 553,296	.3

Office of Foreign Agricultural Relations, Compiled from official sources.

a/ 1937 estimate.

b/ Not including full-blooded Aborigines, of which 54,378 were enumerated at a census taken on June 30, 1935.

c/ 1939.

d/ 1928-29 estimate

e/ 1942.

f/ 1931 census

g/ 1938-1939

h/ 1936-1937

i/ 1937 estimate

j/ 1930 census

k/ 1935 survey.

l/ 1937 borders.

m/ 1939 census.

n/ 1934.

industrialized countries with relatively small agricultural resources and small farm population, they are in a position to exchange their manufactured goods and services for imported foodstuffs.

Japan's case is quite different. To be sure, Japan's industry and commerce, like her agriculture, have made great strides in the past 60 to 70 years. These developments have caused the absorption by industry and commerce of great numbers of people from the rural districts, but what has remained is sufficiently large to permit one to speak of Japan's main agrarian problem as one of "many people on little land."

Farm population. At the time Japan came into contact with the West almost four-fifths of the people were classed as farmers. By 1930, farmers constituted only 48.4 percent of the total, while the number of persons engaged in industry and commerce, respectively, had risen from 3.8 to 7.1 percent, to 18.1 and 15.3 percent. (Table 5)

Table 5. - Population by leading occupational groups in Japan, 1872, 1920 and 1930

Occupational Group	1872		1920		1930	
	Number :in 1,000:	Percent :of total:	Number :in 1,000:	Percent :of total:	Number :in 1,000:	Percent :of total:
Agriculture	14,787	78.9	14,128	53.1	14,156	48.4
Industries	719	3.8	5,300	19.9	5,291	18.1
Commerce	1,329	7.1	3,188	12.0	4,463	15.3
Others	1,901	10.2	4,011	15.0	5,311	18.2
Total	18,763	100.0	26,627	100.0	29,221	100.0

Office of Foreign Agricultural Relations, Compiled from official sources.

More recent data show that by 1939 the percentage of farm households to total accounted for only 40 percent. It is worth noting, however, that this declining ratio was due not so much to a decrease in the farming class as to an increase in the non-farm population. In fact, there has been an increase in the total number of agricultural families, reaching a maximum of 5,642,500 in 1932 as against 5,518,000 in 1886. Since then the number of agricultural families declined by 150,000. This must be attributed to the severe crisis in Japanese agriculture that was most pronounced in the early thirties. On the whole, households remained relatively constant and in 1939 amounted to 4,492,000. As mentioned above, this represents 40 percent of all Japanese families. (Table 6).

The percentage is an average for the country; in Hokkaido it is as low as 34 percent; in Iwate (in the north) it is 64 percent; while in Kagoshima (in the extreme south) it is 70 percent, or nearly as high as the average for the country 50 or 60 years ago.

Table 6. - Agricultural families and total number of families in Japan (Specified years).

Year	Total number (thousands)	Agricultural number (thousands)	Percentage of total Percent
1886	5,518	7,747	71.1
1920	5,573	10,578	52.7
1930	5,600	12,166	46.0
1931	5,634	12,160	46.3
1932	5,643	12,343	45.7
1933	5,623	12,560	44.8
1934	5,617	13,499	41.6
1935	5,611	12,974	43.2
1936	5,597	12,982	43.1
1937	5,575	13,356	41.7
1938	5,519	13,407	41.2
1939	5,492	13,592	40.4

Office of Foreign Agricultural Relations. Norinsho Tokeihyo, 1939, and other official sources.

PART II. SALIENT FEATURES OF JAPANESE AGRICULTURE

Distribution of Land for Different Uses

All the land of Japan falls into four groups: Cultivated, forest, pasture and waste land or gen-ya, and land under various other uses. In 1939, cultivated land represented 15.8 percent of the total area, forest land 55.4 percent, pastures 7.8 percent, and land in other uses 21 percent. (Table 7 and Figure 4).

Forest land.

Forest land which covers 55 percent of the country's surface is one of the principal limiting factors of Japanese agriculture. The forests are primarily mountain forests; hence the difficulty of converting deforested land into farm land.

Only two countries in the world - Finland and Sweden - have a larger share in forests. In absolute figures, however, Japan's forest acreage represents only 8 to 9 percent of that of Canada or the United States. Japan's forests also poor in quality, for nearly half of the forests consists of dwarf woods fit only for fuel, while the other half is made up of trees suitable for timber.

The type of forests and the ownership of forest and pasture lands are shown in tables 8 and 9, respectively.

Pastures and waste land

In 1939, Japan had 7,364,000 acres under pasture or "gen-ya", a treeless land covered with weeds, some of which may be utilized for

Table 7 -- Utilization of land in Japan in specified years

Specified year	Total : Cultivated area		Pastures & Gen-Ya a/		Forests		All other b/	
	acreage	Percentage of total	acreage	Percentage	acreage	Percentage	acreage	Percentage
	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent	1,000 acres	Percent
1921	95,867	15.7	8,633	9.0	45,596	47.6	26,538	27.7
1925	94,208	15.8	-	-	-	-	-	-
1926	94,289	15.8	-	-	-	-	-	-
1933	94,471	15.6	8,033	8.5	50,842	53.8	20,818	22.1
1934	94,468	15.7	-	-	-	-	-	-
1935	94,471	15.7	-	-	-	-	-	-
1936	94,527	15.6	8,219	8.7	51,551	54.5	20,342	21.0
1937	94,527	15.8	-	-	-	-	20,313	-
1938	94,527	15.7	-	-	-	-	18,267	-
1939	94,527	15.8	7,364	7.8	52,369	55.4	19,898	21.0

Office of Foreign Agricultural Relations. Norinsho Tokelhyo, 1939, and other official sources.
 a/ Usually translated as treeless "waste land".
 b/ Includes sites, roads, etc.

Table 8.- Acreage of the different types of forests in Japan in specified years

Thousands of acres (i.e. 000 omitted)

Specified Year	Total	Coniferous	Deciduous	Mixed	Bamboo	Other
1913	46,331	-	-	-	-	-
1924	47,916	11,746	19,357	15,520	311	982
1927	48,228	11,586	19,923	15,162	326	1,231
1930	49,122	11,447	20,930	15,194	336	1,251
1933	50,842	13,395	22,452	13,478	368	1,149
1936	51,551	13,868	22,075	14,113	375	1,120

Office of Foreign Agricultural Relations. Compiled from the Far East Year Book, 1941, p. 306.

Table 9 -- Ownership of forests and pastures in Japan, 1939

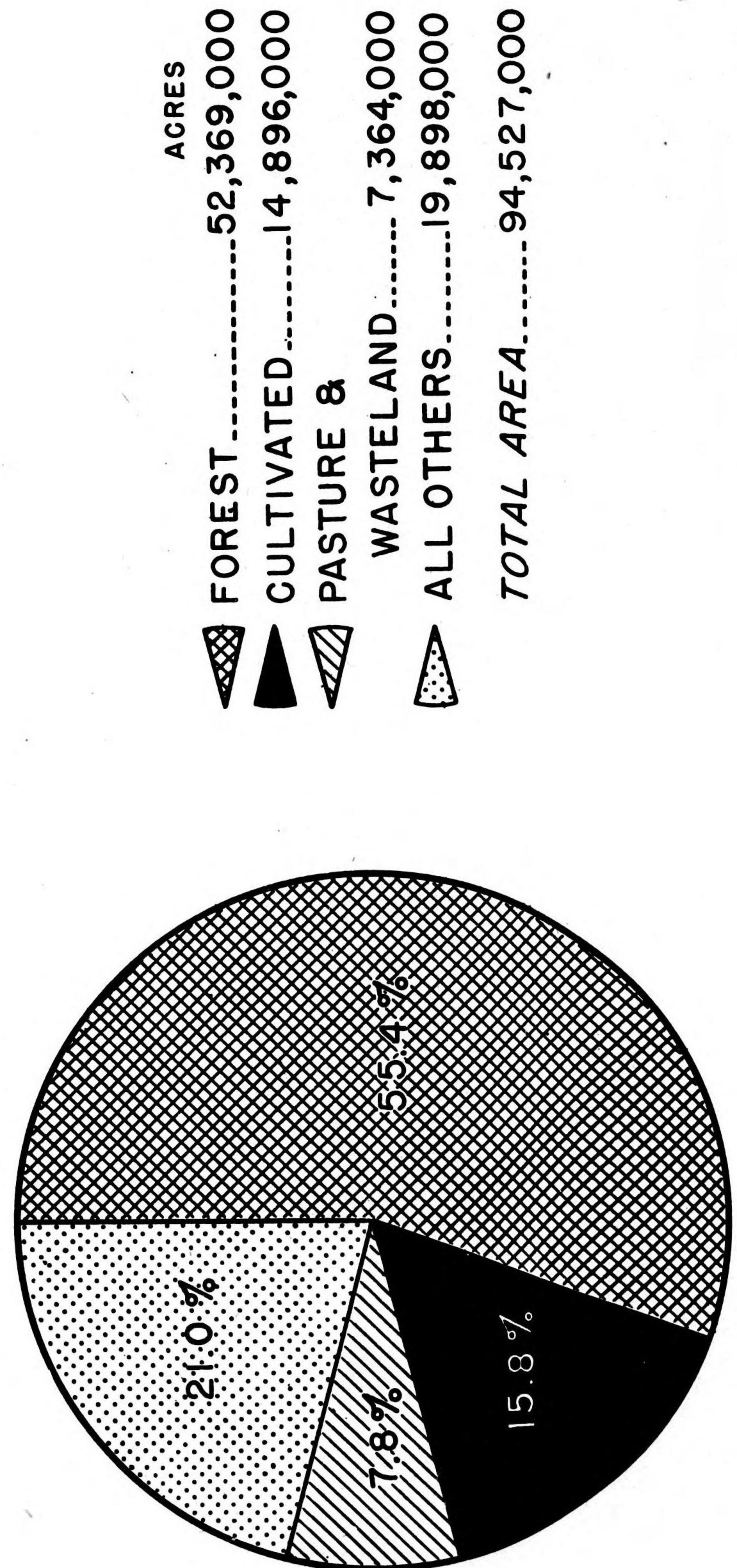
Thousands of acres (i.e. 000 omitted)

Type of land	Imperial household	State	Public bodies, shrines, temples	Private	Total
	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres	1,000 Acres
Forests	2,928	18,816	8,925	21,646	52,369
Pastures	300	598	2,356	4,112	7,364
Total	3,228	19,412	11,281	25,758	59,733

Office of Foreign Agricultural Relations. Norinsho Tokelhyo, 1939

Fig. 4

UTILIZATION OF THE LAND AREA OF JAPAN PROPER IN 1939



grazing or collecting fodder. Data on the area actually used for grazing in 1939 are not available; but in 1935 out of a total of 3,033,000 acres, 900,000 acres were used as pastures for feeding 126,000 cattle, 137,000 acres for horses, and 6,000 for other animals. In addition, 71,000 cattle and 104,000 horses were being pastured in forests covering an area of 1,174,000 acres. Most of the livestock owned by farmers is kept and fed on the farms, the reason being the poor quality of the grass.

Attempts to improve pastures have not been successful. Judging by the state of animal husbandry there seems to be little eagerness to engage in the expensive work of extending and improving pasture land. As one student of Japanese agriculture remarked, the tendency is always for farm lands to be enlarged at the expense of wild land or pasture lands, and this tendency will continue because of the necessity of supporting an ever-increasing population on a limited area of cultivated land.

Cultivated land

The characteristic feature of Japan's agriculture is that the cultivated land is scarce in relation to the rapidly growing population as a whole and to the farm population itself. As the Japanese view it, the pressure of population on the means of subsistence has influenced the country's foreign and domestic policies since about 1870; it explains the development of manufacturing and foreign trade, and the official policy of attempting to increase crop acreage and the productive capacity of the land.

Area of cultivated land. The above statement is relevant in the light of the size of the cultivated area of Japan. In this connection it may be observed that the industrial revolution in Japan did not mean as it did in England for instance, the elimination of considerable acreage under crops. On the contrary, it meant an expansion in the acreage, cost what it might. The result was that in 1939 Japan had a cultivated area of 14,896,000 acres, or 15.8 percent of the total estimated area of Japan Proper. Hokkaido with 16 percent of the total cultivated land has by far the largest block as shown in Table 10. The distribution among the other 46 prefectures ranges from a high of 4.0 percent (Niigata) to a low of .7 percent (Nara).

By the time of the Meiji Restoration most of the level land had already been taken up by the farmers, and they had to turn to the remaining low land, mountain slopes and hillsides in spite of heavy expenditures and other unfavorable conditions. As a result the cultivated area between 1880 and 1939 increased from 10,594,000 to 14,896,000 acres or 36 percent. Despite the increase the fact remains that nearly 5.5 million farm households press upon less than 15 million acres of cultivated land. This is a basic weakness not only of the country's agriculture, but of its economy in general; it is a case of "many people on little land" with relatively few opportunities for alternative occupations.

Possibilities of acreage expansion. Within a period of some sixty years the cultivated area increased by close to 4,000,000 acres

Table 10. - Cultivated land and farm households in Japan by prefectures with percentage of each prefecture to total 1939

Prefecture	Acreage		Farm Households	
	Cultivated land	Percentage	Number	Percentage
	1000 acres	Percent	Number	Percent
Hokkaido	2,398	16.1	191,495	3.5
Aomori	335	2.2	92,874	1.7
Iwate	359	3.2	112,212	2.0
Miyagi	363	3.4	107,048	1.9
Akita	352	3.6	96,729	1.8
Yamagata	348	3.4	103,163	1.9
Fukushima	471	3.2	144,575	2.6
Ibaraki	549	3.8	185,639	3.4
Tochigi	355	2.4	112,067	2.0
Gumma	285	1.9	120,554	2.2
Saitama	399	2.7	162,583	3.0
Chiba	479	3.2	159,480	2.9
Tokyo	106	.7	56,777	1.0
Kanagawa	162	1.1	72,717	1.3
Niigata	600	4.0	205,078	3.7
Toyama	223	1.5	75,367	1.4
Ishikawa	177	1.2	76,812	1.4
Fukui	150	1.0	65,858	1.2
Yamanashi	131	.9	79,905	1.5
Nagano	424	2.8	206,419	3.8
Gifu	252	1.7	135,446	2.5
Shizuoka	323	2.2	160,372	2.9
Aichi	391	2.6	178,002	3.2
Miye	253	1.7	121,253	2.2
Shiga	192	1.3	85,368	1.6
Kyoto	146	1.0	76,127	1.4
Osaka	133	.9	75,593	1.4
Hyogo	313	2.1	174,123	3.2
Nara	108	.7	60,623	1.1
Wakayama	121	.8	76,948	1.4
Tottori	124	.8	55,615	1.0
Shimane	202	1.4	100,187	1.8
Okayama	303	2.0	152,877	2.8
Hiroshima	269	1.8	175,945	3.2
Yamaguchi	255	1.7	111,199	2.0
Tokushima	130	.9	80,982	1.5
Kagawa	128	.9	85,174	1.6
Ehime	225	1.5	126,209	2.3
Kochi	166	1.1	77,019	1.4
Fukuoka	350	2.3	139,765	2.5
Saga	177	1.2	63,694	1.2
Nagasaki	218	1.5	104,914	1.9
Kumamoto	393	2.6	140,116	2.6
Oita	226	1.5	116,407	2.1
Miyazaki	230	1.6	84,122	1.5
Kagoshima	453	3.0	216,425	3.9
Okinawa	149	1.0	89,981	1.6
Total	14,896	100.0	5,491,838	100.0

Office of Foreign Agricultural Relations. Norinsho Tokelhyo, 1939

(3,940,000). A closer examination of the figures for 1918-1939 (Table 11), shows, however, that practically no expansion of acreage took place in the last two decades of that period. It was achieved prior to 1921, in which year Japan attained the largest cultivated area to date, namely, 15,100,000 acres. This upward trend in farm acreage seems to have stopped as indicated by the data in Table 11.

According to an investigation made by the Ministry of Agriculture and Forestry in 1918, the area of new land which might be converted into farm land by means of clearing, embankment and drainage was estimated at 3,708,000 acres. Actually in the intervening years (1918-1939) the total cultivated area declined by 6,000 acres. During the same period most of the reclaimed land was used up for purposes other than agricultural.

Whatever the faults of commission or omission on the part of the Japanese Government in respect to agriculture, it can't be charged with the failure to attempt to expand the cultivated acreage in recent years. It has been a standing policy by Japanese rules going back to ancient times that land must be improved and reclaimed, thus expanding the area under crops. At times, the policy was not actively encouraged, but with the rising difficulties of adding new land, the Government took a more direct hand in the matter.

By virtue of the "Farm Land Improvement Act" enacted in 1899 and revised in 1909, farmers engaged in the reclamation of arable land became entitled to various benefits in the form of government subsidies, amounting to approximately 40 percent of the capital invested in the

Table 11.- Fluctuations in cultivated area in Japan in relation to total number of farm household and acreage per household. Annual 1918-1939

Year	Area 1,000 acres	Annual increase or decrease 1,000 acres	No. of farm families 1,000	Area per farm family Acres
1918	14,902	154	-	2.7
1919	15,035	132	5,481	2.7
1920	15,066	31	5,573	2.7
1921	15,101	35		2.7
1922	15,081	- 20		2.7
1923	14,956	-125		2.7
1924	14,863	- 93	5,532	2.7
1925	14,868	5	5,549	2.7
1926	14,884	17	5,555	2.7
1927	14,900	16	5,562	2.7
1928	14,913	13	5,576	2.7
1929	14,452	-461	5,575	2.6
1930	14,498	46	5,600	2.6
1931	14,591	94	5,634	2.6
1932	14,684	93	5,642	2.6
1933	14,774	90	5,621	2.6
1934	14,796	22	5,617	2.6
1935	14,848	52	5,611	2.7
1936	14,914	67	5,597	2.7
1937	14,945	31	5,575	2.7
1938	14,895	- 50	5,519	2.7
1939	14,896	+ 1	5,492	2.7

Office of Foreign Agricultural Relations. Compiled from Nasu, Shiroshi, "Aspects of Japanese Agriculture." Institute of Pacific Relations, 1941, p. 60.

work of reclamation. ^{1/} Moreover, various institutions for land settlement were founded for the purpose of encouraging farmers to move out of their native provinces and settle in regions in which reclamation of land would be practicable. But in spite of this assistance, the work of reclamation never has been carried out on a large scale.

Difficulties of land reclamation. The process of turning uncultivated land into rice fields is of interest; it indicates the formidableness of the job and why it is often, a forbidding one. Dr. Carl L. Alsberg is responsible for the following description of the actual work of reclaiming a piece of land:

"To make a new paddy [irrigated rice] field the basic problem is to provide a water supply. Having accomplished this the farmer must first remove the top soil, of which there may be from 5 to 10 inches, this is carefully preserved. Then the land is leveled. If it is sloping and much of the land of Japan still uncultivated is hilly - he must build an embankment, or even retaining wall, of such height and shape that the area within it can be made quite flat ... Having seen to his supply of irrigation water and having terraced the land to the necessary extent after removing the top soil, the Japanese farmer must make his paddy retain the irrigation water. This he does by tamping down the subsoil before replacing the top soil. And this need to make the paddy field reasonably water tight renders paddy building more or less of a gamble. The farmer may strike a spring which may bring his efforts to naught, or gravelly or sandy, permeable subsoil which can be made to hold water only with difficulty or not at all." ^{2/}

This leads the author to the observation that the extension of the cultivated area by reclamation is a slow, expensive and not very promising process.

There are numerous other reasons that handicap the conversion

^{1/} Nasu, Shiroshi, Aspects of Japanese Agriculture, Institute of Pacific Relations, 1941, p. 73.

^{2/} Alsberg, Carl L., Japanese Self-Sufficiency in Wheat, Food Research Institute, Nov. 1935, p. 70.

of uncultivated land into cultivated. An official publication summarized them as follows: ^{1/}

1. Difficulty in preparing plans and designs for reclamation.
2. Difficulty in making estimates on cost and renting possibilities.
3. Difficulty in getting funds for reclamation.
4. Difficulty in opening traffic where the land is located in far-off corners of the country.
5. Difficulty in employing farm workers and in inviting settlers.
6. Difficulty in solving various problems in connection with irrigation.
7. Difficulty in obtaining proper men to undertake the work.

The one real difficulty - not mentioned in the above enumeration - is that, with the exception of Hokkaido, there is very little land suitable for agricultural expansion. Considering the fact that the amount of cultivated land has remained practically stationary in the past two decades efforts to expand it, the likelihood that for this reason alone the reclamation of new land is exceedingly difficult, if not impossible. The quality of the land to be reclaimed is so poor and the cultivation of it so difficult that huge financial resources are required to finance such projects.

Reclamation costs. According to a report on the cost of reclamation made by the Ministry of Agriculture and Forestry and issued in 1930, the total cost of reclaiming 80,404 acres amounted to 60,241,317 yen, or ^{1/} Reasons Why Some Land is Still Not Agriculturally Exploited, quoted by Sanu, Shiroshi, *Ibid.*, p. 81.

749 yen per acre. The cost varied with the type of land, i. e. whether the reclaimed land was to be used for irrigated rice fields or upland fields. It also varied considerably according to districts. The highest cost was in Okayama prefecture where it amounted to 7,624 yen per acre, and the lowest in Aomori where it totaled only 204 yen per acre.

Such being the state of reclamation work in Japan, Dr. Nasu concluded "that the exploitation of arable land in Japan Proper has actually reached the limit, leaving little room for further reclamation even with highly expansive and thoughtful assistance from the Government." Under the circumstances, more thorough application of agricultural science to the land already under cultivation is looked upon as the only practical way in which an increase in agricultural production can be attained.

Land Tenure

Small Farm Holdings

The fact that Japan's 5,492,000 farm families cultivate 14,896,000 acres indicates that the size of farm units is very small, averaging 2.7 acres. (Tables 11 and 12). A cross section of Japan shows a gradual increase in the size of farm units from south to north, but with considerable variations in individual prefectures. In southwest Japan, the farm units are generally under 2 acres in size, with some of the holdings along the Inland Sea averaging 1.5 acres. In northern Honshu this figure has increased to 3.5 acres, while in Hokkaido the average farm is 12.5 acres.

Table 12.- Cultivated land per farm household by prefectures in Japan, 1939

Prefecture	Cultivated Acreage 1,000 acres	Farm households Number	Average cultivated acreage per household Acres
Hokkaido	2,398	191,495	12.5
Aomori	335	92,874	2.8
Iwate	359	112,212	3.2
Miyagi	363	107,048	3.4
Akira	352	96,729	3.6
Yamagata	348	103,163	3.4
Fukushima	471	144,575	3.2
Ibaraki	549	185,639	3.0
Tochigi	355	112,067	3.2
Gunma	285	120,554	2.4
Saitama	399	162,583	2.4
Chiba	479	159,480	3.0
Tokyo	106	56,777	1.9
Kanagawa	162	72,717	2.2
Niigata	600	205,078	2.9
Toyama	223	75,367	3.0
Ishikawa	177	76,812	2.3
Fukui	150	65,858	2.3
Yamanashi	131	79,905	1.6
Nagano	424	206,419	2.0
Gifu	252	135,446	1.9
Shizuoka	323	160,372	2.0
Aichi	391	178,002	2.2
Miye	253	121,253	2.1
Shiga	192	85,368	2.2
Kyoto	146	76,127	1.9
Osaka	133	75,593	1.8
Hyogo	313	174,123	1.8
Nara	108	60,623	1.8
Wakayama	121	76,948	1.6
Tottori	124	55,615	2.2
Shimane	202	100,187	2.0
Okayama	303	152,877	2.0
Hiroshima	269	175,945	1.5
Yamaguchi	255	111,199	2.3
Tokushima	130	80,982	1.6
Kagawa	128	85,174	1.5
Imme	225	126,209	1.8
Kochi	166	77,019	2.2
Fukuoka	350	139,765	2.5
Saga	177	63,694	2.8
Magasaki	218	104,914	2.1
Kumamoto	393	140,116	2.8
Oita	226	116,407	1.9
Miyazaki	230	84,122	2.7
Kagoshima	453	216,425	2.1
Okinawa	149	89,981	1.6
Total	14,896	5,491,838	2.7

Office of Foreign Agricultural Relations. Norinsho Tokeihyo, 1939.

As to the size of holdings actually cultivated, 1939 data show that 34 percent of all households cultivate less than 1.2 acres each; 33 percent cultivate from 1.2 to 2.4 acres; 24 percent from 2.4 to 4.8 acres, and only 9 percent cultivate more than 4.9 acres (Table 13).

The total area cultivated by each group is not given in Japanese agricultural statistics, but an unofficial estimate prepared for 1933 is revealing. The first two mentioned groups, comprising 68 percent of all the families, cultivate an estimated 34 percent of all the land; while on the opposite end of the scale one finds three groups, constituting 9 percent of the families, who cultivate 33 percent of the land. Whether owned or not, however, the vast majority of the Japanese farmers work on small plots which often resemble gardens rather than fields.

Concentration of Landownership

Japan's limited cultivated area precludes the concentration of land in great holdings. Official statistics record only 3,547 landowners with over 125 acres each, the average size of these holdings being 300 acres, and 46,000 with an area of from 25 to 124 acres, or an average of 57 acres.

Notwithstanding the scarcity of large properties, there is a striking concentration of landownership in Japan. Data of the Ministry of Agriculture and Forestry throw little light on the exact distribution of landownership. It was estimated unofficially, however, that while 50 percent of all the farm households own only 9 percent

Table 13.-- Total area cultivated in 1933 and farm households in 1933 compared with 1939 classified according to size of cultivated area

Size of cultivated area	Area cultivated in 1933 1/		Households 1933		Households 1939	
	1,000 acres	Percent	Number	Percent	Number	Percent
Less than 1.2 acres ...	1,854	33.8	1,921	34.1	1,237	18.4
1.2 acres to 2.4 acres	1,800	32.8	1,928	34.3	3,724	25.4
2.4 acres to 4.9 acres	1,326	24.1	1,248	22.2	4,817	33.0
4.9 acres to 7.4 acres	314	5.7	319	5.7	2,055	14.0
7.4 acres to 12.2 acres	122	2.2	130	2.3	1,333	9.1
More than 12.2 acres ...	76	1.4	77	1.4	1,482	10.1
Total	5,492	100.0	5,623	100.0	14,648	100.0

Office of Foreign Agricultural Relations. Morinsho Tokaihyo, 1939, and other official sources.
 1/ The 1933 cultivated area is an estimate by Isobe Hidetohi in Labor Conditions in Japanese Agriculture, Bulletin of the Utsunomiya Agricultural College, Sect. 5., Vol. 2, No. 1, 1937, p. 5, table 2.

of all the land, 7.5 percent of the households own 50 percent of the land. ^{1/} The corollary of this is that the holding cultivated by a Japanese farmer does not correspond with the amount of land owned by the same farmer.

Tenancy

The inequality in landownership in Japan is expressed in terms of owners, part-tenants and tenants. The second group is composed mainly of those 2,331,000 families (1939) who owned less than 1.2 acres each, and the third group consists of farmers who own no land at all. Under the circumstances both groups are compelled to rent from those in whose hands the land is largely concentrated. Of the 5,492,000 farm households enumerated in 1939, 31 percent were composed of independent farm owners, 42 percent of part-owners and 27 percent of tenants who owned no land at all. (Table 14).

In the past thirty years there has been relatively little change in the social structure of the Japanese village. In the case of the owners there has been a slight decline notwithstanding official measures to increase their number. The attempts on the part of the Government to reduce tenancy has not met with success for until 1937 the number of tenants had been rising, even if not markedly. Only the group of part-tenants shows an increase, although the increase can't be considered very significant. As one student of Japanese agriculture noted, "The structure of the Japanese village has ossified, so to speak, and now one sees a ^{1/} Hidetoshi, Isobe, Labor Conditions in Japanese Agriculture. Bulletin of the Utsunomiya Agricultural College, Section B, 2: (1), 6, 1937, Table 2(B).

Table 14.-- Land tenure in Japan. Annual 1939 compared with average 1926-1929, 1930-1934, and 1935, 1939

Category of hand tenure	1926 - 1929 average		1930 - 1934 average		1935		1939	
	Number of farmers; of total	Percentage of total	Number of farmers; of total	Percentage of total	Number of farmers; of total	Percentage of total	Number of farmers; of total	Percentage of total
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
Farm Owners ...	1,739	31.2	1,748	31.1	1,732	30.9	1,700	31.0
Part-Owners ...	1,489	26.7	1,498	26.6	1,518	27.1	1,461	26.6
Tenants	2,337	42.0	2,377	42.3	2,360	42.0	2,331	42.4
Total	5,567	100.0	5,623	100.0	5,611	100.0	5,492	100.0

Office of Foreign Agricultural Relations. Norinsho Tokelhyo, 1939
and other official sources.

picture only slightly different from what it was thirty years ago.^{1/}

The distribution of tenancy by prefectures reveals that in Hokkaido 44.4 percent of all farm households were accounted for by tenants. In Osaka the figure was 43.1 percent. Only in five prefectures was the number of tenants to the total number of farm households under 20 percent. In fifteen prefectures 30 percent or more of the farm households fell into the tenancy category. Table 16 and Figure 5 show the total and regional distribution of the acreage worked by tenants.

In 1939, 52 percent of the irrigated rice lands were cultivated by tenants and part-owners. On the whole, the two groups cultivated 46 percent, or 6,816,000 acres of Japan's total cultivated land (Table 15).

Table 15. - Distribution of cultivated area between owners and tenants in Japan, 1939

Category of Farmer and Category of Land	Area 1,000 acres	Percent of Total Percent
Total cultivated area	14,896	100.0
Tilled by owners	8,080	54.2
" " tenants	6,816	45.8
Irrigated fields	7,864	100.0
Tilled by owners	3,793	48.2
" " tenants	4,071	51.8
Dry fields	7,032	100.0
Tilled by owners	4,287	61.0
" " tenants	2,745	39.0

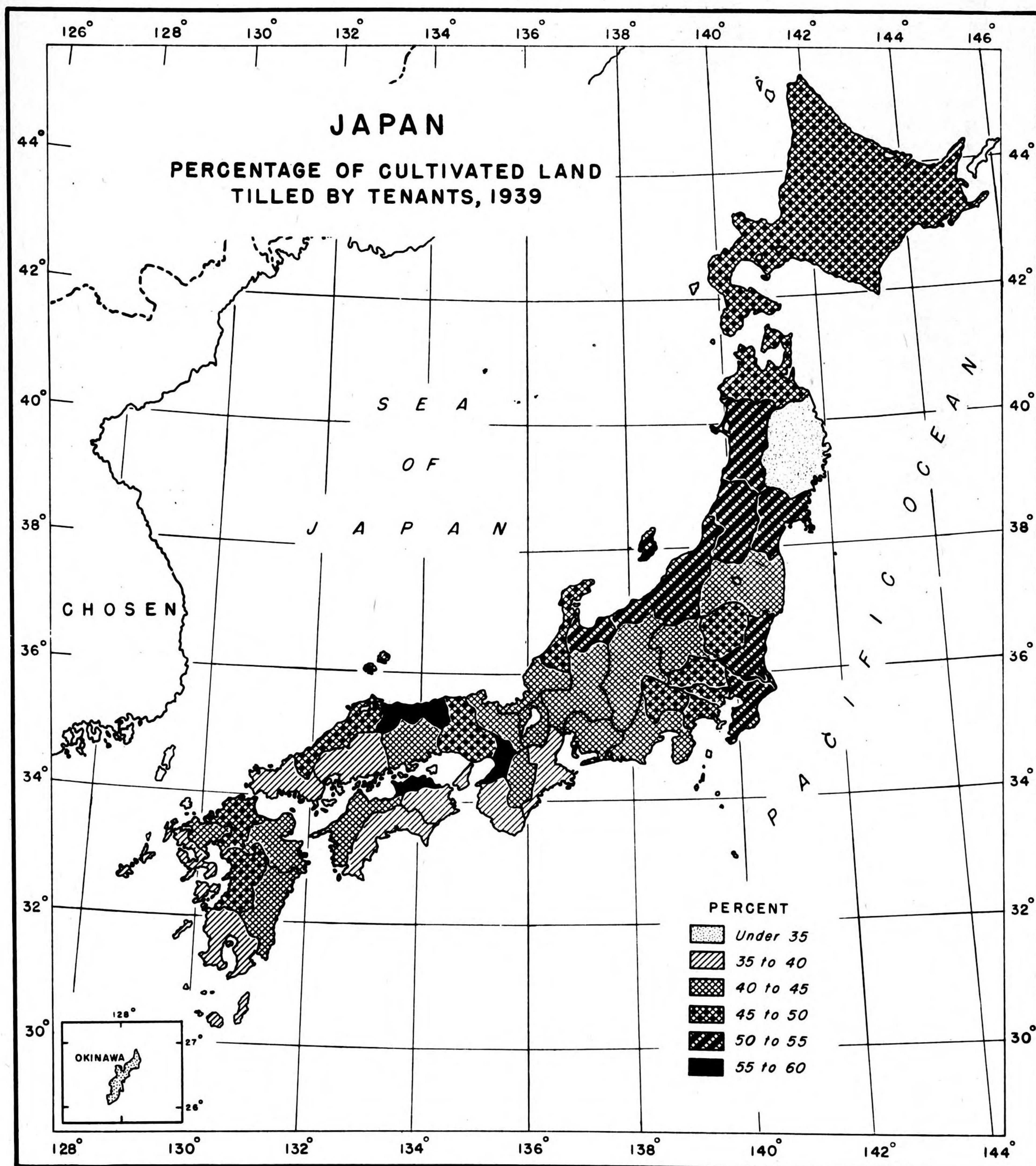
Office of Foreign Agricultural Relations. Norinsho Tokeihya, 1939

^{1/} Grajdanzev, Andrew J. Statistics of Japanese Agriculture. Institute of Pacific Relations, 1941, p. 9.

Table 16. - Acreage cultivated by tenants as a percentage of total cultivated land by prefectures in Japan, 1939

Prefecture	Total : acreage : 1,000 acres	Acreage : cultivated : by tenants : 1,000 acres	Acreage cultivated : by tenants as percent : of total acreage : Percent
Hokkaido	2,398	1,133	47.2
Aomori	335	156	46.6
Iwate	359	121	33.7
Miyagi	363	196	54.0
Akita	352	192	54.8
Yamagata	348	185	53.2
Fukushima	471	209	44.4
Ibaraki	549	285	51.9
Tochigi	355	167	47.0
Gumma	285	126	44.2
Saitama	399	198	49.6
Chiba	479	247	51.6
Tokyo	106	50	47.2
Kanagawa	162	77	47.5
Niigata	600	330	55.0
Toyama	223	121	54.3
Ishikawa	177	80	45.2
Fukui	150	65	43.3
Yamanashi	131	65	49.6
Nagano	424	170	40.1
Gifu	252	109	43.2
Shizuoka	323	143	44.3
Aichi	391	167	42.7
Miye	253	96	37.9
Shiga	192	83	43.4
Kyoto	146	62	42.5
Osaka	133	76	57.1
Hyogo	313	147	47.0
Nara	108	48	44.4
Wakayama	121	45	37.2
Tottori	124	70	56.4
Shimane	202	99	49.0
Okayama	303	127	41.9
Hiroshima	269	101	37.5
Yamaguchi	255	99	38.8
Tokushima	130	50	38.5
Kagawa	128	76	59.4
Ehime	225	96	42.7
Kochi	166	61	36.7
Fukuoka	350	166	47.4
Saga	177	76	42.9
Nagasaki	218	77	35.5
Kumamoto	393	191	48.6
Oita	226	93	41.2
Miyazaki	230	97	42.2
Kagoshima	453	166	36.9
Okinawa	149	22	14.8
Total	14,896	6,816	45.8

Office of Foreign Agricultural Relations. Norinsho Tokeihyo, 1939



In twelve prefectures from 50 to 60 percent of the cultivated land is worked by tenants, and only in one case (Okinawa) is it under 30 percent.^{1/}

With so much land worked by tenants, absentee ownership in Japan is very great. In 1939 there were 1,068,000 individuals recorded as owning land who did not cultivate it themselves. The demand for the land is so great that the few really large estates are never cultivated as a unit by the owners; they prefer for reasons given elsewhere, to rent their holdings to tenants. One of the biggest estates with an area of 4,000 acres is divided among 2,486 tenant families.

Development of tenancy. The great extent of tenancy is one of the most troublesome problems of Japan's agricultural economy. It has been one of the main sources of economic distress and internal tension in recent years. Agrarian unrest in turn has provided no small part of the stimulus to Japan's foreign policy. The tenants and even the somewhat better off groups of part-owners or part-tenants have been the hotbed for extremist political movements on the part of the Army.

After the abolition of feudalism in 1868, about 20 percent of the cultivated area was tilled by tenants. The rapid adjustment from a feudal to a monetary economy worked hardship on many independent farmers. The necessity of obtaining cash to meet heavy taxation led many into indebtedness, frequently resulting in the loss of their land. The spread of tenancy was also facilitated by the fact that the landowners and well-to-do farmers, who owned more land than they

could themselves cultivate, found it more profitable to rent to a^{1/} For more detailed information on this point see last column of Table 15 and Fig. 5.

multitude of tenants than to operate with hired labor. Moreover, for many years the Japanese urban middle class has invested its savings in the purchase of land in accordance with the widely prevalent view that land is a gilt-edged security.

Conditions of tenancy. The scarcity of land and insufficiency of alternative occupations bind the tenant to the land - regardless of the onerous conditions under which he works. Rent contracts for a long period are rare, although there is in existence a so-called "permanent" tenancy system, adopted to facilitate the cultivation of newly reclaimed land. Most agreements, usually oral, are for 3 to 5 year terms, but those involving fruit and mulberry gardens usually run from 10 to 15 years. Whether written or oral, both owner and tenant have a right to abrogate the agreement in accordance with established customs. In actual practice this privilege is exercised solely by the landlords, and in recent years it has become one of the basic causes of bitter conflict between landlord and tenant.

Another feature of Japanese tenancy is that rentals are very high, because tenants are compelled to compete for leases in a market where the demand is usually greater than the supply. For rice land rent is paid in kind, while for other land it is usually paid in cash. (Tables 17 and 18).

The system of payment in kind is an added burden on the tenants. "It is all the heavier, too", a Japanese writer states, "because of the arrangement whereby the tenant farmer pays his landlord so many bushels of rice per ten [.245 of an acre], and this

Table 17- Annual rental in kind for irrigated rice land (paddy fields) in Japan for specified districts and years (Koku per acre)

District	1913	1919	1921	1933	1936	1937	1938	1939	1940
Paddy Fields	^{1/} (Koku)	(Koku)	(Koku)	(Koku)	(Koku)	(Koku)	(Koku)	(Koku)	(Koku)
Hokkaido ..	-	-	1.8	1.6	1.1	1.6	1.8	1.7	1.9
Kwantō	4.1	4.0	4.5	4.0	4.2	4.1	4.2	4.2	4.3
Shikoku ...	5.1	5.0	5.3	4.7	4.7	4.8	4.9	4.9	4.8
Kyūshū	4.7	4.8	5.0	4.5	4.6	4.6	4.6	4.6	4.6
Average									
all Japan :	4.6	4.6	4.8	4.2	4.2	4.3	4.3	4.3	4.4

Office of Foreign Agricultural Relations. Compiled from Grajdanzev, Andrew J. Statistics of Japanese Agriculture. Institute of Pacific Relations, 1941, page 29. Based on Nogyo Nenkan, 1941.
^{1/} 1 koku = 9.094884 bushels of rough rice.

Table 18.- Annual rental in cash for irrigated cropland in Japan for specified districts and years. (Yen per acre)

District	1913	1919	1921	1933	1936	1937	1938	1939	1940
Hokkaido	-	-	13.2	11.0	10.9	14.3	15.5	14.1	20.3
Kwantō	32.5	53.7	63.9	40.4	45.0	49.0	51.4	56.6	66.5
Shikoku	47.7	95.3	93.7	61.6	74.2	78.3	86.3	94.5	124.5
Kyūshū	34.0	65.7	78.5	38.7	53.9	58.3	63.3	65.0	86.3
Average									
all Japan :	37.8	72.0	76.9	44.8	57.0	60.3	65.7	69.4	88.7

Office of Foreign Agricultural Relations. Compiled from Grajdanzev, Andrew J. Statistics of Japanese Agriculture. Institute of Pacific Relations, 1941, page 29. Based on Nogyo Nenkan, 1941.
^{1/} 1 koku = 9.094884 bushels of rough rice.

amount does not change much, irrespective of whether the crop is large or small. In other words, the landowners are assured of a certain stabilized quantity of harvest regardless of the yield." It may be added that, for the most part, the size of the rent is based on yields in good years.

A survey of 9,134 villages by the Japanese Ministry of Agriculture and Forestry showed that in 70 percent of the cases the rental from a single-crop field constituted more than 50 percent of the crop; and from a two-crop field around 60 percent. The high rental in rice leaves many a tenant without sufficient rice, so that he is compelled to purchase some for his own consumption before the season is over. A sample study on the degree of self-sufficiency in regard to rice brought out the fact that there were only 60 percent of tenant farmers who did not need to purchase rice, while 20 percent were self-sufficient for less than six months.

The rental, high though it is, is not the only charge that the tenant must bear. Whereas the landlord pays only the land tax, the tenant has to pay a number of other assessments and dues, buy his own very expensive artificial fertilizer, provide the farm house, farm buildings, implements and seed. Therefore, a tenants' net income is considerably smaller than indicated by the share of the crop that he receives.

It is extremely difficult for a tenant to move with any degree of freedom up the agricultural ladder. Table 19 (see appendix) shows that the capital used by an owner-cultivator, amounts to about 10,000 yen; by a part-owner 5,000 yen, and even to be a tenant requires a

capital of about 2,000 yen. If a day laborer saved half of his daily wage of 0.44 yen a day - which would hardly be possible - more than 12 years would be required to accumulate capital sufficient to become a tenant. If a tenant clear of all debts employed his savings of 102 yen (1936) to become a part-owner, in addition to the money already invested, about 30 years would be required to achieve that status. There are, of course, exceptions. In the main, however, the described conditions explain why the limited means advanced by the Government to reduce tenancy have failed to solve the problem.

Landlord-tenant relations. The long-established landlord-tenant relationship continued till about the end of the First World War without causing much open conflict. To be sure, tenants have never been satisfied with this economic status, but before and during that War they were somewhat better off than after. In addition, their conservatism and ingrained feudal custom of obedience to landlords helped to reduce friction to a minimum. But the growing agricultural distress, the strengthening of the industrial labor movement in Japan, and the spread of ideas opposed to old-established concepts - all these made landlord-tenant relations very similar to those prevailing between industrial workers and their employers. Consequently, tenant and landlord unions and the number and seriousness of disputes increased rapidly.

Since 1917 the annual number of disputes has increased from 85 to a peak of nearly 6,000 in 1935. Even in 1939, a year of improved agricultural conditions, 3,578 disputes were registered. These

figures represent only disputes that came into the open; the actual extent of discontent must be reckoned as very much greater.

During the first few years after the War, disputes were confined to a few districts, but subsequently they occurred in practically every part of Japan. Every dispute involved an average of four or more landlords and twenty or more tenants. This is explained by the fact that a tenant often rents land from a number of landlords, all of whom may be involved in a particular dispute.

The causes underlying the disputes are numerous, but the following two became outstanding: during the 1920's, excessive rents; more recently, about 60 percent of the disputes were due to attempts of the landlords to evict the tenant from the land by refusing to renew the lease. Thus the struggle between the landlord and the tenant has gradually centered upon the vital question - the right of the tenant to cultivate the land.

Agricultural Labor

In addition to owners, part-owners and tenants, there is yet another group, a very small one, also engaged in agriculture. This is the hired labor group, engaged full time on farms. In 1930 these laborers were made up of 247,000 domestics, 174,000 engaged in unspecified tasks, 8,000 employed in odd jobs, and 5,000 persons in managerial capacities. Even including the domestics, Japan's farm labor in 1930 was composed of 430,000^{1/} or 3 percent of the total number of people engaged in agriculture.

^{1/} Isobe, H. Labour Conditions in Japanese Agriculture, Utsunomiya Nippon, 1937, p. 27.

In view of the tendency of Japanese agriculture to change slowly and gradually, the likelihood is that the number of hired laborers in the 1930's did not differ from the number at the beginning of that decade. The small number of laborers helps to delineate the fact that the essential character of Japanese agriculture is family farming, its very existence being dependent upon family labor.

The relatively high wages of 1929 were followed by lower ones in the middle 1930's. (See Table 20). They rose to a new high in 1939, when for a male worker they were 73 percent and 26 percent, respectively, above those of 1935 and 1929. The rise in monetary wages does not indicate a comparable rise in real wages, because prices of foodstuffs and of other consumer goods also have risen in the wake of the general inflationary trend.

Table 20 -- Daily wages paid to specified categories of farm workers and terms of employment. 1929, 1935 and 1939

Category of workers and terms of employment	1929	1935	1939
	Yen	Yen	Yen
Employed yearly	0.66	0.48	0.83
Men	0.48	0.32	0.62
Women			
Employed seasonally			
Men	1.45	0.95	1.89
Women	1.08	0.78	1.45
Employed daily			
Men	1.35	0.85	1.65
Women	1.03	0.65	1.29

Office of Foreign Agricultural Relations. The Statistical Abstract of the Ministry of Agriculture and Forestry. 1936-37, and Norinsho Tokeihya, 1939.

PART III. AGRICULTURAL PRODUCTION

Regional Distribution of Japanese Agriculture

The principal agricultural features of Japan described in the preceding pages are typical of almost any individual rural region of the country. Almost the same is true of the distribution of principal crops throughout Japan. A map of the utilization of arable land shows that rice predominates in every prefecture, Hokkaido and Okinawa being the only exceptions. For this reason, in the case of rice, regional characteristics are blurred; its cultivation takes place wherever level land is found, and it is usually a question of how much of this cereal is cultivated rather than one of not cultivating any at all. The tea and mulberry crops are subject to more distinct regional characteristics, especially the former; in many of the prefectures they play but a small role, while in a relatively small number of prefectures their cultivation is highly concentrated.

The fact that Japanese agriculture is characterized throughout the length and breadth of the land, by a sameness of social and economic conditions, as well as by a relative homogeneity in the distribution of the principal crops renders unnecessary detailed regional discussion of the country's agriculture. But from the standpoint of topography, climate and the distribution of some of the crops, an outline of the principal regions is desirable. For this purpose Japan may be divided into the following five zones:

^{1/} Based on Trewartha, G. T., A Reconnaissance Geography of Japan. University of Wisconsin, Madison, 1934, pp. 77-243.

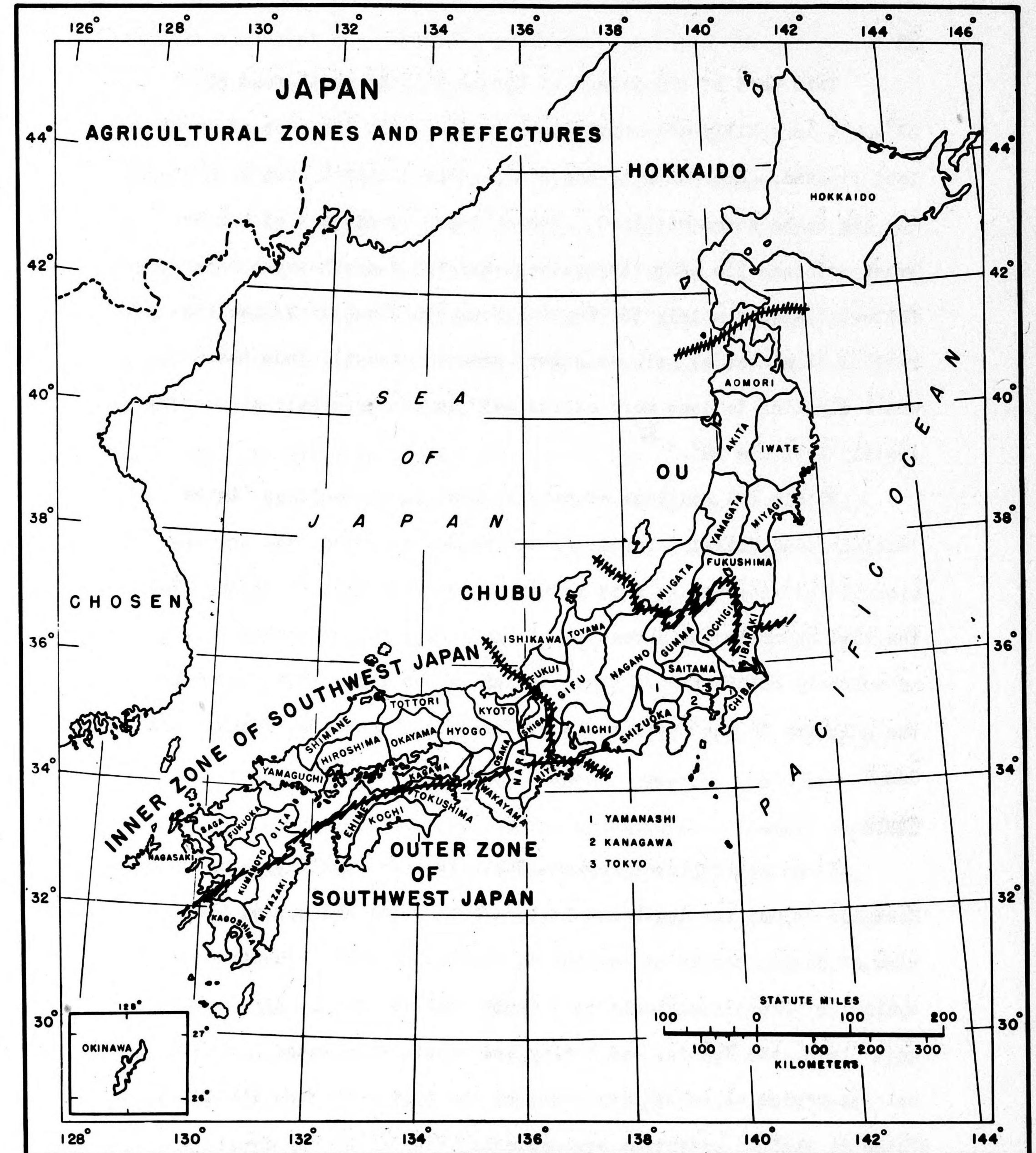
Hokkaido, Ou, Chubu, Inner Zone of Southwest Japan and Outer Zone of Southwest Japan. (Fig. 6).

Hokkaido

Because of the cooler, shorter summers and severe winters, Hokkaido's agriculture differs from that of the rest of the country in two important respects: a) cultivation of rice is less widespread, and b) multiple and winter cropping is practically absent. Rice remains the single most important crop, but it represents only about a fourth of the cultivated land of Hokkaido, as against 52 percent for the country as a whole. Practically all of the Hokkaido crops are spring sown, the fields remaining fallow in the winter. Tea is entirely absent and the mulberry is almost non-existent. Apples, beans and potatoes take the place of tea and mulberry as commercial crops.

Hokkaido itself is characterized by considerable climatic difference, as between western, northern and southern regions. This accounts for its division into three principal agricultural regions. First, there is the western or "Rice and Oats Region." As the name suggests, rice and oats are of equal importance, with beans and potatoes next in importance. Second, there is the northern or "Mixed Farming Region," where rice and oats each occupy almost 25 percent of the area, and beans, potatoes, peas, rye, wheat and some buckwheat occupying the remaining acreage. Third and last is the southern, or "Stock Raising Region." In many parts of this area there is relatively little crop production, but a considerable activity in horse-breeding and dairying.

Fig. 6 RESTRICTED



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Ou

This part of the island of Honshu extends north from about 37°. It is a hilly and mountainous region, with the area of level land limited. According to one study, "Six critical crop boundaries are to be noted within Ou; the northern boundaries of tea and sweet potatoes lie near its southern margin; a north-south line following approximately the Central Mountain Range separates the regions of winter as well as summer cropping (east), from those where planting is done more exclusively in summer(west); at approximately latitude 38°." ^{1/}

Within the confines of this region, in prefectures (Akita, Yamagata, and Niigata) bordering on the Sea of Japan, the proportion of land devoted to rice is perhaps the heaviest in Japan. But the most characteristic feature of the region is the concentration of mulberry cultivation. Figure 12 shows the large role played by the mulberry in the prefectures of Yamagata, Fukushima, Tochigi and Gumma.

Chubu

As an agricultural region, Chubu is less distinctive than Hokkaido or Ou; its dense population, both rural and urban, the size of farms, the crops and the double and multiple cropping are typical of Japan's agriculture. Chubu includes the country's largest plain, the Kwanto, and barley and wheat are planted throughout the region as subsidiary crops on the irrigated rice fields. There is also an extensive area on which vegetables and fruit trees are cultivated, and tobacco is raised, while tea and mulberry cultivation reach their maximum development. Shizuoka is

^{1/} Ibid, p. 111.

the most important tea producing prefecture, and over 40 percent of all the mulberry acreage is concentrated in Chubu.

In addition to having the largest area of arable land of any region in Japan, Chubu enjoys another important advantage. No other area is equally favored by local markets. Tokyo, Japan's greatest port, Yokohama, and numerous other cities lie there. A dense network of railways, electric lines, and improved roads are supplemented by waterways and tie the rural areas to these large domestic markets and to the port of Yokohama.

Inner Zone of Southwest Japan

This region is endowed with favorable climatic conditions, but the area of level land is small. The density of the rural population is great and the farm holdings are even smaller than the average for Japan. In order to take advantage of the numerous hillsides, terracing is resorted to throughout the region.

Despite some of the limitations mentioned, agriculturally the Inner Sea Region is one of the most favored. Particular notable for its quality is the rice produced in the prefectures of Osaka, Kagawa, Hyogo and Okayama, and this is especially true of the rice of the Kumamoto prefecture. Fruit of a great variety grow well here. Tea of Kyoto is one of the best produced in Japan, although quantitatively it is over-shadowed by the tea produced in the prefecture of Shizuoka. Some dairying and cattle raising for beef may also be mentioned. The great variety of output, and the ease with which it can be disposed of in the neighboring large urban centers, enables the farmers to enjoy

a higher standard of living than that of the farmers of Hokkaido and Ou.

Outer Zone of Southwest Japan

Climatically this is the most nearly tropical region of Japan, humid mid-summer months having average temperatures not much below 80°F., while temperature in January is between 40° and 50° F. Rainfall is abundant, 80 to 100 inches being common on the lowlands and it is higher in the mountains. The amount of level arable land is meager.

The Outer Zone produces rice. In fact, this region includes the Kochi prefecture, the only one where a second rice crop is grown regularly. Kochi is open to the Pacific on the south and shut off by mountains to the north; hence the warm winters and the possibility of raising two crops of rice a year from the same land. Yet because the area of plains is small, rice is not the predominant crop. The cultivation of barley, wheat, vegetables and mulberry on upland fields is the characteristic agricultural pattern there.

The region embraces among the sections, the southern half of the islands of Kyushu; in its southernmost part one finds upland fields of tobacco, sugar cane, beans, sweet potatoes, upland rice, and winter grains are usual. This is the only part of Japan Proper where the sugar cane crop is of some importance.

Agricultural Practices

Intensive Agriculture

With many people on little land, the fields of Japan are cultivated very intensively. The fields are treated much more carefully than many a garden in the West. Part of the intensive system of cultivation is the division of the fields into separate patches of all shapes and sizes. There is no minimum size, a few are as large as an acre and some are as small as "a table cloth, or even a couple of napkins." What a Japanese farmer aims at is a field of about one-fourth of an acre if possible.

The rice fields are graded to absolute level, each one being surrounded by dikes. Many of the upland fields are leveled and made secure in their place by terracing. The leveling facilitates working and retains all natural or artificial fertilizers, and makes possible the continuous growing of such heavy yielding crops as irrigated rice, and multiple crops on the upland. The flatness and small size of cultivated plots are necessary in order that when flooded the water may be of uniform depth everywhere. All this calls for an immense amount of labor.

Although the Japanese are handicapped by a natural infertility of soil in many districts, they obtain, as will be indicated elsewhere, high yields per acre. Such marked achievement has been rendered possible not only through abundant application of fertilizers but also through intensive application of labor. Careful cultivation, constant weeding, repeated applications of fertilizers, painstaking watering of crops

where irrigation is needed, in addition to double and multiple cropping, these are indicative of the intensive cultivation of the fields.

Double and Multiple Cropping

It is characteristic of Japanese agriculture that on a large part of the land two successive crops are grown each year. Two crops of rice are rare, but from 30 to 40 percent of the irrigated rice land is replanted to winter crops, such as wheat and barley; where the climate is least favorable because winters are severe and snowy, very little irrigated land is double-cropped. This is the situation along most of the western shore line bordering the Sea of Japan, and especially in the northern and northeastern prefectures of Honshu and of Hokkaido. On the upland fields (unirrigated cropland) too, more than one crop is produced from the same unit of land each year. The farmers commonly have three or more crops growing at the same time, (multiple cropping) but in different stages of maturity.

In consequence of the system of double and multiple cropping, a distinction should be made between cultivated land and harvested area, the latter being the acreage actually harvested. Thus then in 1939 Japan's harvested area amounted to 19.9 million acres, or a third larger than the cultivated land. (Table 21).

Table 21. - Harvested acreage compared to cultivated area in Japan
Annual 1934-1939

Year	Cultivated acreage 1,000 acres	Harvested acreage 1,000 acres	Percentage Percent
1934	14,796	19,641	133
1935	14,848	19,762	133
1936	14,914	19,857	133
1937	14,943	19,891	133
1938	14,897	20,048	134
1939	14,896	19,977	134

Office of Foreign Agricultural Relations. Based on official sources.

In Hokkaido and in the prefecture of Akita the harvested area is 88 and 98 percent, respectively, of the cultivated. These are the exceptions. In all other prefectures the harvested area is greater than the cultivated. It is particularly high in the Hyogo prefecture where the harvested area is 2.3 times larger than the cultivated; in Osaka, 2.2; in Kumamoto, 2; in Kagawa, 1.9 and in Kagoshima, 1.8. Most of these prefectures are in southwestern Japan. In general, the harvested area is smaller in the North and greater in the South than the cultivated area. Taking the upland and rice fields together, the average for Japan in 1939 was 1.4. It would have been greater but for the fact that the larger part of the irrigated rice fields of Japan cannot be used for another crop after the rice has been harvested due to climatic and other unfavorable conditions.

The possibility of extending the area on which double-cropping operations are carried out, while limited, has not been exhausted. According to the Japanese Ministry of Agriculture and Forestry, the

following is the situation with respect to this question: 1/

Of [the] single-crop fields, the portion which cannot be made double-cropped on account of the difficulty in irrigation or drainage covers 693,000 cho [1.69 million acres]; of which the portion with insufficient irrigation is 136,000 cho [0.33 million acres], and the portion with imperfect drainage, 557,000 cho [1.36 million acres], the former representing 4.4 percent of the total area of the paddy fields [irrigated rice fields], and the latter 15 percent. By improving the facilities for irrigation or drainage 475,000 cho [1.16 million acres] of the one-crop paddy field could probably be changed into a two-crop field. In the case of the rest it is impossible to make such a change, owing to the climate and other conditions.

Fertilizers

Fertilizers are of unusual importance in countries like Japan where the system of agriculture is very intensive, and where a scarcity of agricultural land makes it important to secure high yields from every field. Understanding the necessity to fertilize, Japanese farmers for many years have fully utilized materials locally available, mainly compost, night soil, green manure, and wood ashes. Bean cake and fish fertilizers were added to this list later, following a development of the soybean industry in Manchuria and of the fish-packing industry in Japan. More recently, large quantities of chemical fertilizers, particularly of ammonium sulphate and superphosphate, have also been employed. So important are fertilizers now considered by the Japanese that farm expenditures for this item, during recent years (1937-1938), have been as much as one-tenth the gross revenue obtained from all agricultural products.

A more exact idea of the fertilizer consumption in Japan is given in data calculated for the year 1938, which may be taken as 1/ Nasu, S. Land Utilization in Japan. Prepared for the Third Session of the Institute of Pacific Relations, Tokyo, 1929, p. 136.

fairly representative of the situation in the immediate pre-war period. According to this estimate, fertilizers applied that year were sufficient to place on each harvested acre approximately 82 pounds of nitrogen, 46 pounds of phosphoric acid and 49 pounds of potash. (Table 22). Because of double and multiple cropping, these figures are about one-third less than the quantities would be if calculated on the basis of amounts per acre of cultivated land. Of the nitrogen applied, about 41 percent came from chemical fertilizers, 45 percent from farm-supplied materials and 14 percent from commercial organic materials. Of phosphoric acid, the percentage from each of these is of a similar order; but of the potash about 75 percent came from farm-supplied materials.

Compared with countries where an extensive system of agriculture prevails, as in the United States, these amounts are extremely high. They are not exceptionally high, however, in comparison with countries like Belgium and the Netherlands where, as in Japan, agriculture is intensive and extraordinarily good yields are obtained. In the case of Japan, also, there is an absence of hay crops which would normally furnish nitrogen for succeeding crops. When one crop follows another closely, as in multiple cropping, plants begin their growth in a soil largely depleted of available nutrients, and vigorous growth is dependent to an unusual degree upon supplies from the outside. The amounts of fertilizer used in Japan, therefore, are no higher than required to maintain the existing high level of yields, particularly with respect to nitrogen.

Table 22 - Estimated consumption of fertilizers in Japan, 1938

Sources	Nitrogen		Phosphoric Acid		Potash	
	Amount consumed 1/1,000 m.t.	Percent N 2/	Amount consumed 1/1,000 m.t.	Percent P ₂ O ₅ 2/	Amount consumed 1/1,000 m.t.	Percent K ₂ O 2/
Commercial Chemical						
Ammonium sulphate	714.0	20.5				
Calcium cyanamide	210.8	22.0				
Superphosphate			582.0	20.4		
Potassium sulphate				115.7		
Potassium chloride	25.8	16.0			95.0	50.0
Sodium nitrate	1,113.0	9.8	1,113.0	7.7	13.8	60.0
Compound fertilizers					1,113.0	3/ 3.2
Sub-total			305.0		204.4	
Lbs. per Crop Acre			34		22	10
Commercial Organic						
Soybean cake	833.0	7.0	833.0	1.5	833.0	2.0
Rapeseed cake	38.5	7.0	38.8	1.5	38.8	2.0
Cottonseed	47.9	7.0	47.9	1.2	47.9	1.5
Other oil cake	92.3	5.5	92.3	1.0	92.3	1.5
Fish products	327.5	9.4	327.5	4.2	327.5	0.6
Bone meal	39.0	4.1	39.0	19.7	39.0	2.0
Sub-total			101.9		36.7	
Lbs. per Crop Acre			11		4	2
Farm Supplied						
Farmyard Manure	39,109	0.58	39,109	0.3	39,109	0.5
Night soil	16,057	0.57	16,057	0.13	16,057	0.27
Green manure	6,043	4/ 0.28				
Fuel ashes			1,095	3.5	1,095	8.9
Sub-total			335.2		176.5	
Lbs. per Crop Acre			37		20	37
GRAND TOTAL			743.1		417.6	
Lbs. per Crop Acre			82		46	49

Office of Foreign Agricultural Relations.

1/ Except for the farm supplied fertilizers, data are from the Japan Year Book 1940-41, pp. 532-533. They take into consideration domestic production, imports from abroad and from the colonies, exports abroad and to the colonies and amounts "consumed as raw materials."

The farm supplies manures, except for fuel ashes, are based on data presented in Gradjanzev, A. J., Statistics of Japanese Agriculture, Institute of Pacific Relations, 1941, p. 15.

Data for fuel ashes are based on the assumption that each Japanese family supplies to agriculture an average one-half pound per day of mixed wood and grass ashes. This figure, it may be noted, is some 15 percent lower than an estimate made by Professor F. H. King for 1908 (King, F. H., Farmers of Forty Centuries, 1911, p. 296), when it is likely that, on the average, more wood and grass probably were consumed for fuel by individual families but when the total population was only 66 percent of that in 1938.

2/ Taken in part from Gustafson, A. F., Handbook of Fertilizer, 1939. The larger part is taken from figures given for Japanese fertilizing materials in Nambu, M., Rice Culture and Rice Grain, 1927, pp. 469-470.

3/ No indication of the actual formula for this fertilizer was given. When the amounts of bone meal and the various mineral fertilizers listed as "consumed as raw materials" were added together, however, it was found that the total nearly equalled the figure given for compound fertilizers. It, therefore, has been assumed that the compound fertilizers are made up of these materials. The formula which they make (9.8 - 7.7 0 3.2) is one which would appear to be suitable for rice culture.

4/ Represents one-half the nitrogen content given for fresh legume green manure, on the arbitrary assumption that one-half has originated from supplies in cultivated soil. No phosphoric acid and potash are represented to have been added through green manure, because the amounts carried by this material have been taken for the most part from supplies in cultivated soil.

More direct evidence on this point is available in the results of fertilizer experiments reported from a number of agricultural experiment stations. One such report, representing an average of results from soils of all Japan, shows that, without the addition of any artificial fertilizer at all, the average yield was 48 percent below the yield of plots fully fertilized. With nitrogen alone absent, phosphorus and potassium being supplied, average yields were 45 percent below those of plots fully fertilized. In plots lacking phosphorus only, the drop in yield was 12 percent; in the absence of potassium, it was 9 percent (Table 23). Quite obviously, the application of nitrogen fertilizers is of great importance to crop production in Japan. Nearly adequate amounts of available potassium appeared to exist in the soil at the time of these experiments, and the response to applications of phosphorus was only slightly greater. Considering this small response to phosphorus, some doubt exists as to whether the large amounts customarily applied are actually necessary; and these heavy applications may have resulted in a gradual accumulation of this element in the soil.

Official statements which have appeared since the outbreak of war in 1941 suggest that some kind of a fertilizer shortage has been experienced. This would be readily understandable in the case of superphosphate, since a large part of the raw materials used in its manufacture have customarily been imported. Outside supplies of potash have also been cut off; but this should not be of great consequence to crop production as the main part of this element has normally

Table 23-- Results of fertilizer experiments in Japan ^{1/}
(Yields in terms of 100 percent for NPK) ^{2/}

Kind of soil ^{3/}	No fertilizer applied	PK	NK	NP	NPK
"Alluvial"	50.9	54.0	89.2	91.3	100.0
"Flood"	53.7	56.1	86.3	90.4	100.0
"Tertiary"	54.6	56.5	89.0	90.2	100.0
"Ancient formed"	51.6	52.9	89.8	91.3	100.0
"Granite"	56.2	59.1	90.9	92.0	100.0
"Volcanic"	47.7	49.8	79.8	91.0	100.0
Simple average	52.45	54.73	87.50	91.03	100.0

^{1/} Kudo, T. The Manuring of Rice Plants. Iwate-ken Agricultural Experiment Station. March 1931, p. 10. Stated to represent averages for soils of all Japan.

^{2/} The number of years of the experimental records, the amounts and kinds of fertilizer applied, the total number of experiments averaged, and the kind of experimental layouts employed are not stated.

^{3/} These names represent literal translations.

been supplied from local materials. A critical shortage, if any, would be expected of nitrogen; and there is evidence that for several years farmers have not had available as much ammonium sulphate as they would like. Up to the present, however, it seems doubtful whether the shortage of this chemical has caused material reduction in the quantity of the main cereals produced.

Some interest exists in the question as to how much drop in total production might be expected were all nitrogen-bearing chemical fertilizers to be completely eliminated from agricultural use. Accepting as representative the data already presented, such an elimination would result in an average drop of yield of around 20 percent, assuming that the deficiency of commercial nitrogenous fertilizer is not made up through the increased use of domestically produced nitrogen-bearing materials - barnyard manure, night soil, etc.

Mechanization

The intensive work performed on Japanese farms, from planting to harvesting, is carried on almost exclusively by hand. With some minor exceptions, motor-driven machines are scarcely ever used in seeding, fertilizing and harvesting, although animal labor often is used in plowing. Even in Hokkaido, which is most suited for mechanization, animal-drawn farm implements have been in use for generations and no need was felt for replacing them with modern equipment.

The farm equipment used in field work is light and of the simplest construction. The dikes and ditches could not stand heavy equipment, and in the tiny fields too much maneuvering of the machinery

would destroy the crop. Aside from physical factors, mechanization has been retarded for economic reasons. Human labor is one of the things that farms have in abundance; this in itself tends to preclude the use of labor-saving devices.

To assume, however, that mechanization is a totally unknown quantity would be erroneous. While no motor driven machinery is employed in the preparation of the field, in planting and in harvesting, the situation has been somewhat different in recent years with respect to other aspects of farming. Official data show that between 1927 and 1937 the number of electric motors and gasoline engines on farms increased from 52,000 to 188,000. To this number should be added 59,000 motors and engines rented to farmers by private business organizations.

The distribution of this equipment varies widely according to local agricultural conditions. In Okayama prefecture with a seasonal shortage of labor, there was one motor to every eight families, whereas in Yamanashi prefecture there was one for every 621 households.

Table 24. - Power units on farms in Japan. 1927 to 1937, inclusive.

Year	Electric motor	Gasoline engine	Gas engine	Steam engine	Total
1927	11,603	39,406	367	252	51,628
1931	28,306	63,459	262	239	92,266
1933	37,861	80,491	238	211	118,801
1935	47,138	96,353	263	113	143,867
1937	66,619	120,842	243	109	187,813

Oriental Economist, August 1939, p. 516. Data supplied by Japanese Ministry of Agriculture and Forestry.

A feature of this power equipment, which reflects the small size of the farmer's holding, is their low horse power capacity. Of the units owned by farmers and farm organizations in 1937, for example, the gasoline engines averaged 2.9 hp. and the electric motors 1.5 hp. The respective figures for the units owned by renting agencies are 3.2 and 2.5 hp. By far the majority of electric motors owned by farmers are rated at only 1/4 to 2 hp. The machines and implements operated by these engines and motors must necessarily be of very light design.

Table 25. - Rated capacity of farm engines in Japan, 1937

Installed by farmers or their organizations	Units	Total hp.	Average hp.
Gasoline engines	120,842	349,348	2.9
Electric motors	66,619	101,623	1.5
In possession of renting agencies:			
Gasoline engines	33,813	108,742	3.2
Electric motors	24,740	63,368	2.5

Oriental Economist, August 1939, p. 516. Data supplied by Japanese Ministry of Agriculture and Forestry.

Information on the utilization of mechanical horse power available to the farmers is supplied in Table 26. In addition to the uses indicated some power machinery is used for operating drying kilns for grains, in matting and straw rug making, etc. With the exception of pumps, however, the machines are employed expressly for the processing of products on the farm and no mechanical equipment is used directly

in raising crops. In 1937 the horse power capacity of the mechanical equipment of the 5,575,000 families amounted to 623,000 horse power, or a fraction more than one-tenth of a horse power per family. It follows also that much of the mechanical equipment shown in the table below is hand operated.

Table 26. - Principal farm machinery in Japan, annual 1931, 1933, 1935, 1937

Kind of machine	1931 Number	1933 Number	1935 Number	1937 Number
Threshers	55,954	67,259	91,735	128,620
Hullers	76,744	94,482	104,498	107,778
Wheat hullers	11,893	12,272	13,749	9,960
Rice cleaners	35,970	41,375	51,116	63,465
Wheat cleaners	6,530	7,703	10,329	11,307
Flour milling machines	5,855	7,339	8,866	10,230
Vertical pumps	13,280	15,198	16,146	26,027
Centrifugal pumps	13,660	16,660	16,467	18,236

Oriental Economist, August 1939, p. 516. Data supplied by Japanese Ministry of Agriculture and Forestry.

Livestock

One striking feature of Japanese agriculture is that it is hardly ever associated with animal industry. Farming is limited to the cultivation of the soil for the produce derived directly from it. The preponderance of highlands suggests a thriving animal industry;

but as a matter of fact, pastures are poorly developed and livestock numbers are very small.

A number of reasons explain this state of affairs. First, there is a lack of good natural pasture land because the native wild grass is coarse, unnutritious and generally crowds out the valuable forage grasses. Second, the market for animal products is limited; the Japanese have never acquired a taste for dairy products, and most of the people are unable to afford meat. The second cause stems from the fact that in a densely populated country such as Japan and with limited food resources, the food value produced from an acre under grains is 6 to 7 times larger than the food value of the meat or milk that can be obtained by feeding the grain. Also, where human labor is abundant and cheap, the question of animal husbandry as a source of draft power is not as important as on the large farms in other countries.

Cattle, as well as horses, are raised chiefly for draft purposes and stable manure. The total number of cattle in 1939 was 1,967,000 of which number 123,000 were milk cows. The number of horses (1936) was estimated at 1,432,000. Pigs are only half as numerous as cattle, while sheep and goats numbered 149,000 and 287,000 respectively. The number of cattle increased considerably between 1936 and 1939, but the number of horses has declined since 1932, a development which may be attributed to the invasion of Manchuria and the migration of farmers to that region. Japan's more strenuous military ventures since then must have reduced

the number of horses still further. The number of sheep is still very small, but between 1936 and 1939 it increased two and one-half times. This undoubtedly reflects efforts to increase the domestic supply of wool. (Table 27).

As to the regional distribution of the cattle and horses, most farmers in northern and southern Japan keep horses while those in central Japan keep either cattle or horses. The region of greatest cattle concentration is the Chugoku Peninsula, in the extreme southwestern Honshu, the principal island of Japan. But only in Hokkaido with its somewhat better grasses is livestock farming more advanced than in the rest of Japan.

In 1939 only 1,531,000 farm families (28 percent of the total) had cattle, and of those, 1,279,000 had no more than one head each, of 576,000 families keeping hogs, 378,000 had one hog each. In general, the average number of cattle per farm household is .4; that of horses .3; and of hogs .2.

Table 27 -- Livestock numbers in Japan at end of specified years. Annual 1929 to 1939

Specified Livestock	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000	: 1,000
Cattle	: 1488.0	: 1498.0	: 1512.0	: 1529.0	: 1560.0	: 1615.0	: 1684.0	: 1771.0	: 1826.0	: 1894.0	: 1967.0
Oxen	: 401.0	: 399.0	: 400.0	: 399.0	: 402.0	: 408.0	: 425.0	: 433.0	: 445.0	: 459.0	: 472.0
Pigs	: 706.0	: 742.0	: 947.0	: 926.0	: 914.0	: 981.0	: 1063.0	: 1110.0	: 1088.0	: 1140.0	: 1070.0
Sheep	: 20.7	: 23.7	: 24.5	: 26.9	: 30.5	: 36.0	: 47.3	: 61.0	: 89.8	: 114.0	: 149.0
Goats	: 215.4	: 217.2	: 218.9	: 229.0	: 236.0	: 253.8	: 277.9	: 292.0	: 293.3	: 281.7	: 286.7
Rabbits	:	:	:	:	:	:	:	:	:	: 4,946.0	: 6,604.0
Horses	: 1490.0	: 1490.0	: 1477.0	: 1541.0	: 1501.0	: 1464.0	: 1448.0	: 1432.0	:	:	:

(Figures not published)

Office of Foreign Agricultural Relations.
Norinsho Tokaihyo, 1939, and other official sources.Area in Various Crops

The farm land of Japan falls into two main groups: rice fields (irrigated land), and upland farms (unirrigated lands) which are devoted to other crops. Many of the cultivated crops in the uplands as indicated earlier, are also grown on rice fields as winter crops. The total area under all crops in 1939 was 19,919,000 acres, and the distribution of this acreage among various crops is shown in table 28.

During the decade 1929 to 1939, there was a tendency to replace the culture of mulberry trees (silk production) with large acreages under field crops. Among grain crops the most marked shift was toward increased wheat acreage, largely at the expense of barley and other grains. Rice and legumes have given place to potatoes, industrial crops and vegetables. There has, also, been a general increase in miscellaneous field crops from 7.8 percent of total harvested acreage in 1929 to 8.8 percent in 1939. (Fig. 7).

The causes underlying the changes will be discussed in the section dealing with the individual crops; suffice it to say here that the wheat acreage increased by 50 percent thereby making Japan self-sufficient in wheat; barley and mulberry have declined by 15 percent each, while acreage of industrial crops has increased by 36 percent. But on the whole, with the exception of wheat, the acreage under various crops in relation to the total crop area has remained fairly stable.

Table 28.- Acreage under specified crops in Japan, 1939

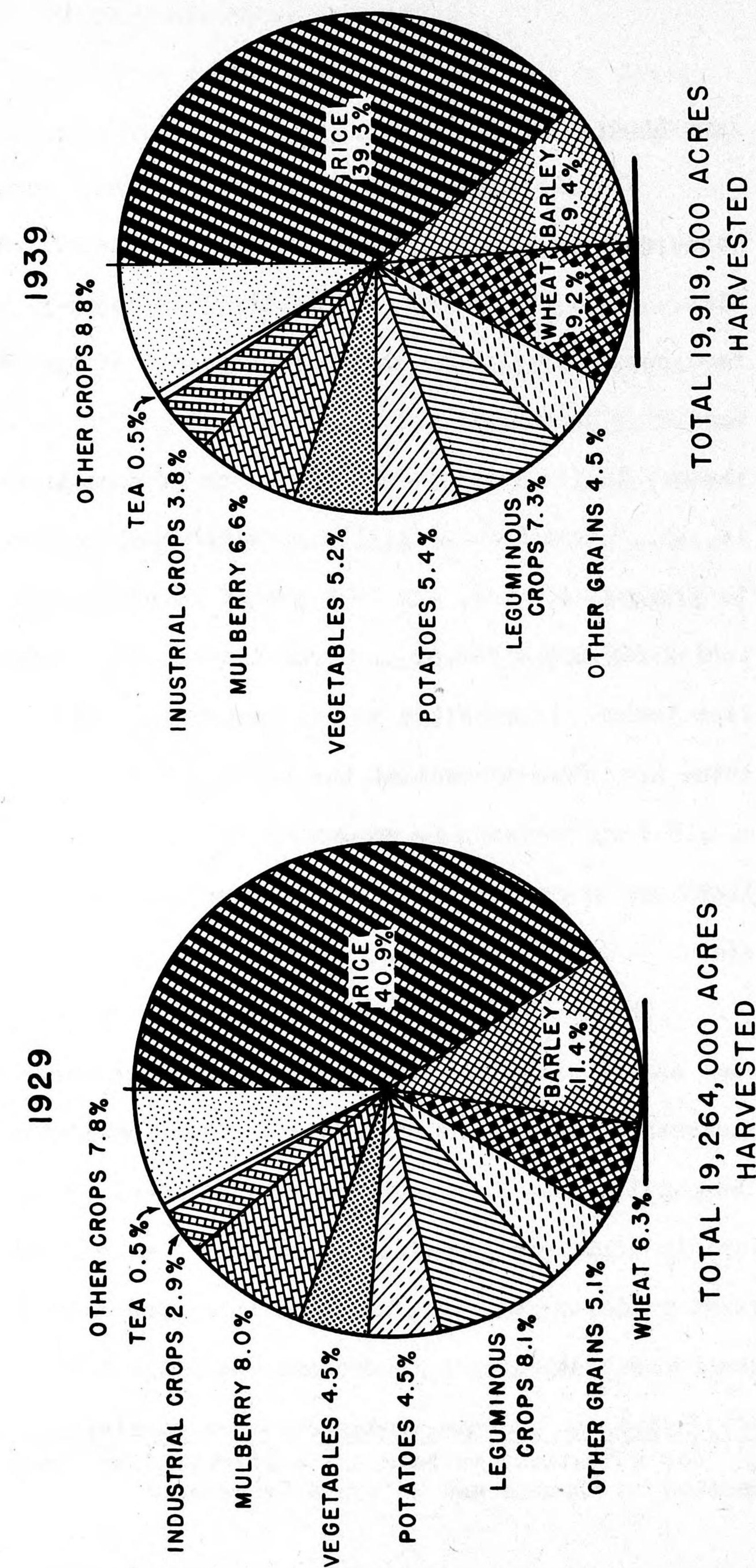
Specified crop	1939	
	Acreage	Percent of total
	1,000 acres	Percent
Irrigated rice	1/ 7,926	39.3
Cereals (dry crops):		
Wheat	1,827	9.2
Common barley	867	4.4
Naked barley	1,004	5.0
Oats	304	1.5
Millets (foxtail, proso, and barnyard)	279	1.4
Buckwheat	201	1.0
Corn	130	.6
Total	4,612	23.1
Leguminous crops		
Soy beans	795	4.0
Other beans, peasant peanuts	654	3.3
Total	1,449	7.3
Potatoes		
Sweet	681	3.4
Irish	406	2.0
Total	1,087	5.4
Vegetables	1,022	5.2
Industrial crops		
Sugar	50	.2
Fibers	192	1.0
Oilseeds	251	1.3
Other industrial crops	261	1.3
Total	754	3.8
Tea	99	.5
Mulberry	1,307	6.6
Green fodder	223	1.1
Green manure crops	1,153	5.8
Other crops	387	1.9
Grand total	19,919	100.0

Office of Foreign Agricultural Relations. Norinsho Tokaihyo, 1939, and The Statistical Abstract of the Ministry of Agriculture, and Forestry, 1936/37.

1/ Including 374,000 acres of upland rice.

Fig. 7

JAPAN: PERCENTAGE OF ACRES HARVESTED IN VARIOUS CROPS, 1929 AND 1939



Food Crops

Importance of Food Crops

The distinguishing feature of Japanese agriculture is the preponderance of the rice crop. It is the main article of the Japanese diet. Until the second half of the 19th century, it was more than a food commodity; it was the very basis and substance of the country's economy. Japan's industrialization since then has brought major changes in its economy, yet the place of rice in Japanese agriculture is still paramount. A little more than half of the cultivated land is devoted to rice. In 1939 out of 14,896,000 acres of cultivated land 7,826,000 acres or 53 percent consisted of "paddy" or irrigated rice lands. In relation to harvested area^{1/} the rice acreage constitutes over 39.3 percent of the total. More than half of the value of all farm products is accounted for by this cereal (57 percent in 1939) and the majority of the farming population is engaged either exclusively or incidentally in its cultivation.

This emphasis upon rice is probably no accident, because, to some extent at least, the type of agriculture developed has been influenced by the amount of cultivated land available in relation to the population. With relatively little land fit for cultivation, a rapidly growing population demanding larger supplies of food and a fixed policy of the Government to encourage self-sufficiency in food, the concentration upon food crops was natural. Rice became the dominant food crop, because, under Japanese conditions, it yields more

^{1/} For a distinction between "cultivated" and "harvested" area see section on "Double and Multiple Cropping."

calories per unit of land than any other cereal.

Individually, other food crops are not as important to Japan as rice, but taken together they utilize 41.2 percent of the harvested area. Thus, food crops as a whole account for 80.4 percent of the total land under crops. The fact that so much land is devoted to food crops is yet another feature of Japanese agriculture worth noting.

Where such a high proportion of the cropped land is devoted to raising food, there is little room for industrial crops. In fact, the latter utilize only 4 percent of the total cropped area. At one time, when the population of Japan was much smaller than it is now, a fair quantity of cotton was produced. In modern times cotton production has practically disappeared, despite the favorable climatic and soil conditions in parts of southern Japan, mainly due to an increased demand for foodstuffs. Given a unit of land equally suited to the production of either food crops or cotton, the farmer ordinarily can obtain a higher income by devoting the land to food crops than by putting it in cotton.

Rice

Among cereal crops Japan grows rice, wheat, barley, oats, millet, buckwheat, and corn; but rice is by far the most important food crop. Of the 12.4 million acres (1939) in cereals, rice alone accounted for 7.8 million acres, or 63 percent of the total; while the value of the rice crop was estimated at 2,874 million yen or 53 percent of the total value of Japan's agricultural output. Rice is used at practically every meal; and although other grains also are

consumed, they supplement rather than replace rice. Japan's food problem is inextricably bound up with an increase in the supply of rice to keep pace with the growing population. For this reason the policies of the Government concerning the maintenance of sufficient food supplies have been mainly concentrated on increasing the unit yield of rice rather than the acreage.

Types of Japanese Rice. In view of the importance of rice in the Japanese food supply, it may be well to point out some of the types of this cereal grown there. The rice produced in Japan, and for that matter in any other rice-producing country, is of two principal kinds; common rice (non-glutinous) and glutinous rice. The first is made up of varieties whose kernels can be cooked so that they remain separate; the second, of varieties whose kernels when boiled form a gluey, sticky mass. The acreage under this type represents from 8 to 9 percent of the total area of irrigated rice. The latter, whatever its variety, is grown under irrigation or in natural swamps where there is standing water at appropriate seasons. In Japan 96 percent of the rice acreage is irrigated; the remaining upland rice area is without irrigation. The cereal is planted in May and June and harvested from late August to November.

Acreage, Yield and Production. Shortly after Japan embarked on its course of industrialization in the latter part of the nineteenth century, the country's rice area was estimated at 6,240,000 acres (Table 29). By the end of the nineteenth century it had increased to 7,000,000 acres, and during the 1930's it averaged 7,860,000 acres.

Table 29 .- Acreage, yield and production of rice in Japan, selected period 1878-1939

Period	Acreage		Yield		Production	
	1,000 acres	Percent of 1878-82	Pounds per acre	Percent of 1878-82	Million pounds	Percent of 1878-82
Average:						
1878-1882	6,244	100	1,512	100	9,441	100
1888-1892	6,708	107	1,835	123	12,306	130
1898-1902	6,950	111	1,925	128	13,378	142
1908-1912	7,247	116	2,212	146	16,028	147
1921-1925	7,704	123	2,412	158	18,584	193
1926-1930	7,828	125	2,508	165	19,631	204
Annual						
1931	7,961	127	2,236	146	17,802	185
1932	7,982	128	2,439	160	19,471	202
1933	7,778	124	2,936	193	22,837	237
1934	7,775	124	2,150	142	16,715	173
1935	7,852	126	2,359	153	18,524	192
1936	7,859	126	2,762	181	21,712	225
1937	7,877	126	2,715	177	21,383	222
1938	7,893	126	2,691	174	21,238	220
1939	7,823	126	2,555	186	19,990 ^{2/}	231

Office of Foreign Agricultural Relations. Compiled from official sources.
1/ Nasu, Shiroshi, Aspects of Japanese Agriculture, Institute of Pacific Relations, 1941, p 108.

2/ Based on an estimated production of 62 million koku as against an official estimate of 68.9 million koku.

Thus in the course of half a century the area increased by 1,620,000 or 26 percent. In the past two decades, however, it increased by only 3 percent, while more recently the rice acreage has remained practically stationary. This is just one aspect of the fact that the great efforts to extend the total area under cultivation have passed the peak and that increased production must depend upon other factors to a greater extent than in the past.

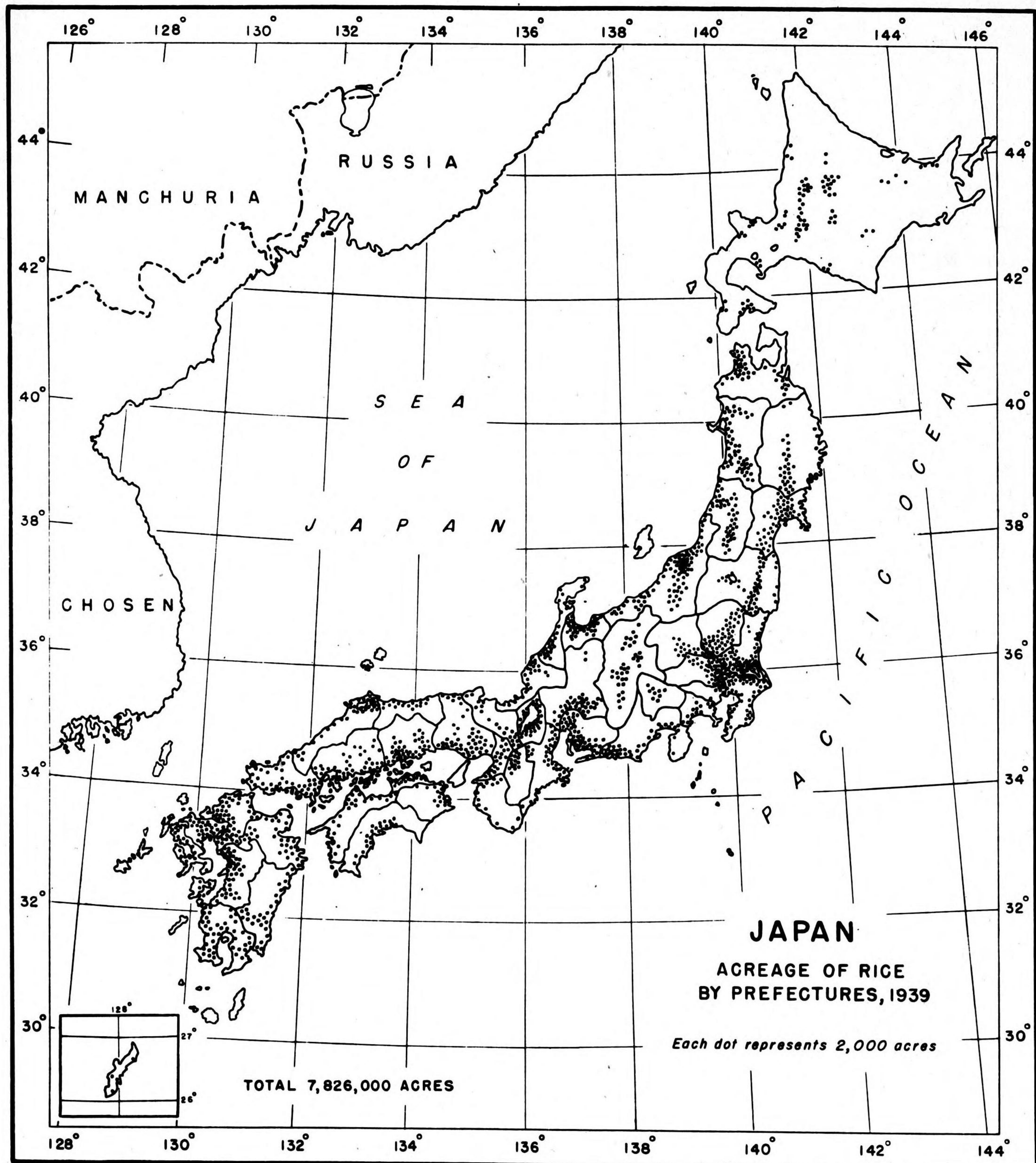
The distribution of the rice acreage by prefectures is very uneven; this is largely in consequence of the peculiar topographical features of Japan. The area in rice varies from 456,000 acres or 19 percent of the total cultivated land in the prefecture of Hokkaido to only 22,000 acres or 15 percent in the prefecture of Okinawa. In all the other prefectures where the total acreage fluctuates between the foregoing extremes, the ratio of rice land to total cultivated land ranges from a low of 29 percent (Tokyo) to a high of 88 percent in the Toyama prefecture (Table 30 and Fig. 8). Hokkaido with 5.8, Niigata with 5.6 and Ibaragi with 4.2 percent of the total rice acreage are the principal rice prefectures.

During the period of the rapid expansion of the rice area, as well as after the acreage became more or less stationary, there has been taking place a more intensive and better cultivation of the land and a liberal application and skilful utilization of chemical fertilizers. Under the stimulus of these factors rice yields increased from an annual average of 1.512 pounds of brown rice (43 bushels in terms of rough rice) per acre in 1878-1882 to 2.616

Table 30- Total cultivated acreage and acreage in rice by prefectures in Japan, 1939

Prefecture	Cultivated acreage	Rice acreage	Percent rice acreage is of cultivated acreage	Percent acreage in each prefecture is of total rice acreage
	1,000 acres	1,000 acres	Percent	Percent
Hokkaido	2,398	456	19	5.8
Aomori	335	171	51	2.2
Iwate	359	153	43	1.9
Miyagi	363	240	66	3.1
Akita	352	264	75	3.4
Yamagata	348	234	67	3.0
Fukushima	471	252	54	3.2
Ibaraki	549	329	60	4.2
Tochigi	355	234	66	3.0
Gumma	285	109	38	1.4
Saitama	399	195	49	2.5
Chiba	479	282	59	3.6
Tokyo	106	31	29	.4
Kanagawa	162	64	40	.8
Niigata	600	442	74	5.6
Toyama	223	196	88	2.5
Ishikawa	177	132	75	1.7
Fukui	150	119	79	1.5
Yamanashi	131	44	34	.6
Nagano	424	171	40	2.2
Gifu	252	157	62	2.0
Shizuoka	323	151	47	1.9
Aichi	391	232	59	3.0
Miye	253	172	68	2.2
Shiga	191	156	82	2.0
Kyoto	146	97	66	1.2
Osaka	133	95	71	1.2
Hyogo	313	240	77	3.1
Nara	108	73	68	.9
Wakayama	122	70	58	.9
Tottori	124	79	64	1.0
Shimane	202	124	61	1.6
Okayama	303	202	67	2.6
Hiroshima	269	172	64	2.2
Yamaguchi	255	160	63	2.0
Tokushima	130	69	53	.9
Kagawa	128	90	70	1.1
Chime	225	107	48	1.4
Kochi	166	94	57	1.2
Fukuoka	350	257	73	3.3
Saga	177	132	75	1.7
Nagasaki	218	78	36	1.0
Kumamoto	393	205	52	2.6
Oita	226	141	62	1.8
Miyazaki	230	131	57	1.7
Kagoshima	453	202	45	2.6
Okinawa	149	22	15	.3
Total	14,896	7,826	53	100.0

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Fig. 8



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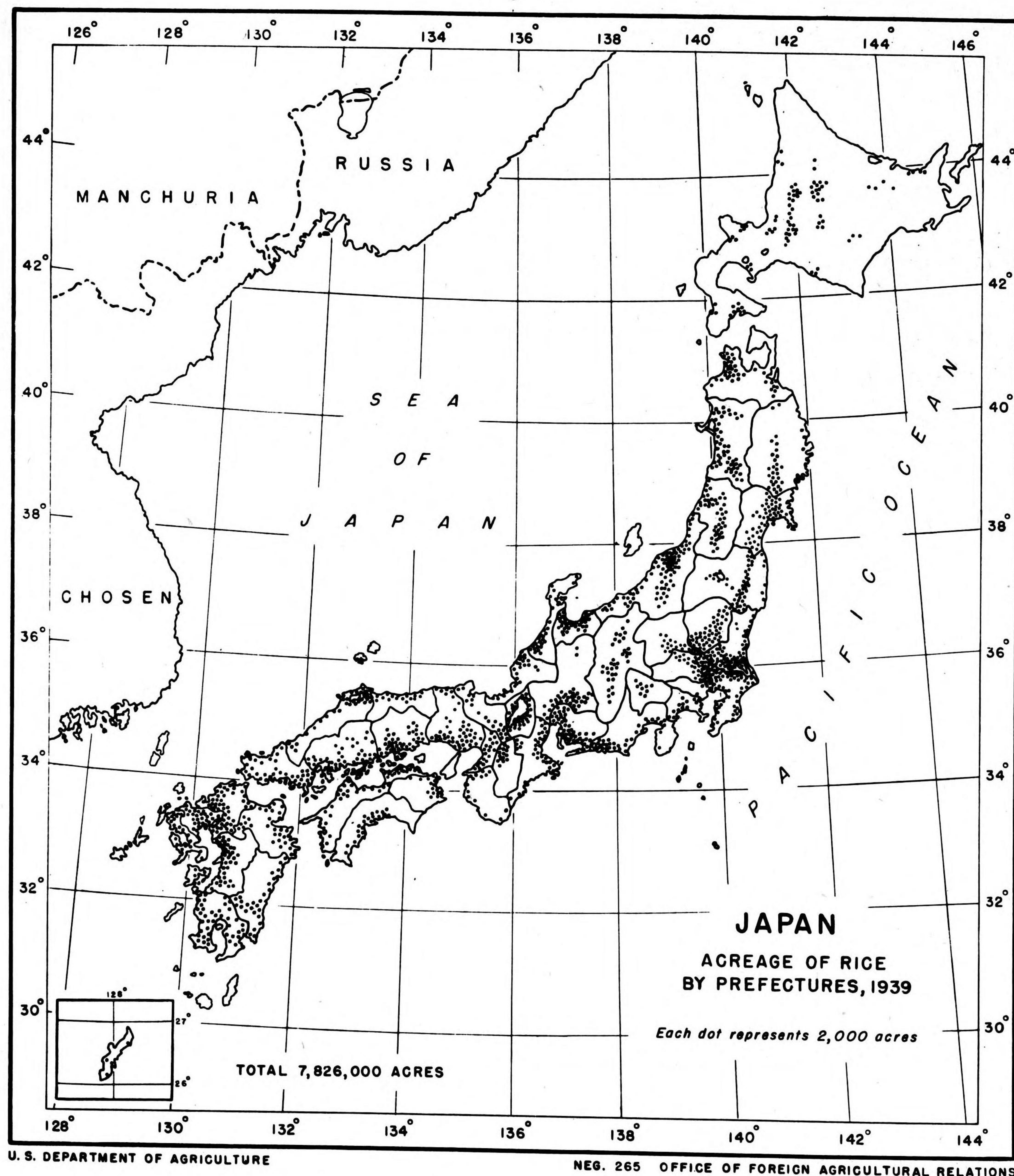
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Table 20- Total cultivated acreage and acreage in rice by prefectures in Japan, 1939

Prefecture	Cultivated acreage	Rice acreage	Percent rice acreage is of cultivated acreage	Percent acreage in each prefecture is of total rice
	1,000 acres	1,000 acres	Percent	Percent
Hokkaido	2,398	456	19	5.8
Aomori	335	171	51	2.2
Iwate	359	153	43	1.9
Miyagi	363	240	66	3.1
Akita	352	264	75	3.4
Yamagata	348	234	67	3.0
Fukushima	471	252	54	3.2
Ibaraki	549	329	60	4.2
Tochigi	355	234	66	3.0
Gumma	285	109	38	1.4
Saitama	399	195	49	2.5
Chiba	479	282	59	3.6
Tokyo	106	31	29	.4
Kanagawa	162	64	40	.8
Niigata	600	442	74	5.6
Toyama	223	196	88	2.5
Ishikawa	177	132	75	1.7
Fukui	150	119	79	1.5
Yamanashi	131	44	34	.6
Nagano	424	171	40	2.2
Gifu	252	157	62	2.0
Shizuoka	323	151	47	1.9
Aichi	391	232	59	3.0
Miye	253	172	68	2.2
Shiga	191	156	82	2.0
Kyoto	146	97	66	1.2
Osaka	133	95	71	1.2
Hyogo	313	240	77	3.1
Nara	108	73	68	.9
Wakayama	122	70	58	.9
Tottori	124	79	64	1.0
Shimane	202	124	61	1.6
Okayama	303	202	67	2.6
Hiroshima	269	172	64	2.2
Yamaguchi	255	160	63	2.0
Tokushima	130	69	53	.9
Kagawa	128	90	70	1.1
Ehime	225	107	48	1.4
Kochi	166	94	57	1.2
Fukuoka	350	257	73	3.3
Saga	177	132	75	1.7
Nagasaki	218	78	36	1.0
Kumamoto	393	205	52	2.6
Oita	226	141	62	1.8
Miyazaki	230	131	57	1.7
Kagoshima	453	202	45	2.6
Okinawa	149	22	15	.3
Total	14,896	7,826	53	100.0

Office of Foreign Agricultural Relations. Norinsho Tokeihyo, 1939. RESTRICTED

Fig. 8



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pounds (75 bushels rough) in 1935-1939 or 73 percent (Table 29). Since during the same period the acreage increased only by one-fourth, the assumption is that the increase in output was mainly the result of the improvement of technique including fertilization and the varieties seeded. A comparison of the average Japanese yields with those of such typically rice-producing countries as Burma, Siam, French Indo-China, India, Java and Philippines, shows that the former are roughly three times as large as those in any of the specified countries.

In more recent years the increase in yield has been relatively slight, and the likelihood is that in the future the yield will not be increased at as rapid a pace as in the past. Following as means of restoring the fertility of the land is not practiced on much of the irrigated acreage. Cereal crops such as barley and wheat, and sometimes rapidly growing truck crops, are planted following rice year-in-and-year-out. No true system of crop rotation generally is employed, and soil fertility is maintained by the extensive use of fertilizers. There are indications, however, that neither the additional human efforts nor the greater application of fertilizers is likely to result in a proportionate increase in yields.

The changes in output from 9.4 billion pounds of brown rice (272 million bushels in terms of rough rice) in 1878-1882 to 20.5 billion pounds (1,593 million bushels) in 1935-1939, reflect not only increased acreage but even to a greater degree increase in yield.

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Disappearance and Supply. The greatly augmented production has not been sufficient to take care of Japan's rice requirements because of the growing population and the increase in per capita disappearance from 278 pounds (average of four - 5-year periods from 1878 to 1897, to a high of 363 pounds during 1922-1926. In the years following, disappearance has declined to some extent (Table 31), but not sufficiently to materially change the problem of supply.

The deficit of rice from domestic sources did not become apparent until in the late 1890's. Up to almost the middle of the 1890's the average production of 18 billion pounds was not only sufficient for the country's needs, but left a small exportable surplus. Since then the country has become increasingly dependent upon imports. At the turn of the century annual net imports amounted to about 400 million pounds; and in the late 1930's (Table 31) they have risen to over 4 billion pounds, or about 17 to 18 percent of the total consumption.

Colonial Rice. With the increase in imports there came a shift in the sources from which they were drawn; rice from French Indo-China, British India, Thailand, and the United States gradually gave way to colonial rice from Korea and Formosa. Korea supplied 12 percent and Formosa 6 percent of the Japanese rice consumption.

Considering Japan's food requirements, the availability of colonial rice to that country is of utmost importance. Rice from Korea and Formosa is a result of long, strenuous efforts on the part of Japan to assure the country not only of a sufficient supply of rice, but also of rice that suits the taste of the Japanese people.

1/ Swen Wen Yuh and Alsberg, Carl L., Japan as a Producer and Importer of Wheat. Wheat studies of the Food Research Institute, Vol. VI, No. 8, July 1930. Table XI, page 377.

Table 31. - Rice production, trade, and apparent disappearance of rice in Japan, 1902-03 to 1942-43 (Converted from koku of brown rice to million pounds of brown rice)

Marketing year November - December	: Carry-over :		: Imports :		: Total :		: Carry-over :		: Disappearance :		Population : Million :
	: beginning :	: of year :	: Foreign :	: Chosen :	: Million :	: Million :	: Total :	: Total :	: Million :	: Million :	
	: Million :	: Million :	: Million :	: Million :	: Million :	: Million :	: Million :	: Million :	: Million :	: Million :	: Million :
1902-03	11,908	1,632	161	1,793	13,701	103	13,598	297	45,766	1,000	
1903-04	14,984	1,784	175	1,919	16,903	146	16,757	362	46,320		
1904-05	16,582	1,599	210	1,809	18,391	74	18,317	391	46,785		
1905-06	12,308	871	267	1,138	13,446	83	13,363	282	47,293		
Average 1902/03-1906/07	14,929	850	198	1,048	15,977	89	15,888	332	47,870		
1907-08	15,815	655	361	1,541	15,684	99	15,585	333	46,799		
1908-09	16,745	443	372	1,016	16,831	82	16,749	348	48,192		
1909-10	16,907	288	242	815	17,560	122	17,438	357	48,793		
1910-11	15,035	599	228	946	15,981	142	15,839	316	49,434		
1911-12	16,673	648	211	938	17,611	97	17,514	343	50,120		
1912-13	16,193	527	283	856	17,091	127	16,965	343	49,477		
1913-14	16,205	797	316	1,485	17,678	105	17,573	341	51,581		
1914-15	18,380	167	224	1,589	18,558	124	18,434	316	52,311		
1915-16	17,594	1,074	254	995	18,260	252	18,008	358	53,036		
1916-17	17,531	460	262	782	20,824	286	20,538	349	49,481		
Average 1912/13-1916/17	17,636	527	263	1,092	19,969	223	19,746	363	54,379		
1917-18	19,609	242	214	3,063	21,461	104	21,357	362	52,958		
1918-19	20,380	263	333	1,533	23,689	91	23,598	372	55,237		
1919-20	17,792	1,222	239	2,472	22,895	272	22,623	355	57,124		
1920-21	18,602	932	312	2,033	22,226	138	22,088	364	55,882		
Average 1917/18-1921/22	19,569	522	366	2,002	23,926	228	23,698	372	57,868		
1922-23	17,876	522	312	1,466	23,139	251	22,888	362	58,620		
1923-24	18,433	1,656	535	3,074	25,100	620	24,480	364	59,428		
1924-25	19,251	690	705	3,076	24,100	179	23,921	365	60,341		
1925-26	19,251	690	705	3,076	24,100	179	23,921	365	61,316		
1926-27	17,925	1,331	851	1,085	23,934	419	23,515	353	59,515		
Average 1922/23-1926/27	18,611	1,054	654	3,227	25,511	325	25,186	363	62,224		
1927-28	18,611	1,054	654	3,227	25,511	325	25,186	363	63,138		
1928-29	19,444	412	726	2,872	24,644	180	24,464	347	63,967		
1929-30	19,202	565	765	3,629	25,511	245	25,266	355	64,725		
1930-31	18,611	403	705	2,774	24,242	160	24,082	344	64,254		
Average 1927/28-1931/32	18,607	393	726	3,141	24,491	218	24,273	351	65,366		
1932-33	19,202	318	812	3,346	26,242	201	26,041	353	66,296		
1933-34	19,471	352	812	3,536	26,453	263	26,190	370	67,238		
1934-35	22,877	55	887	4,594	30,335	293	30,042	336	69,124		
1935-36	16,715	23	720	4,137	26,210	263	25,947	340	69,254		
1936-37	16,524	132	1,536	4,560	26,288	181	26,107	362	70,258		
Average 1932/33-1936/37	19,852	125	1,512	4,257	27,481	229	27,252	352	68,248		
1937-38	21,353	48	1,586	4,906	28,711	189	28,522	362	71,258		
1938-39	21,353	50	1,269	5,029	26,309	161	26,148	354	72,222		
1939-40	19,990	3,901	1,064	3,153	27,129	183	26,946	341	72,878		
1940-41	19,668	4,514	1,483	7,093	28,051	161	27,890	358	71,740		
1941-42	21,733	3,547	1,612	5,519	27,811	183	27,628	358	71,740		
Average 1937/38-1941/42	20,002	2,412	1,705	5,519	27,811	183	27,628	358	71,740		
1942-43	19,990	2,257	967	3,869	28,695	161	28,534	358	71,740		

1/ Unofficial estimates.
2/ Unofficial estimates vary from 17,733 to 18,700 million pounds. Official figure is 17,733 million pounds.
3/ Unofficial estimates vary from 19,300 to 21,600 million pounds.
Office of Foreign Agricultural Relations.

The nature of this problem and the methods followed were stated in a publication of the Government General of Korea as follows:^{1/}

[In our Japanese food supply, rice, the principal article of consumption, tends to be short year after year. As a step toward the solution of this problem the Imperial Government is doing all it can to increase rice production by effective enforcement of the Land Readjustment Law, by promulgation of the Reclamation Law, and by trying to improve agricultural technique in every way. In spite of all these efforts, the increase in rice production clearly does not suffice to meet the demand in the near future. In view of these facts, and in order not only to help in solving the Empire's food problem but specifically also to develop the economy of Korea, the Government General of Chosen planned in 1919 to have about 1,960,000 acres of paddy field reclaimed and improved within 30 years. As a first installment, the Government is trying to complete such work on about a million acres in fifteen years. In this way, and counting also on an increase of the yield by improved techniques of production approximately 45,630,000 bushels of rice are to be added to the total annual output in that period. This is the so-called "More Rice" project in Korea that has been under way since 1927.]

From the point of view of solving the rice problem, the measures adopted by the Japanese in Korea have been eminently successful, as is proved by the increase in the rice output in Korea and Formosa and the ever-growing volume of imports from those colonies. This development has had an adverse effect upon the fortunes of the Japanese farmers. The following statement throws light upon the peculiar relationship between colonial and Japanese rice:^{2/}

^{1/} Government General of Korea, "The Land Amelioration Undertaking in Korea", November 1928, p. 4. Quoted by Hoon K. Lee in Land Utilization and Rural Economy in Korea, 1936, p. 123.

^{2/} Ishii, Ryoichii, Population Pressure and Economic Life in Japan, 1937, pp. 168-169.

[Although the colonies hold the key to the solution of the problem of food supply in Japan, at the moment products of these colonies have depressed Japanese agriculture. To illustrate, since Chinese rice is ever ready to fill the rice markets in Japan, a poor agricultural season in Japan cannot be compensated by a high price. On the other hand, a good crop may, and frequently, does ruin the farmer, since this results in a sharp decline in the price. Nevertheless Japan proper cannot supply her own needs, she must rely on colonial products for a sufficient food supply.]

Whatever the effects upon the Japanese rice producer, however, before the war virtual self-sufficiency in this basic food crop had resulted from the supplying, by domestic producers and the colonies, of 97 percent of all the rice consumed in Japan.

Surpluses and Deficits by Prefectures. Japan Proper, as shown in the preceding pages, is a deficit rice producer. It is important to show Japan's production by prefectures in order to estimate the extent to which each is a surplus or deficit rice producer.

Tokyo, the most thickly populated prefecture of Japan, produced only .4 percent of Japan's rice output. In the other densely populated prefectures such as Osaka, Hyogo, Kanagawa and Aichi, the ratio of production to consumption is very small also. (Table 32).

Official data that would determine the extent of Tokyo's deficit or for that matter the deficit or surplus of any other prefecture, are not available. A general idea can be obtained, however, by comparing the estimated average per capita disappearance for the country as a whole (372 pounds) with the average per capita production in each prefecture, as well as with the average per capita production as a whole (372 pounds). It appears then

that 26 of the 47 prefectures were deficit rice producers. The former were responsible for a gross deficit of 8.7 billion pounds, while the other 21 accounted for a surplus of 3.8 billion pounds, or a net deficit for the entire country of 4.8 billion pounds. (Table 32 and Fig. 9).

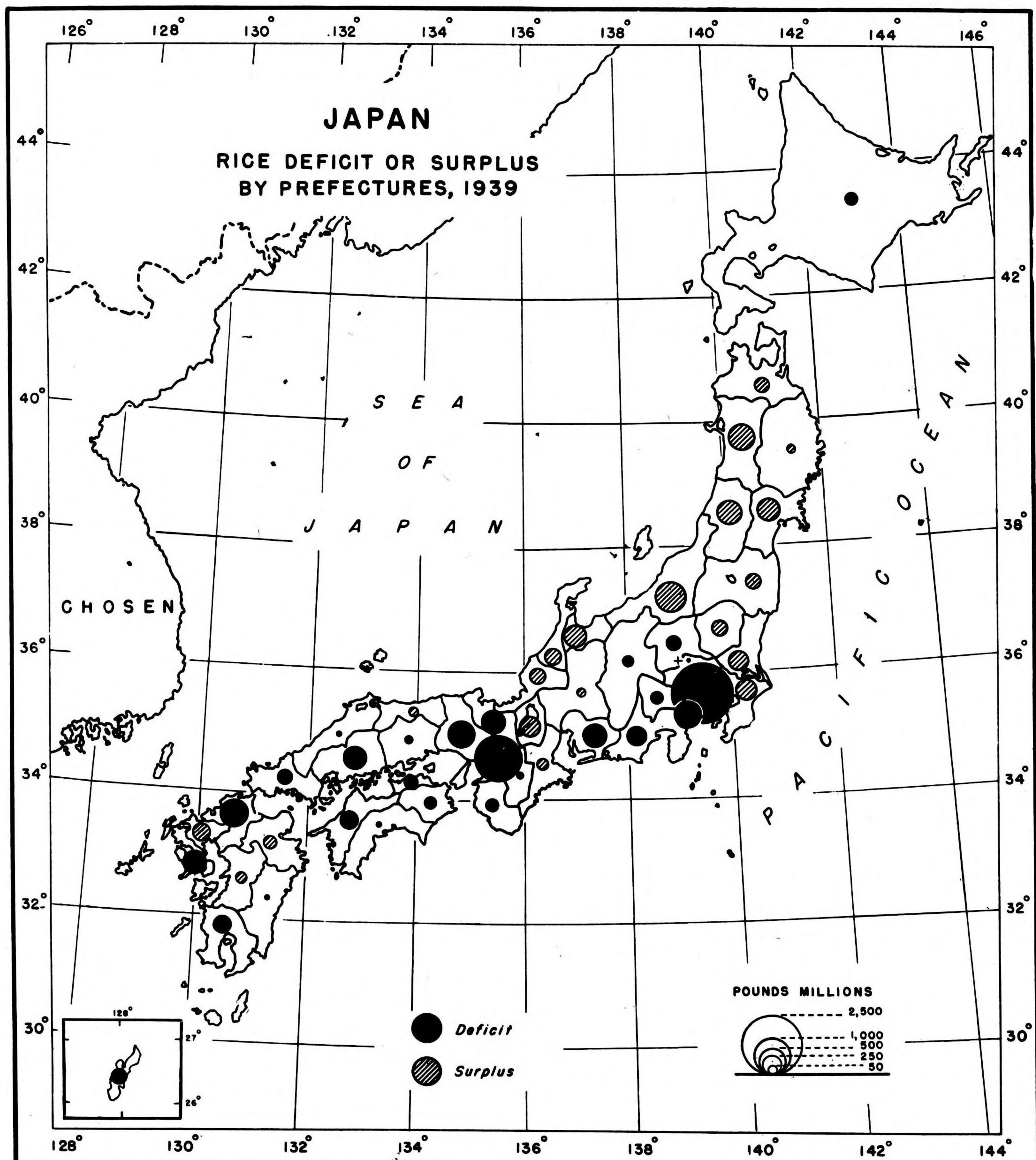
Among the prefectures, that of Tokyo had the largest per capita and total deficit. In 1939 the latter was estimated at 2.5 billion pounds or 29 percent of the total gross (8.7 billion pounds). The per capita rice production in Tokyo being only 12 pounds, the per capita deficit was 360 pounds. Thus 97 percent of the rice consumed in Tokyo prefecture must be imported from the surplus-producing prefectures and from abroad. Osaka, Kanagawa, Nagasaki, Kyoto and Hiroshima, in the order mentioned, are the other prefectures with the largest deficits.

In determining the deficits or surpluses it has been assumed that the per capita disappearance in every prefecture amounts to 372 pounds. But in reality that is not the case, because the actual disappearance differs as between urban and rural segments of the population, the former consuming less than the latter. Also, there is a difference among prefectures with no preponderant urban population; in such cases the difference is due to the greater or smaller availability of such grains as wheat and barley, as well as to the different standards of living prevailing in the various agricultural regions. In view of the above considerations, it is well to emphasize that the calculated deficits and surpluses (Table 32) do not necessarily correspond to the actual deficits or surpluses of a given prefecture.

Table 32 - Estimates of surplus rice producing and deficit rice consuming areas in Japan, based upon per capita production in each prefecture and average per capita disappearance in 1939

Prefecture	Population 1,000	Rice Production Mil. pounds	Production per person Pounds	Production : (-) Deficit or : Total	
				(+) Surplus per person : Pounds	(-) Deficit or (+) Surplus 1,000 Pounds
Hokkaido	3,261	1,105	339	- 33	- 107,613
Aomori	1,033	525	508	+ 136	+ 140,488
Iwate	1,099	454	413	+ 41	+ 45,059
Miyagi	1,304	765	587	+ 215	+ 280,360
Akita	1,076	792	736	+ 36 ^{1/2}	+ 391,664
Yamagata	1,145	777	679	+ 307	+ 351,515
Fukushima	1,637	763	466	+ 94	+ 153,878
Ibaragi	1,596	829	519	+ 147	+ 234,612
Tochigi	1,235	594	481	+ 109	+ 134,615
Gumma	1,285	364	283	- 89	- 114,365
Saitama	1,581	591	374	+ 2	+ 3,162
Chiba	1,604	857	534	+ 162	+ 259,848
Tokyo	7,095	87	12	- 360	-2,554,200
Kanagawa	2,006	200	100	- 272	- 545,632
Niigata	2,043	1,383	677	+ 305	+ 623,115
Toyama	814	628	771	+ 399	+ 324,786
Ishikawa	777	431	555	+ 183	+ 142,191
Fukui	668	381	570	+ 198	+ 132,264
Yamanashi	658	165	251	- 121	- 79,618
Nagano	1,712	578	338	- 34	- 58,208
Gifu	1,262	518	410	+ 38	+ 47,956
Shizuoka	2,047	491	240	- 132	- 270,204
Aichi	3,085	730	237	- 135	- 416,475
Miye	1,188	506	426	+ 54	+ 64,152
Shiga	726	506	697	+ 325	+ 235,950
Kyoto	1,815	303	167	- 205	- 372,075
Osaka	4,868	317	65	- 307	-1,494,476
Hyogo	3,132	646	206	- 166	- 519,912
Nara	639	214	335	- 37	- 23,643
Wakayama	889	226	254	- 118	- 104,902
Tottori	491	231	470	+ 98	+ 48,118
Shimane	753	264	351	- 21	- 15,813
Okayama	1,369	476	348	- 24	- 32,856
Hiroshima	1,890	327	173	- 199	- 376,110
Yamaguchi	1,232	283	230	- 142	- 174,944
Tokushima	738	195	264	- 108	- 79,704
Kagawa	761	160	210	- 162	- 123,282
Ehime	1,182	277	234	- 138	- 163,116
Kochi	713	242	339	- 33	- 23,529
Fukuoka	2,928	717	245	- 127	- 371,856
Saga	682	403	591	+ 219	+ 149,358
Nagasaki	1,345	136	101	- 271	- 364,495
Kumamoto	1,412	582	412	+ 40	+ 56,480
Oita	1,007	443	440	+ 68	+ 68,476
Niyasaki	873	310	355	- 17	- 14,841
Kagoshima	1,618	422	261	- 111	- 179,598
Okinawa	604	43	71	- 301	- 181,804
Total	72,878	22,237	305	- 67	-4,875,224

Office of Foreign Agricultural Relations. Norinsho Tokeihyo., 1939 and other sources.
1/ Theoretical deficits or surpluses calculated on the basis of average per capita disappearance for country as a whole estimated at 372 pounds of brown rice. See also comment in text.



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In the deficit prefectures for instance, the calculated deficits are probably smaller than those indicated, whereas in the surplus prefectures the calculated surpluses are probably exaggerated. However, with the possible exception of Saitoma, Niyazaki and perhaps one or two other prefectures, the degree of deviation from the actual is not thought to be sufficiently great as to invalidate the characterization of individual prefectures as deficit or surplus regions.

Wheat

Wheat is the second most important cereal, although its acreage in 1939 was only 23 percent of that of rice, and the value of the output was only about one-tenth that of rice. Most of the wheat is consumed in the urban centers; and as far as the farmer is concerned wheat is largely a cash crop with the proceeds of which he makes all or part of his fertilizer payments.

Except in Hokkaido, wheat is a winter crop, grown exclusively on double-cropped land on which it is subsidiary to the summer or principal crop. For this reason wheat does not compete with rice for the land; but it does compete with other winter crops, the most important of which is barley; certain minor crops like rape are also competitors. In the late 1930's some of the land under mulberries was diverted to wheat. Generally, in southern Japan wheat competes with common barley, mainly upon upland. Since wheat has a longer growing period, makes a ranker growth and lodges more easily, it is at a disadvantage in competition with barley. The fact remains, however, that the acreage in barley, particularly naked barley, has been

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declining, whereas that in wheat has been expanding. The income differential was sufficiently important to induce farmers to shift some of their barley acreage to wheat.

In the years immediately prior to 1933, acreage and production had shown little change. The average annual (1923-1932) area in wheat was 1,210,000 acres, and the production 32,000,000 bushels. Domestic production accounted for about two-thirds of consumption, the deficit being covered by imports, valued at 45 to 50 million yen annually.

Five-Year Plan. In 1932 the Government launched a 5-year plan for the expansion of wheat production. This was motivated by the desire to alleviate the distress then rampant in the countryside by making wheat growing more profitable, to improve the balance of trade through a reduction of imports, and, what was even more important, to provide Japan with a supply of domestically-grown wheat sufficient to cover requirements. The plan aimed to expand the wheat area by 490,000 acres, raise the yield by 15 percent, and increase the volume of production by 15 million bushels. Subsidies and a higher tariff on imported wheat and flour were some of the material inducements offered.

On the scientific side, the Plan was aided by the use of high-yielding varieties already available, the development of high-yielding new varieties, earlier maturity, shortness and stiffness of straw and improvement of milling extraction of flour.

^{1/} Alsberg, Carl L., Japanese Self-Sufficiency in Wheat, Food Research Institute, November 1935, pp. 84-85.

Acreage, Yield and Production. Judging by augmented acreage, quantity of production and yield, and by the sharp reduction in imports, the plan was successful. Three years after the plan was put into operation the area was enlarged by 280,000 acres, and by 1939 Japan had 1,826,000 acres under wheat, or 580,000 acres more than in 1932. In 1940 the acreage stood at a record high of 2,062,000 acres. (Table 33).

At one time the greater part of the acreage was on upland, but gradually it has come to be seeded more and more on irrigated land as a secondary crop following rice. In 1939 approximately half of the acreage was on irrigated land. This development was due to the fact that a greater part of the naked rather than the common barley was displaced as more of the former is grown on irrigated land than on upland.

Production of wheat is scattered throughout Japan, but in 14 out of 47 prefectures the acreage is less than one percent of the national total area under wheat. The principal wheat regions are in central Japan, on the Pacific Ocean side of the main island. Five prefectures closely grouped together are responsible for 26 percent of the total acreage. Of these, Ibaragi with 137,000 acres is the most important one. Fukuoka with 115,000 acres and Kumamoto with 94,000 acres are the largest wheat growing prefectures in southern Japan; while in the north Hokkaido with 86,000 acres is the principal producing region. (Table 34 and Fig. 10).

Table 33- Wheat: Acreage, yield, production, trade, and disappearance of wheat in Japan
1928-29 to 1941-42

Year	Acreage		Yield		Production		Imports		Exports		Disappearance	
	1,000 Acres	Bushels	per acre	Bushels	1,000 Bushels	Wheat	Flour ^{1/}	Wheat	Flour ^{1/}	1,000 Bushels	Total	Per Capita
1928-29:	1,201	26.8	32,220	27,983	219	60,422	10,767	49,655	.78			
1929-30:	1,213	26.3	31,890	18,324	831	51,045	5,403	45,642	.71			
1930-31:	1,204	25.6	30,887	24,813	529	56,229	7,953	48,276	.74			
1931-32:	1,228	26.3	32,304	29,712	264	62,280	7,592	54,688	.83			
1932-33:	1,247	26.3	32,768	18,802	29	51,599	15,092	36,507	.55			
1933-34:	1,511	26.7	40,410	16,504	60	56,974	12,795	44,179	.65			
1934-35:	1,589	30.0	47,660	17,924	59	65,643	16,418	49,225	.72			
1935-36:	1,627	30.0	48,718	14,503	519	63,740	10,131	53,609	.77			
1936-37:	1,688	26.8	45,192	7,789	1,099	54,080	4,432	49,648	.70			
1937-38:	1,776	28.4	50,410	4,620	74	55,107	14,275	40,832	.57			
1938-39:	1,777	25.5	45,244	1,282	1	46,527	10,490	36,037	.49			
1939-40:	1,827	34.3	61,086	-	-	-	-	-	-			
1940-41:	2,062	32.1	66,134	-	-	-	-	-	-			
1941-42:	1,982	25.7	51,008	-	-	-	-	-	-			

Compiled from official sources, Office of Foreign Agricultural Relations.

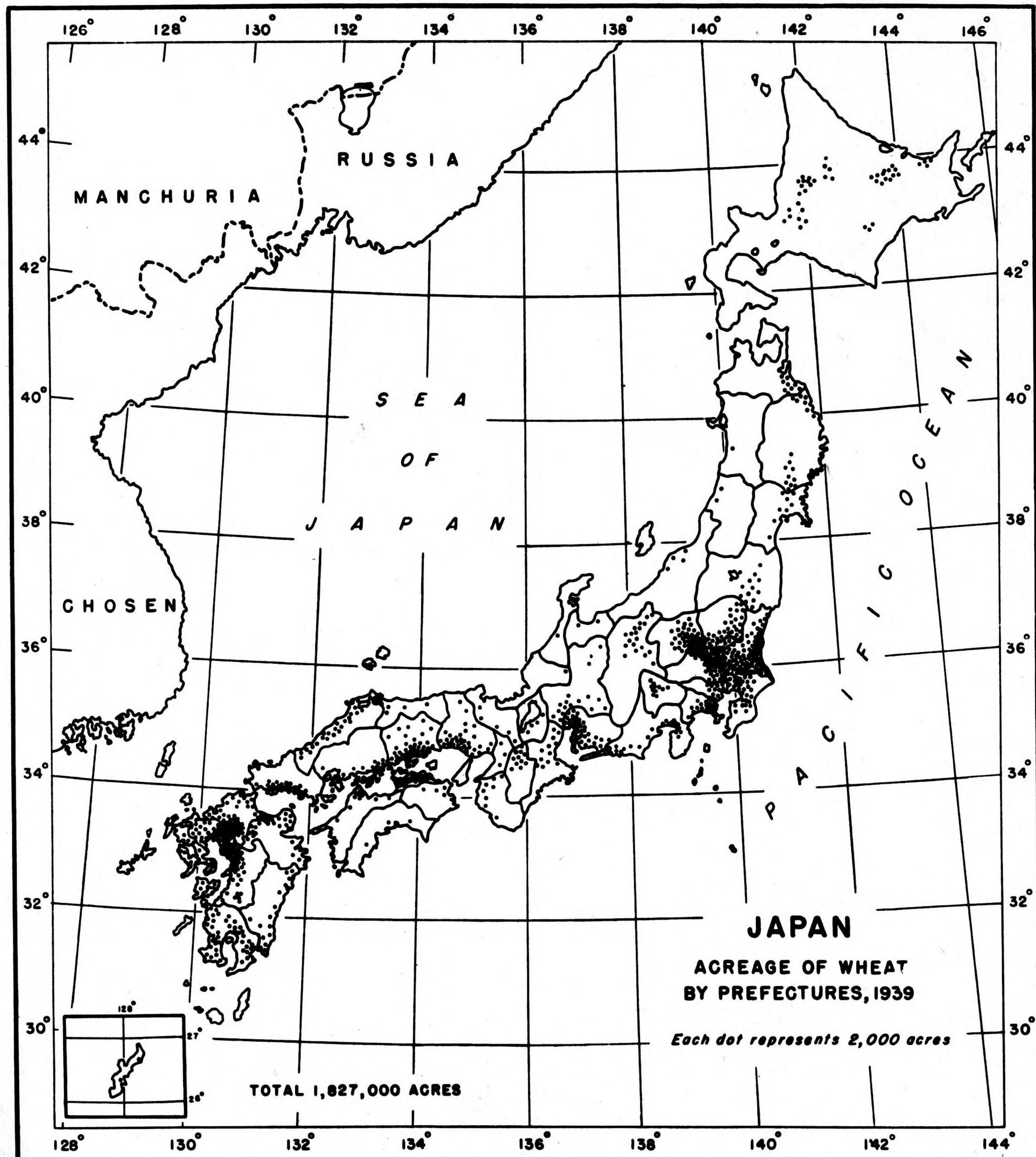
^{1/} Flour converted to wheat on the basis of 1 barrel equals 4.5 bushels.

Table 34.- Wheat and Barley: Acreage by prefecture in Japan, 1939

Prefecture	Wheat		Barley	
	Acreage	Percent acreage in each prefecture is of total wheat acreage	Acreage	Percent acreage in each prefecture is of total barley acreage
	Acres	Percent	Acres	Percent
Hokkaido	85,800	4.7	38,623	2.1
Aomori	18,646	1.0	4,490	.2
Iwate	33,632	1.8	40,650	2.2
Miyagi	16,786	.9	38,669	2.1
Akita	2,972	.2	839	^{1/}
Yamagata	4,407	.2	3,909	.2
Fukushima	27,793	1.5	38,048	2.0
Ibaraki	137,071	7.5	91,520	4.9
Tochigi	87,950	4.8	67,412	3.6
Gumma	91,214	5.0	34,940	1.9
Saitama	88,740	4.9	66,651	3.5
Chiba	75,065	4.1	66,804	3.6
Tokyo	20,552	1.1	23,817	1.3
Kanagawa	38,304	2.1	28,663	1.5
Niigata	7,705	.4	10,417	.6
Toyama	3,197	.2	1,675	.1
Ishikawa	1,611	.1	6,641	.4
Fukui	2,533	.1	4,706	.2
Yamanaahi	21,256	1.2	23,775	1.3
Nagano	38,404	2.1	27,793	1.5
Gifu	34,163	1.9	35,958	1.9
Shizuoka	38,195	2.1	58,635	3.1
Aichi	79,065	4.3	44,442	2.4
Miye	24,383	1.3	44,643	2.4
Shiga	8,452	.5	21,328	1.1
Kyoto	9,858	.5	23,626	1.3
Osaka	6,093	.3	23,544	1.2
Hyogo	73,184	4.0	67,076	3.6
Nara	21,064	1.2	21,523	1.1
Wakayama	16,726	.9	18,869	1.0
Tottori	7,552	.4	18,021	1.0
Shimane	8,695	.5	20,164	1.1
Okayama	93,435	5.1	51,638	2.7
Hiroshima	23,179	1.3	82,005	4.4
Yamaguchi	29,283	1.6	63,725	3.4
Tokushima	8,978	.5	57,341	3.1
Kagawa	52,060	2.9	47,302	2.5
Ehime	19,462	1.1	83,816	4.5
Kochi	5,965	.3	21,762	1.2
Fukuoka	114,542	6.3	50,064	2.7
Saga	58,626	3.2	26,692	1.4
Nagasaki	31,355	1.7	75,478	4.0
Kumamoto	93,985	5.2	118,675	6.3
Oita	51,333	2.8	63,362	3.4
Miyazaki	30,831	1.7	40,358	2.2
Kagoshima	79,169	4.3	68,661	3.7
Okinawa	3,913	.2	2,393	.1
Total	1,827,184	100.0	1,871,143	100.0

Office of Foreign Agricultural Relations. Norinsho Tokeshyo, 1939.

^{1/} Less than 0.1 percent.



Yields were relatively high (26 bushels per acre) even before the inauguration of the Five-Year Plan. In the years following the expansion program (1934-1939) the average yield was 12 percent higher than in the previous six years. The extent to which the record yields were due to the Plan on the one hand or to favorable weather conditions on the other, can be determined only after a lapse of some years. It is clear, however, that the expansion of acreage rather than the increase in yields, was primarily responsible for the increase in production. In consequence of this combined development, Japan's wheat output rose sharply. In 1934 it amounted to 48 million bushels, a volume sufficient to take care of the country's consumption that year. Further advances have been made since, the 1939 and 1940 crops being estimated at 61 and 66 million bushels respectively, the latter of which was more than double the 1932 production.

With the increased output, Japan's net annual wheat imports amounting to 15 million bushels during the 5-year period 1928-1932 were reduced to an annual average of 3.5 million bushels during 1933-1936. Data for the years following show that the country changed from a net importer to a net exporter, to the extent of some 10 million bushels a year. (Table 33).

Disappearance. The per capita disappearance of wheat in Japan during the years of increased production showed no rise, while in the years 1937 and 1938 it declined from around .7 to about .5 bushels. The total quantity of wheat available for domestic

utilization in the years 1934-1939 averaged about the same (46 million bushels) as in the previous five years. The population having increased, a decline in per capita disappearance was inevitable.

It should be noted, however, that but for Japan's policy of maximizing exports, domestic production would have been quite sufficient to maintain a per capita disappearance of .7 to .8 bushels. Another factor must be taken into consideration; a decline in the per capita disappearance does not necessarily mean a decline in the total food intake. Consumption of wheat in Japan is elastic, depending upon the price of rice. Low rice prices tend to restrict wheat consumption; for in view of the Japanese preference for rice, it is reasonable to assume that when rice is less expensive than wheat, more rice and less wheat will be consumed.

Wheat Utilization. In Japan, more wheat is converted into flour, but the utilization of the latter is not identical with that in the countries of the West. According to a survey of the Federation of the Farmers' Co-operative Societies of Japan, the wheat is utilized in the following manner:

Table 35. - Utilization of wheat in Japan, annual 1934-1938

	: 1934	: 1935	: 1936	: 1937	: 1938
	: Percent	: Percent	: Percent	: Percent	: Percent
Flour milling	: 71.6	71.0	74.1	81.0	81.3
Manufacture of Soy Sauce	: 7.2	7.4	9.5	8.8	9.6
" " Bean Paste	: 1.1	0.6	1.3	0.8	1.4
Other uses	: 20.1	21.0	15.1	9.4	7.7
Total	: 100.0	100.0	100.0	100.0	100.0

Flour is used as a substitute for rice in the form of macaroni and vermicelli, and for making confectionery and baking of bread. In the past few years the proportion of flour used for bread has been rising, but in 1938 only 23 percent of the flour was thus utilized, while macaroni, vermicelli and confectionery products consumed 62 percent of the total. It has been pointed out that if more flour were used for bread, the domestic utilization of wheat would be less satisfactory than it is now.^{1/} This is attributed to the fact that Japan's wheat, which is mostly of a winter variety, is soft and of a low gluten content. For this reason satisfactory noodles and confectioneries can be made from the soft flour milled from the Japanese wheat, whereas for bread hard wheat flours of high gluten content are preferred.

Barley

Barley, both naked (hull-less) and common, figures prominently in Japan's food supply. Few Japanese eat barley in preference to rice, and with the rising standard of living, mainly among the urban population, the per-capita consumption of barley has declined sharply. But the crop remains an important supplement to rice, especially for the rural population. In 1939, over 9 percent of the harvested area was under barley, and the estimated value of the crop was about 5 percent of the total value of the agricultural output.

^{1/} Ibid, p. 82.

Acreage, yield, production and disappearance. The barley acreage is somewhat more evenly distributed throughout Japan than that of wheat. Only in 8 prefectures is the acreage less than one percent of the total. Kumamoto in southern and Ibaragi in central Japan, with 119,000 and 92,000 acres, respectively, are the two main barley-growing prefectures. (Table 34 and Fig. 11). The prefectural acreage distribution of common and naked barley, separately, is shown in Table 35.

The barley acreage has been on the decline for many years. Between 1903-07 and 1928-32 it was reduced from 3.3 to 2.1 million acres or 36 percent. The 1930's registered a further decline, the average for 1935-39 being 1.9 million acres. Competing crops, notably wheat, were responsible for this decline.

For a long time the reduction in acreage was not reflected in production. (Table 36). The decrease in output between 1903-07 and 1928-32 amounted to only 6 percent. This relatively small decrease in production paralleling a much larger decrease in the harvested acreage is explained by a 33 percent increase in yield per acre of naked barley and 43 percent increase in the case of common barley. Although yields were maintained at high levels in the 1930's, the further decline in acreage reduced the output to an annual average of 71 million bushels. (1935-39). With declining production, growing population, and a small volume of imports, the per capita disappearance has declined by almost one-half. Japan considers itself

Fig. 11

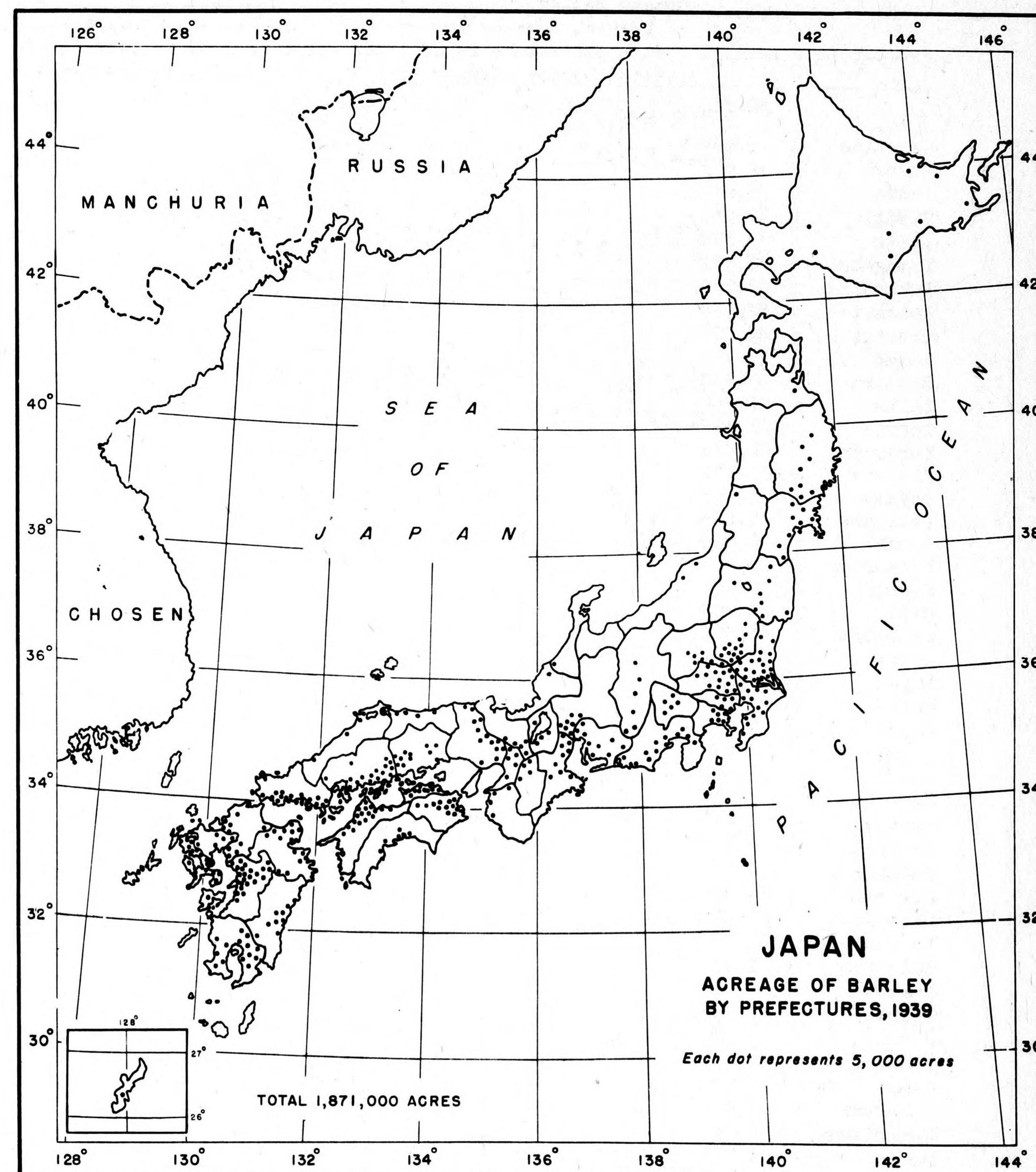


Table 35 a- Barley: Acreage by prefecture in Japan, 1939

Prefecture	Common Barley		Naked Barley	
	Acres	Percent	Acres	Percent
Hokkaido	9,564	1.1	29,059	2.9
Aomori	4,471	.5	19	1/
Iwate	38,048	4.4	2,602	.3
Miyagi	37,613	4.3	1,056	.1
Akita	822	.1	17	1/
Yamagata	3,897	.4	12	1/
Fukushima	37,754	4.4	294	1/
Ibaraki	85,572	9.9	5,948	.6
Tochigi	66,035	7.6	1,377	.1
Gumma	34,911	4.0	29	1/
Saitama	65,835	7.6	816	.1
Chiba	62,334	7.2	4,470	.5
Tokyo	22,543	2.6	1,274	.1
Kanagawa	24,446	2.8	4,217	.4
Niigata	10,179	1.2	238	1/
Toyama	1,653	.2	22	1/
Ishikawa	6,629	.8	12	1/
Fukui	4,588	.5	118	1/
Yamanashi	23,422	2.7	353	1/
Nagano	27,585	3.2	208	1/
Gifu	32,902	3.8	3,056	.3
Shizuoka	41,856	4.8	16,779	1.7
Aichi	31,447	3.6	12,995	1.3
Miye	12,979	1.5	31,664	3.2
Shiga	20,132	2.3	1,196	.1
Kyoto	14,694	1.7	8,932	.9
Osaka	6,228	.7	17,316	1.7
Hyogo	12,413	1.4	54,663	5.4
Nara	737	.1	20,786	2.1
Wakayama	1,475	.2	17,394	1.7
Tottori	8,322	1.0	9,699	1.0
Shimane	15,349	1.8	4,815	.5
Okayama	20,368	2.4	31,270	3.1
Hiroshima	21,664	2.5	60,341	6.0
Yamaguchi	15,867	1.8	47,858	4.8
Tokushima	1,384	.2	55,957	5.6
Kagawa	40	1/	47,262	4.7
Ehime	689	.1	83,127	8.3
Kochi	376	1/	21,386	2.1
Fukuoka	6,931	.8	43,133	4.3
Saga	5,428	.6	21,264	2.1
Nagasaki	4,455	.5	71,023	7.1
Kumamoto	6,055	.7	112,620	11.2
Oita	3,514	.4	59,848	6.0
Miyazaki	2,925	.3	37,433	3.7
Kagoshima	9,903	1.2	58,758	5.9
Okinawa	1,209	.1	1,184	.1
Total	867,243	100.0	1,003,900	100.0

Office of Foreign Agricultural Relations, Morinsho Tokelnyo, 1939.

1/ Less than 0.1 percent.

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Table 36.- Barley: Acreage, yield, production in Japan for specified years
Averages 1898-1907 to 1928-1932 and annual 1933 to 1939

Specified Years	Common barley		Naked barley		Total	
	Acreage : 1,000 acres	Yield : bushels	Acreage : 1,000 acres	Yield : bushels	Acreage : 1,000 acres	Production : 1,000 bushels
Average 1898-1907	1,595	41,709	1,667	26.4	3,262	85,721
1903-1907	1,621	42,934	1,691	23.9	3,312	83,375
1908-1912	1,505	45,509	1,667	28.3	3,172	92,628
1913-1917	1,442	47,400	1,711	30.0	3,153	98,719
1918-1922	1,294	42,731	1,589	30.0	2,883	90,365
1923-1927	1,112	39,201	1,339	32.0	2,451	82,119
1928-1932	95	35,468	1,201	35.2	2,151	77,733
Annual 1933	850	33,375	1,073	31.3	1,923	67,013
1934	814	32,796	1,039	37.3	1,853	71,527
1935	838	35,159	1,078	38.6	1,916	76,782
1936	836	30,674	1,078	34.1	1,914	67,393
1937	809	33,182	1,053	35.6	1,862	70,656
1938	876	30,481	1,017	31.6	1,893	62,610
1939	867	37,426	1,004	42.1	1,871	79,741

Office of Foreign Agricultural Relations, Morinsho Tokelnyo, 1939 and other official sources.

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quite self-sufficient in this cereal. The effect of the reduction in the barley output on the food supply situation is compensated for by other food crops grown on the land formerly occupied by barley.

Minor Grains

In addition to rice, wheat and barley, there are a number of minor grain crops such as oats, corn, buckwheat, and three types of millet; barnyard, foxtail and proso. In the course of the decade 1930-39 (Table 37) there has been little change in acreage or production of these crops. In 1939 all these grains occupied an area of 913,000 acres, or 4.6 percent of the total cropped acreage.

Japan is fully self-sufficient in buckwheat and oats, but depends upon imports for one-third of its millet and two-thirds of its corn. In both cases, however, the volume of imports is rather small.

Potatoes and Vegetables

The output of Irish and sweet potatoes is fairly large with sweet potatoes predominating. In 1939 the potato acreage was estimated at 1,087,000 acres, of which sweet potatoes accounted for 681,000 acres. In the course of the 1930-39 decade (Table 38) the potato acreage as a whole has increased by 15 percent and output by 32 percent. The gain in both cases was accounted for mainly by Irish potatoes. The per capita disappearance in 1939 amounted to 163 pounds.

Japan is a large producer and consumer of vegetables, including radishes and other roots. A few vegetables such as daiken

Table 37 Oats, Buckwheat, Corn, and Millet: acreage and production in Japan for specified years. Annual 1930 to 1939

Year	Oats		Buckwheat		Corn		Millet ^{1/}	
	Acreage : : 1,000 : acres	Production : : 1,000 : bushels	Acreage : : 1,000 : acres	Production : : 1,000 : bushels	Acreage : : 1,000 : acres	Production : : 1,000 : bushels	Acreage : : 1,000 : acres	Production : : 1,000 : bushels
1930	297	11,849	238	4,781	113	2,860	321	9,267
1931	292	10,455	260	4,155	114	2,215	330	7,969
1932	314	7,221	255	3,746	111	2,166	335	8,469
1933	314	10,438	248	4,704	117	2,993	332	9,483
1934	298	12,985	254	3,431	122	2,584	328	5,681
1935	300	9,979	238	3,106	122	2,249	324	6,527
1936	308	10,947	235	3,809	125	3,071	328	8,481
1937	300	9,927	221	4,070	128	3,363	316	8,672
1938	337	13,336	208	3,558	135	3,271	302	8,081
1939	304	9,973	200	3,404	130	3,374	379	7,374

Office of Foreign Agricultural Relations. Compiled from official sources.

^{1/} Excludes barnyard, foxtail, and proso millets.

Table 38.- Potatoes: Acreage and production in Japan, 1930 to 1939

Year	Irish potatoes		Sweetpotatoes		Total	
	Acreage 1,000 acres	Production Million pounds	Acreage 1,000 acres	Production Million pounds		
1930	254	2,285	641	7,501	895	9,786
1931	259	2,033	649	7,456	908	9,489
1932	275	2,041	657	7,653	932	9,694
1933	317	3,030	666	7,742	983	10,772
1934	332	2,800	657	6,695	989	9,495
1935	344	2,756	681	7,873	1,025	10,629
1936	375	3,693	698	8,264	1,073	11,957
1937	419	4,558	708	8,518	1,127	13,076
1938	396	4,075	691	8,344	1,087	12,419
1939	407	4,152	681	7,716	1,088	11,868

Office of Foreign Agricultural Relations. Norinsho Tokeihyo, 1939.

(giant radish) and lotus root have been included in the diet for centuries. In recent decades there has been a considerable increase in the output of such items as watermelons, cucumbers, carrots, onions and eggplants. The acreage and production of vegetables is shown in Table 39. The per capita disappearance of vegetables of 220 pounds (1936) shows that Japan produces them in quantities exceeding the country's requirements.

Fruit

The volume of fruit produced is sufficient to supply the country's people and leave substantial quantities of certain kinds for export. Mandarin oranges, persimmons, pears and apples are the fruits grown. Owing to certain differences in climate and soil, mandarin oranges are grown chiefly in the southwest and apples in the northeast, while persimmons and pears are grown throughout the country. The prefectures of Shizuoka and Wakayama are noted for their mandarin oranges, while Aomori Prefecture is famous for its apples, producing not less than three-fourths of the total Japanese crop.

The volume and types of fruit produced in 1937, 1938 and 1939 are shown in Table 40. In 1939 exports of fresh and canned fruit constituted 8.3 percent of the total output.

Leguminous Crops

The principal legume crops produced are soy beans, other beans, peas and peanuts. The most important is soy beans. Soy beans are a staple food of the Japanese, and are used for soy sauce, bean paste

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Table 39 .- Acreage and production of vegetables in Japan, 1930 and 1933-36

Specified Crop	1930		1933		1934		1935		1936	
	Acres	Production: 1,000 Pounds	Acres	Production: 1,000 Pounds	Acres	Production: 1,000 Pounds	Acres	Production: 1,000 Pounds	Acres	Production: 1,000 Pounds
Taro	125	1,359	130	1,364	129	1,274	131	1,405	132	1,453
Carrots	25	262	27	272	28	278	30	302	31	324
Radishes	248	5,439	251	5,133	284	5,199	262	5,562	267	5,466
Turnips	119	1,765	131	1,822	137	1,973	140	2,054	139	1,977
Edible burdocks	40	426	40	427	42	435	42	439	43	462
Cucumbers	42	544	46	615	47	565	49	600	50	655
Egg-plants	68	986	71	1,032	72	946	73	959	74	994
Onions	61	800	68	870	74	973	74	953	75	991
Pumpkins	50	573	55	658	56	600	57	592	60	705
Watermelons	53	863	68	1,149	73	1,099	74	1,076	67	1,025
Other										
Vegetables	80	949	99	1,197	105	1,239	106	1,271	112	1,345
Total	911	13,966	986	14,539	1,047	14,581	1,038	15,213	1,050	15,397

Office of Foreign Agricultural Relations. Compiled from official sources.

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Table 40 - Fruit: Production in Japan, 1937, 1938, 1939

Specified fruit	1937		1938		1939	
	Acres	Production: 1,000 Pounds	Acres	Production: 1,000 Pounds	Acres	Production: 1,000 Pounds
Mandarin oranges		967,747		771,086		1,021,940
Bitter oranges		141,673		188,539		157,733
Navel oranges		41,730		45,758		43,103
Other oranges		47,925		53,358		51,464
Persimmons		508,836		548,276		586,393
Apples		343,800		407,099		462,665
Pears		362,433		367,047		375,789
Grapes		152,267		132,725		131,162
Peaches		102,165		102,647		102,399
Loquats		46,270		46,610		43,128
Cherries		10,618		10,958		10,801
Plums		283,566		354,665		348,878
Total		3,009,030		3,028,768		3,335,455

Office of Foreign Agricultural Relations. Commercial Intelligence Journal, September 6, 1941, pp. 296-298.

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and bean soup. They are also in demand for a number of industrial purposes, chief of which is soy bean oil.

The total area of all leguminous crops in 1936 was 1,516,000 ^{1/} acres or 7.6 percent of the total cultivated area. The soy bean crop alone covered 807,000 acres. The 1939 area under all these crops amounted to 1,449,000 acres of which soy beans are estimated at 795,000 acres (Table 41). Because of competition from imported Manchurian soy beans, extension of mulberry tree plantations prior to the 1930's, and increased acreage under orchards and vegetables, the soy bean area declined from an annual average of 1,091,000 acres during the 5-year period 1920-24 to 808,000 acres in the period 1935-39, or by 26 percent. Production followed suit, with a decrease from 18 to 13.5 million bushels. Despite the declining output, consumption of soy beans during the same period has increased from an annual average of 32 million bushels to about 44 million bushels. Production of soy beans in recent years has averaged about 30 percent of the country's consumption.

The shortage of about 30 million bushels was made up by imports from Manchuria (supplying 80 percent) and Korea (20 percent). Next to rice, soy beans form the largest single imported foodstuff. From the Japanese point of view, the mitigating factor of this situation is that the colonies are the sole source of supply. This fact has led a Japanese to remark that from a practical point of view, Japan is self-sufficient in soy beans. With respect to other beans, such as "azuki" and "broad" beans, the ratio of domestic production to total consumption has been estimated at 55 and 85 percent, respectively. The condition that applies to imported soy beans applies to these beans as well, since they, too, originate in Manchuria.

^{1/} Includes 19,000 acres under peanuts.

Table 41. - Leguminous crops: acreage and production in Japan 1930 to 1939

Year	Soy beans		Other beans		Peas		Peanuts	
	Acreage	Production	Acreage	Production	Acreage	Production	Acreage	Production
	:1,000: :acres	:1,000: bushels	:1,000: :acres	:1,000: bushels	:1,000: acres	:1,000: bushels	:1,000: acres	:1,000: pounds
1930	857	15,532	617	11,856	95	1,967	14	23,372
1931	866	12,719	595	7,971	114	2,003	15	24,784
1932	844	12,350	599	6,766	112	1,672	16	25,608
1933	800	14,372	611	11,397	136	2,182	17	31,571
1934	831	11,075	596	8,185	140	2,824	19	25,055
1935	822	11,576	570	6,932	153	2,142	19	26,964
1936	807	13,484	554	7,611	135	1,922	19	30,237
1937	813	14,554	-	-	-	-	-	-
1938	808	13,822	-	-	-	-	-	-
1939	795	14,063	546	9,145	88	1,475	20	34,392

Office of Foreign Agricultural Relations. Compiled from official sources.

Fish, meat and dairy products

Technically these foodstuffs of animal origin are not crops; but inasmuch as fish, meat and dairy products make up part of Japan's diet they are included in this section dealing with food crops and supply.

Fish. Fish and fish products are the most important source of animal protein in the Japanese diet, comparable to meat and dairy products in the western countries. Because Japan is entirely seagirt, has a long coast line, good fishing harbors, experienced fishermen, and a supply of fish varied in kind and vast in amount, it ranks as the foremost fishing country in the world.

The principal catches include herring, sardines, cod, flounder, tuna, salmon, mackerel, crabs, cuttlefish, shrimps, lobsters, and numerous other less important varieties. Approximately 35 to 40 percent of all fish caught, mostly sardines and herring, are converted into fertilizer in the form of fish waste and fish meal, and into fish oil, for industrial and alimentary purposes. Marine plants, in addition to being used for food, provide important substances, such as agar-agar and iodine, for the chemical, pharmaceutical and munitions industries. Skins of fish (salmon and shark) and of marine animals (whales, porpoise, seals) are used as substitutes for leather.

Normally, about 1.5 million Japanese are engaged directly in fishing and processing. Of this number about 800,000 are permanently employed and some 700,000 are employed seasonally or on a part-time basis. About 80 percent of all persons engaged in the fishing industry

are men and 20 percent women. In addition to those directly concerned, more than 8 million people are indirectly dependent on the fishing industry.

On the basis of the method of fishing and the distance from home bases, Japanese fishing is divided into two main types: a) coastal or off-shore, extending up to a distance of 100 miles, and b) deep-sea fishing. It was estimated that the total 1939 catch of fish and other marine products from all sources (excluding whales and aquiculture) amounted to about 5.5 million tons. Aquiculture, i.e. the raising of fish, oysters, etc. in ponds, rice paddies, lakes and streams, yielded an average of 115,000 metric tons annually. In addition, 1,800 whales were caught in domestic waters, and perhaps 8,000 whales in the Antarctic.

In 1936 the per capita consumption of fish in Japan was estimated at 95 pounds. A comparison with fish-consuming European countries makes clear the importance of fish in the Japanese diet. Thus in Norway, the principal fish-consuming country in Europe, the per capita consumption is 85 pounds, and in the United Kingdom about 60 pounds.

To bring about this large catch, Japan had a large fishing fleet at its disposal. In 1939 the total number of motorless boats was 283,000, and that of motor-powered 72,000. Small fishing craft have been very extensively used from olden times due to the nationwide coastwise fishing on a small scale. But the number of the small, motorless boats has been on the decrease, while the larger, improved craft has been increasing. From 1927 through 1929 the small boats

declined in number from 334,000 to 283,000 or 15 percent, whereas the motor-craft increase from 21,000 to 72,000, or 343 percent. This development was largely responsible for the expansion of the industry in recent years.

As many other aspects of Japan's economy, the fishing industry is subjected to close official supervision. Under the Fishing Law, the prefectural governors are empowered to regulate the amount of the fish-catch, the processing of fish, the number of fishermen, as well as to determine the types of fishing equipment and boats used. For the promotion of the industry, legislation has been enacted for the creation of a National Aquatic Products Association, made up of local associations. Besides, there are numerous fishery guilds. In 1937 a total of 343 associations and 4,016 guilds had a membership of 449,000 and 605,000 respectively.

Meat and Dairy Products

Meat and dairy products play a minor role in the Japanese diet. Animal industry has not thrived because of the limited area available for pasture and feed crops. In 1939, the country had a total of 1,967,000 head of cattle, 1,070,000 hogs, only 149,000 sheep and 50 million chickens producing 3.5 billion eggs. Under the circumstances, the production and consumption of meat, eggs and dairy products is small indeed.

In 1939 Japan slaughtered 408,000 cattle, 45,000 horses, 1,319,000 pigs, 3,400 sheep and 39,000 goats, the total meat production being estimated at 331 million pounds. In the same year 39,000 farmers were listed as milk producers, of which 6,000 were dairy farmers.

The total volume of milk production was estimated at 346 million liters. The per capita consumption of meat (exclusive of poultry) is less than six pounds. This is altogether an insignificant quantity in the light of the 65 to 130 pounds per capita consumed in Western Europe and the 125 pounds consumed in the United States.

Most of the meat and dairy products are eaten by the well-to-do inhabitants of the urban centers, while the rural population consumes such products very sparingly. A Japanese eats about 50 eggs and about 9 pounds of dairy products per year. The food habits being what they are, the country considers itself self-sufficient in meat and dairy products, even though it depends upon imports for 10 percent of its fresh meat requirements.

Industrial Crops

Industrial crops play a relatively small role in Japan's agricultural economy. In 1939 the area under all industrial crops was reported at 754,000 acres, as against 555,000 acres in 1929, or an increase of 36 percent. Despite the increase, the area under the industrial crops represented only 3.9 percent of the total harvested acreage, and 4.4 percent of the total value of the 1939 agricultural output. Most of the crops are planted on irrigated rice fields. Until about 1932 the acreage under industrial crops tended to decline, largely in consequence either of imported goods or synthetic substitutes. Since 1932 the trend has been in the opposite direction because of the rise in prices of a number of the products.

Japanese agricultural statistics divide the industrial crops into four groups; sugar, fibres, oilseeds and "other". The share of each category in the total acreage of industrial crops was 6.6 percent, 25.4 percent; 33.3 percent, and 34.7 percent, respectively. The acreage distribution and output of principal industrial crops (Table 42) show how deficient Japan proper is in such products, particularly in fibres. Yet obviously the deficiency did not hinder the country's industrial development.

Cotton. The lack of cotton, for instance, illustrates the point. Prior to 1939 Japanese agricultural statistics recorded less than 2,000 acres under cotton. In 1939 no cotton acreage is given. Absence of domestically grown fibers did not prevent Japan from building up a cotton-textile industry of such proportions that before the war it ranked third in number of spindles, second in the volume of cotton consumed, and first in the quantity of cloth exported. In short, like England at an earlier date, Japan was able to create its premier industry by importing the raw material and exporting it in the form of cotton cloth.

Pyrethrum. Of the industrial crops produced in Japan and exported abroad, the outstanding one is pyrethrum. It is a very important insecticide, used in the form of extracts or liquid sprays. Until 1914, Dalmatia, later a part of Yugoslavia, was almost the only source of pyrethrum. This supply was cut off by the First World War, and Japan was enabled to seize the market, which it has retained until the present war.

Table 42 - Acreage and production of industrial crops in Japan, 1939

Crop	Acreage	Percent each :	
		crop is of	Production
		total indus-	trial crop
		trial crop	acreage
	Acres	Percent	1,000 pounds
Sugar	49,912	6.6	2,891,570
<u>Fiber crops</u>			
Cotton	-	-	-
Flax	71,056	9.4	116,663
Hemp	20,977	2.8	24,987
Jute	-	-	-
Ramie	13,113	1.7	7,557
Rush	15,922	2.1	160,739
Paper mulberry	28,264	3.7	27,429
Paperbush	34,522	4.6	31,034
Other fiber crops ^{1/}	8,180	1.1	37,251
Total	192,034	25.4	405,660
<u>Oilseeds</u>			
Flaxseed	-	-	16,990
Rapeseed	235,822	31.3	5,131 bu.
Sesame	15,476	2.0	204 bu.
Total	251,298	33.3	
<u>Other industrial crops</u>			
Pyrethrum	53,101	7.1	21,108
Peppermint	54,708	7.2	106,544
Tobacco	106,544	14.2	188,552
Wax berries	13,619	1.8	40,104
Other ^{2/}	32,921	4.4	21,406
Total	260,893	34.7	377,714
Total industrial	754,137	100.0	

Office of Foreign Agricultural Relations. Norinsho Tokeshyo, 1939.

^{1/} Shichito and willow.

^{2/} Indigo, konnyaku (starchy plant), and sponge gourd.

Pyrethrum is a perennial plant in the chrysanthemum family. The toxic materials, pyrethrin I and II, are found largely in the flowers. About two years are usually required to obtain the first crop. Considerable labor is needed to plant the seeds, transplant the young seedlings, keep down weeds and especially to harvest the flowers. Work must be done carefully since the type of plant, care of the plantings, stage of the flowers at harvesting especially and the drying methods used - all affect the yield of flowers and the pyrethrum content.

Judging by the higher yields of flowers, the methods of artificial drying and higher pyrethrin content, the crop has done well in Japan. The largest output of 28 million pounds from an area of 71,000 acres was attained in 1935. The decline in prices in subsequent two years caused a decline in acreage, which in 1939 amounted to 53,000 acres with an output of 21 million pounds. Unlike many other crops, the cultivation of pyrethrum is concentrated in a few prefectures. Six of them are responsible for 98 percent of the total acreage, but of these Hokkaido accounts for 75 percent of the acreage.

Before this war about two-thirds of the Japanese output of pyrethrum was exported to the United States; this represented about 90 percent of total United States imports.

Tobacco

Tobacco is an important crop in Japan, covering an area of 106,000 acres (1939) with an output of 188 million pounds. Production under the direction of the government tobacco monopoly, is

carried on by small producers numbering approximately 320,000, with an average acreage per farmer of slightly over .3 of an acre. Hand methods are used almost exclusively in growing tobacco, and great care is taken to insure high yields. The average tobacco yield is approximately 1,500 pounds per acre as compared with the average yields in the United States in recent years of almost 850 pounds.

There is a wide range in soil types in the tobacco districts of the country and some tobacco is cultivated throughout Japan. The Monopoly has made detailed studies of soils in the tobacco-producing districts, and the allocation of areas to be used for the production of different types of tobacco is made in accordance with soil types. Prior to the war against the western powers the Monopoly permitted four different crop rotations for tobacco farms. The different rotations permit the planting of tobacco on the same land 1 year out of 3, every other year, 2 years out of 3, and in very limited areas, year-after year. Tobacco always follows barley in the rotation systems, and tobacco plants are transplanted into fields between rows of barley, before the latter is harvested.

The high yields are attained by a liberal application of fertilizers. All types of tobacco receive them in some form. The most common fertilizers used are decomposed manures, oilseed cakes, rice bran, wood ashes, and superphosphates. Other fertilizers used only to a limited extent include fresh barnyard manure, sewage, bonemeal, fish meal, sulphate of potash and sulphate of soda. All fertilizers are applied during the growing season. The first application, which is limited to manure and beancake, is made at the time of transplanting. Other applications follow as the plants develop.

Japan has a relatively large number of types of tobacco, but in the main they fall into two principal categories: native types, and flue-cured, introduced from American seed in 1902. Acreage and output of native tobacco has declined sharply in consequence of the rapid expansion in recent years in flue-cured production (Table 42a). Tobacco growers in certain districts have been required to shift part of their acreage of domestic types to flue-cured, and in the 1930's Japan became practically self-sufficient in this type of tobacco, just as it has been self-sufficient in domestic types all along.

Consumption of tobacco has been rising in Japan, but per-capita consumption of over 2 pounds is still low in comparison with most other countries. Corresponding figures for China are 2.8 pounds, for India 3.7 pounds and about 7 pounds for the United States. The low per-capita consumption in Japan is attributed to low income for most of the population and to the general abstinence by the Japanese from the use of all types of stimulants.

Table 42 a. - Area and Production of Tobacco in Japan-1921 to 1939

Year	Total tobacco		Flue-cured		Native	
	Area	Production	Area	Production	Area	Production
	Acres	1,000 pounds	Acres	1,000 pounds	Acres	1,000 pounds
1921	92,141	134,899	3,860	3,889	88,281	131,010
1922	96,809	153,364	3,801	5,624	93,008	147,740
1923	95,792	136,115	3,794	3,979	91,998	132,136
1924	94,776	140,567	4,109	5,582	90,667	134,985
1925	91,446	143,426	4,941	8,241	86,505	135,185
1926	90,246	138,483	6,700	9,813	83,546	128,670
1927	91,260	150,323	8,457	14,191	82,803	136,132
1928	92,161	140,485	9,732	15,891	82,429	124,94
1929	88,326	136,212	10,156	15,714	78,170	120,498
1930	89,033	150,183	10,555	17,044	78,478	133,139
1931	90,273	150,710	13,234	21,826	77,039	128,884
1932	83,542	133,611	18,282	23,669	65,260	109,942
1933	83,656	146,694	27,632	40,271	56,024	106,423
1934	84,617	145,452	28,578	44,626	56,039	100,826
1935	86,048	142,262	33,075	51,288	52,973	90,974
1936	86,638	133,356	36,479	48,893	50,159	84,463
1937	85,546	140,502	39,346	62,163	46,200	78,339
1938	92,664	142,269	44,379	65,056	48,285 ^{1/}	77,213 ^{2/}
1939	106,000	188,000	--	--	--	--

Office of Foreign Agricultural Relations
Compiled from official sources.

^{1/} Includes 1,468 acres of American-type burley.

^{2/} Includes 1,943,000 pounds of American-type burley.

Yet ash itself is relatively low in food plant; and to make the soil yield a good crop, intensive application of nitrogenous fertilizers is a first prerequisite. In some sections farmers use as many as 230 pounds of nitrogen per acre, in addition to a quantity of phosphates and potash. In fact, the cost of manuring is the single largest item of expense in the production of tea, ranging from 35 to 40 percent of the total cost of production.

The tea bushes begin to yield at the end of the fourth or fifth year after planting. The best leaf is obtained between the eighth and fifteenth years, while the ordinary life of a bush is approximately 25 years. There are normally three periods for picking the leaves. The first crop, which furnished about one-half of the total yield, is gathered from about May 1 to June 15. The picking of the second crop begins about the middle of July, and the third crop is gathered from the middle of August to the end of September. By far the greatest proportion of the tea is green tea, and it constitutes the bulk of exports.

Acreage, Yield and Production: The acreage devoted to tea has declined since the last decade of the past century. In 1892 Japan had 149,000 acres under tea, as against 118,000 in 1920, and 99,000 acres in 1939 (Table 43). Although some tea is grown in every prefecture with the exception of Hokkaido and Aomori, it is one crop in Japan which is so heavily concentrated in one prefecture. This is Shizuoka, with 41 percent of the total tea acreage, producing 60 percent of the total tea output (Table 44 and Fig.12). Total acreage in the past decade has changed but little,

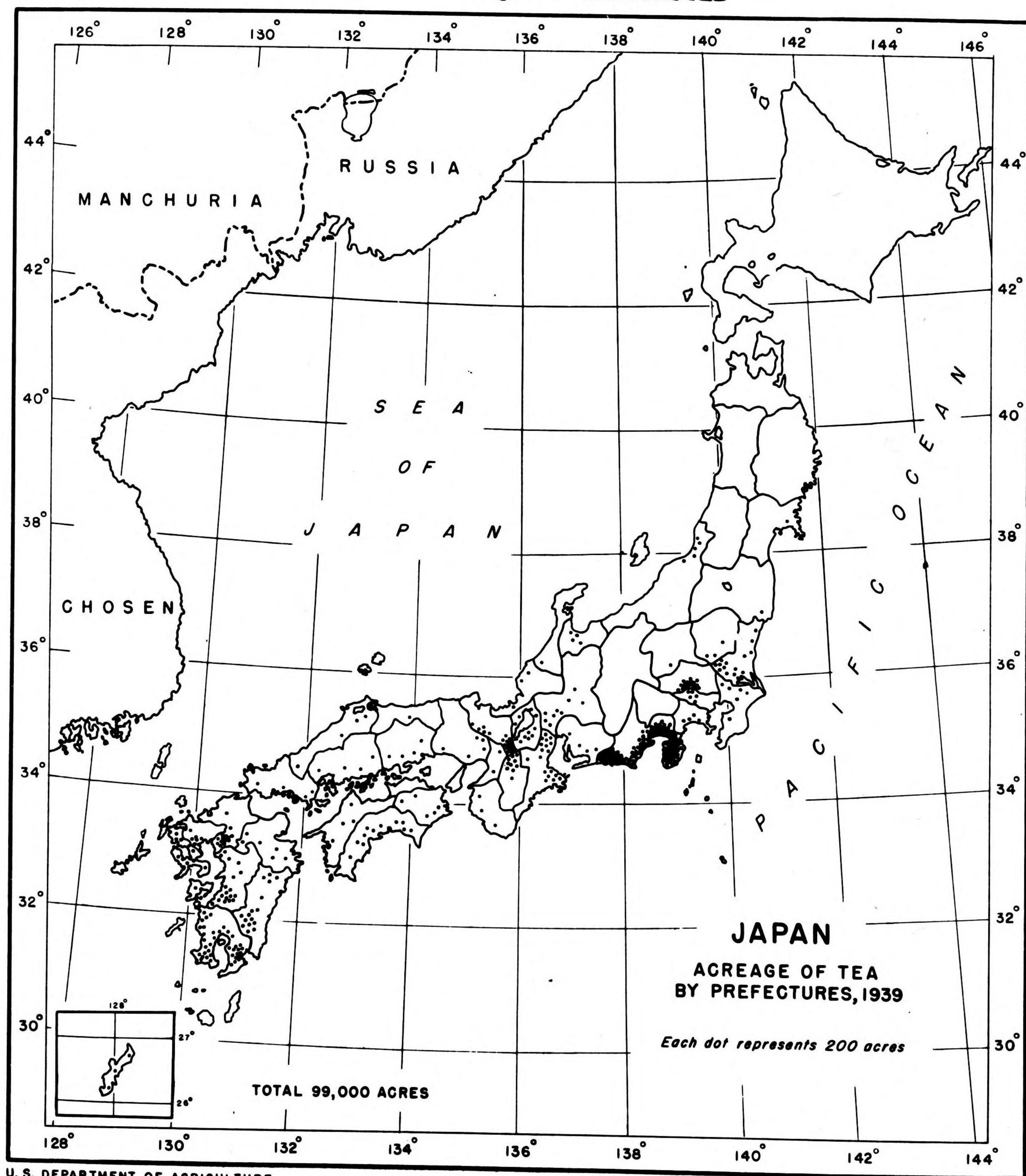
Table 44.- Tea acreage and production by prefectures in Japan, 1939

Prefecture	: Percent acreage :		: Percent production :	
	Acreage	in each prefecture is of total tea acreage	Pro- duction is of total tea production	in each prefecture is of total tea production
	Acres	Percent	1,000 pounds	Percent
Hokkaido	-	-	-	-
Aomori	-	-	-	-
Iwate	27	1/	10	1/
Miyagi	125	.1	37	1/
Akita	5	1/	2/	1/
Yamagata	17	1/	2	1/
Fukushima	137	.1	49	1/
Ibaraki	2,816	2.8	2,385	1.9
Tochigi	671	.7	279	.2
Gumma	284	.3	75	.1
Saitama	3,320	3.4	2,337	1.9
Chiba	1,152	1.2	683	.5
Tokyo	968	1.0	525	.4
Kanagawa	801	.8	297	.2
Niigata	912	.9	452	.4
Toyama	725	.7	300	.2
Ishikawa	296	.3	184	.1
Fukui	620	.6	1,036	.8
Yamanashi	93	.1	67	.1
Nagano	86	.1	22	1/
Gifu	1,723	1.7	1,816	1.4
Shizuoka	40,236	40.7	76,089	60.1
Aichi	720	.7	970	.8
Miye	3,634	3.7	6,348	5.0
Shiga	2,034	2.1	2,196	1.7
Kyoto	3,717	3.8	4,364	3.5
Osaka	358	.4	649	.5
Hyogo	1,012	1.0	968	.8
Nara	1,968	2.0	3,470	2.7
Wakayama	698	.7	763	.6
Tottori	115	.1	104	.1
Shimane	870	.9	669	.5
Okayama	764	.8	806	.6
Hiroshima	789	.8	930	.7
Yamaguchi	703	.7	698	.6
Tokushima	990	1.0	898	.7
Kagawa	29	1/	32	1/
Ehime	894	.9	413	.3
Kochi	2,274	2.3	1,327	1.1
Fukuoka	2,899	2.9	1,336	1.1
Saga	1,260	1.3	580	.5
Nagasaki	1,833	1.8	655	.5
Kumamoto	3,717	3.8	2,306	1.8
Oita	1,157	1.2	552	.4
Miyazaki	3,169	3.2	4,419	3.5
Kagoshima	7,643	7.7	4,507	3.6
Okinawa	689	.7	87	.1
Total	98,950	100.0	126,692	100.0

Office of Foreign Agricultural Relations, Norinsho Tokelhyo, 1939.

1/ Less than 0.1 percent. 2/ 412 pounds.

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Fig. 12 RESTRICTED



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but since 1931 production has shown a continuous and steep increase. The average output of 1935-1939 amounted to 114.5 million pounds, compared with 77.8 million pounds in 1920-1925, or an increase of 57 percent. This was brought about primarily by mounting yields, which in 1935-1939 averaged 1,170 pounds as against 700 pounds in 1920-1925, or an increase of 67 percent. The causes underlying this rise in yield can perhaps be best explained by the improvement in the technique of growing tea as well as by the more intensive picking, induced by the improved Japanese position in the world tea export trade. In the period 1930-39 Japan's net exports averaged 34.4 million pounds, or 33.6 percent of the total output.

SERICULTURE

Importance of the Industry: Sericulture plays an important role both in the agricultural economy and in the national economy of Japan. The raising of cocoons by farmers, which is the basis of the silk industry, holds a position second only to that of rice, but as a cash crop it is, or was, by far the most important one in Japan. Despite the decline in cocoon raising in recent years, the value of the cocoon output in 1939, accounted for 16 percent of the total value of agricultural production. In the same year 1,651,000 or 30 percent of all the farm families in Japan were engaged in cocoon raising. As to the place of the silk industry in the national economy, during 1935-1939 raw silk exports averaged 21 percent of total value of exports to foreign exchange countries.

Physical and Economic Requirements: The cultivation of mulberry trees and the rearing of silkworms are technically possible in many parts of

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the world. In actual practice, however, sericulture is limited to countries with a relatively mild winter, humid climate, and, above all, to countries with an abundant supply of cheap and industrious labor. Many a country is endowed with the first prerequisites, and few with both groups. Japan has both. In addition, Japan has displayed great adaptability to new techniques in raising cocoons, converting them into silk, and disposing of the silk. The industry reached its highest development during the 1920's and early 1930's. This period of peak development came at a time when nylon was not on the market, and when the wearing of silk stockings in the United States became the custom among nearly all classes of women.

In a country like Japan, where the arable land is very limited and the question of food is given primary consideration, mulberry trees are planted where rice cannot be planted, that is, in upland fields. Sometimes mulberry trees or bushes are planted in foot-paths between rice fields, on narrow ridges or earth separating one rice field from another, and even in gardens. But it is mainly on the abundant sloping land, which is unsuited for irrigated and un-irrigated food crops, that the mulberry tree is found. The soils given over to the mulberry are largely thin, stony and unfertile as far as food crops are concerned, but with the application of fertilizers the mulberry plant seems to thrive.

The Mulberry Tree and Cocoon Varieties: There are over 200 kinds of mulberry trees in Japan, but all of them are classified into early, middle and late varieties, depending upon the period of budding. Mulberries are grown largely on bushes about 4 feet high, which

produce the most leaves in the least area. The plants are spaced 2 feet apart in rows from 3 to 3.5 feet distant, thus providing about 4,000 plants per acre. In the more mountainous regions bushes give way to dwarf trees, numbering from 1,000 to 2,800 per acre. The leaves provide the food for the silkworms, which in turn spin the cocoons.

The quality of the cocoons depends upon their size, shape, texture and yield, but for practical purposes farmers produce two types of cocoons; white that go into the making of the highest quality silk, and yellow, used only for coarser or inferior silk. In 1939 the production of yellow cocoons amounted to only 55 million pounds as against 693 million pounds of white.

The Cocoon Raisers: The number of farmers engaged in raising cocoons in the past quarter of a century fluctuated, depending upon the price of cocoons. In consequence of the increased demand for silk and the prevailing high prices in the 1920's the number of producers reached a peak of 2,217,000 in 1929 - or 40 percent of all the agricultural families of Japan. (Table 45). Under the impact of the severe depression from which the silk industry suffered throughout the 1930's (excepting 1939) the number of cocoon raisers declined to 1,651,000 in 1939 - a decrease of 24 percent from the peak of 1929. The disappearance of 566,000 sericulturists within the period 1929-1939 does not mean that the country lost that many farmers, for during the same period the total number of agricultural families decreased only 84,000. It does mean, however, that this many farmers were

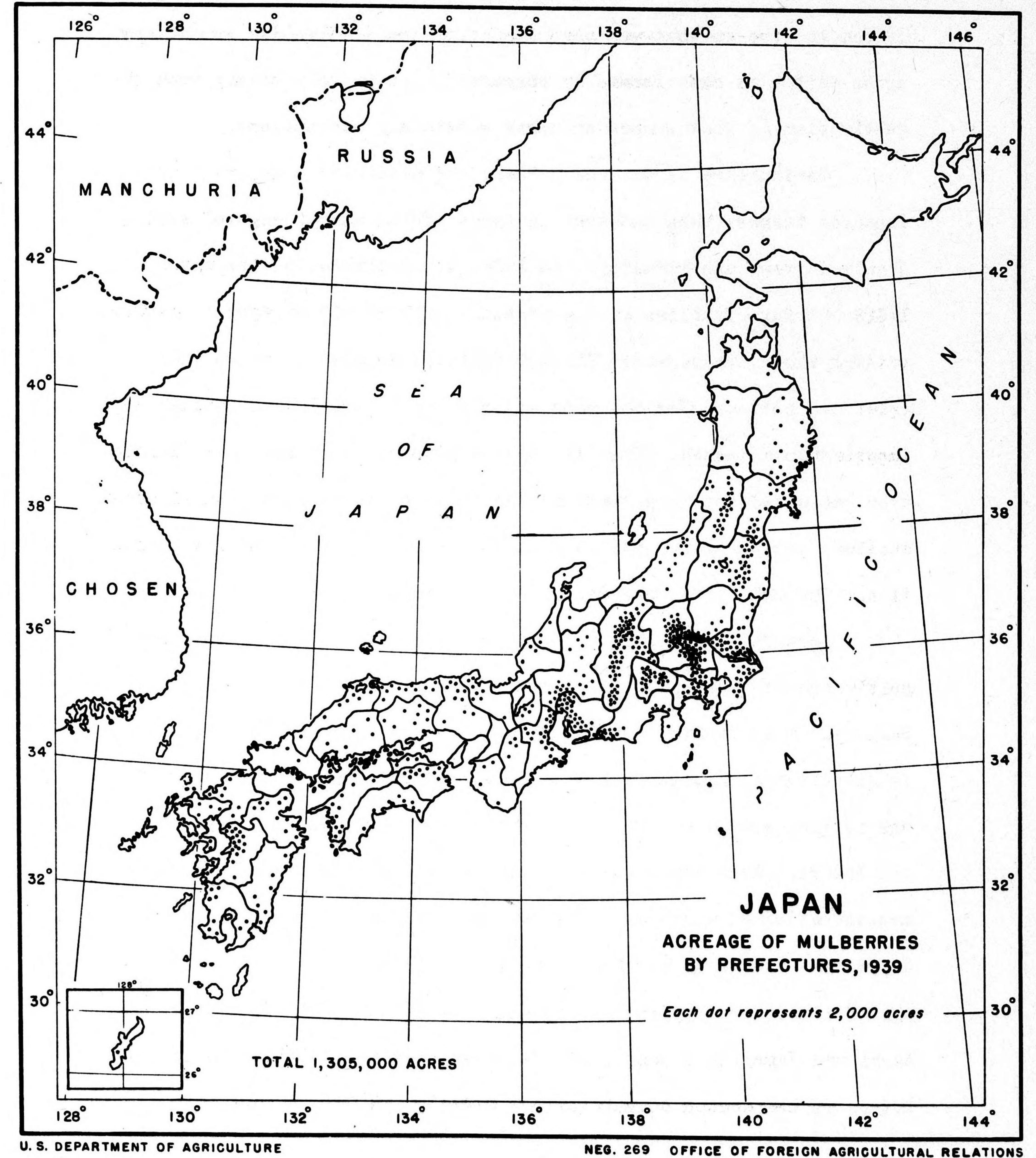
Table 45 - Families raising cocoons in relation to total number of farm families in Japan, 1929-40

Year	Families raising cocoons		Total farm families		Percentage families raising cocoons are of total		Year		Families raising cocoons		Total farm families		Percentage families raising cocoons are of total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1929	2,217,000	39.8	5,576,000	39.8	1935	1,895,000	5,611,000	33.8						
1930	2,216,000	39.6	5,600,000	39.6	1936	1,857,000	5,597,000	33.2						
1931	2,120,000	37.6	5,634,000	37.6	1937	1,819,000	5,575,000	32.6						
1932	2,065,000	36.6	5,643,000	36.6	1938	1,618,000	5,519,000	29.3						
1933	2,092,000	37.2	5,622,000	37.2	1939	1,651,000	5,492,000	30.0						
1934	1,995,000	35.5	5,617,000	35.5	1940	1,648,000	-	-						

Office of Foreign Agricultural Relations.

Compiled from official sources.

Fig. 13

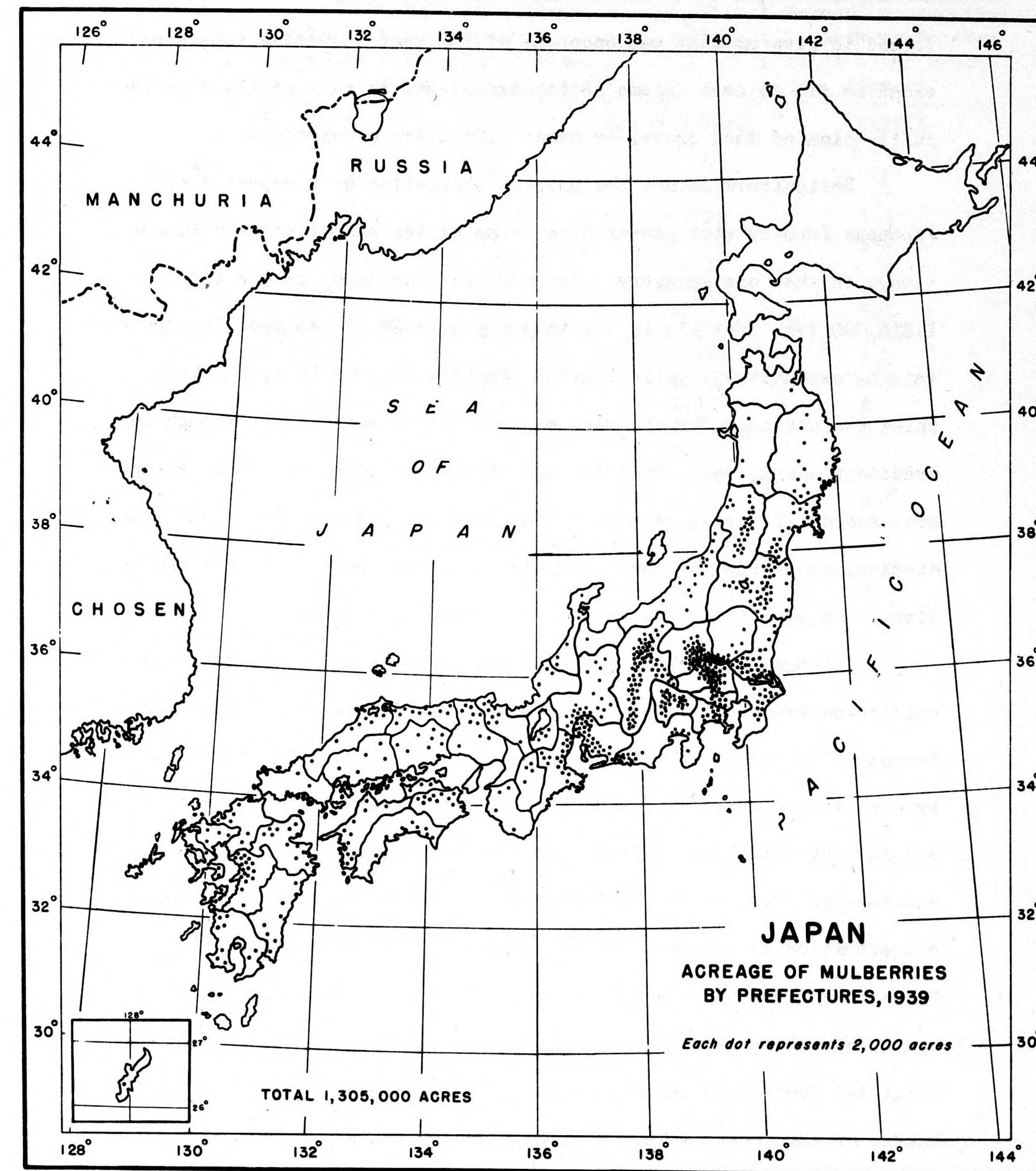


forced to give up what was once one of the most lucrative subsidiary crops as far as cash income is concerned, and to rely mainly upon the cultivation of food crops, or other subsidiary occupations.

Sericulture is not the primary occupation of a majority of Japanese farmers when measured in terms of the number engaged exclusively in that one industry. In 1938, for instance, of the total 1,619,000 farm families in the industry only 29,000 engaged in cocoon raising exclusively, while 221,000 families engaged in it as their chief occupation. For the vast majority it is a sideline, though an important one indeed. Even in 1937, a year of low prices, the cocoon crop accounted for 12 percent of the value of total agricultural production, exceeding the combined value of wheat, barley and oat production. The proportion was raised to 16 percent in 1939.

Acreage, Production and Prices: In Japan mulberry trees can be cultivated everywhere, as far north as Hokkaido and as far south as Formosa. This leading subsidiary crop though widespread, is not evenly distributed throughout the country. In the north the mulberry acreage is very small, and this is shown by the prefectures of Hokkaido and Aomori. From about the fortieth parallel south there is a heavy concentration of acreage. In 1939 Nagano alone was responsible for 12 percent (Table 46 and Fig. 13), of the total; this, and the acreage of six other prefectures (Gumma, Fukushima, Saitama, Yamagata, Aichi and Yamanashi) constitute 44 percent of the total. The distribution of the cocoon output follows closely that of acreage.

Fig. 13



forced to give up what was once one of the most lucrative subsidiary crops as far as cash income is concerned, and to rely mainly upon the cultivation of food crops, or other subsidiary occupations.

Sericulture is not the primary occupation of a majority of Japanese farmers when measured in terms of the number engaged exclusively in that one industry. In 1938, for instance, of the total 1,619,000 farm families in the industry only 29,000 engaged in cocoon raising exclusively, while 221,000 families engaged in it as their chief occupation. For the vast majority it is a sideline, though an important one indeed. Even in 1937, a year of low prices, the cocoon crop accounted for 12 percent of the value of total agricultural production, exceeding the combined value of wheat, barley and oat production. The proportion was raised to 16 percent in 1939.

Acreage, Production and Prices: In Japan mulberry trees can be cultivated everywhere, as far north as Hokkaido and as far south as Formosa. This leading subsidiary crop though widespread, is not evenly distributed throughout the country. In the north the mulberry acreage is very small, and this is shown by the prefectures of Hokkaido and Aomori. From about the fortieth parallel south there is a heavy concentration of acreage. In 1939 Nagano alone was responsible for 12 percent (Table 46 and Fig. 13), of the total; this, and the acreage of six other prefectures (Gumma, Fukushima, Saitama, Yamagata, Aichi and Yamanashi) constitute 44 percent of the total. The distribution of the cocoon output follows closely that of acreage.

Table 46.- Acreage and production of mulberries in Japan by prefectures, 1939

Prefecture	: Percent acreage :		: Percent production :	
	Mulberry : : acreage :	in each prefec- : : ture is of total : : mulberry acreage :	Production : : in each prefecture : : is of total produc- : : tion :	in each prefecture : : is of total produc- : : tion :
	Acres	Percent	1,000 pounds	Percent
Hokkaido	345	1/	76	1/
Aomori	1,762	.1	437	.1
Iwate	25,594	2.0	8,695	1.2
Miyagi	35,056	2.7	13,333	1.8
Akita	8,050	.6	1,658	.2
Yamagata	56,690	4.4	21,834	2.9
Fukushima	84,166	6.5	38,634	5.1
Ibaraki	57,449	4.4	32,388	4.3
Tochigi	15,809	1.2	8,346	1.1
Gumma	97,950	7.5	66,352	8.8
Saitama	79,882	6.1	51,972	6.9
Chiba	32,502	2.5	17,658	2.4
Tokyo	20,830	1.6	12,727	1.7
Kanagawa	24,592	1.9	14,189	1.9
Niigata	34,840	2.7	12,292	1.6
Toyama	2,340	.2	1,336	.2
Ishikawa	9,300	.7	3,322	.4
Fukui	6,276	.5	1,986	.3
Yamanashi	54,604	4.2	47,367	6.3
Nagano	158,755	12.2	88,789	11.8
Gifu	45,436	3.5	30,265	4.0
Shizuoka	28,263	2.2	18,358	2.5
Aichi	60,772	4.7	45,768	6.1
Miye	40,920	3.1	24,760	3.3
Shiga	8,325	.6	3,028	.4
Kyoto	16,696	1.3	9,112	1.2
Osaka	296	1/	144	1/
Hyogo	20,766	1.6	9,795	1.3
Nara	7,974	.6	4,608	.6
Wakayama	7,146	.5	5,114	.7
Tottori	21,994	1.7	10,187	1.4
Shimane	20,083	1.5	9,148	1.2
Okayama	16,789	1.3	7,586	1.0
Hiroshima	9,332	.7	4,772	.6
Yamaguchi	4,247	.3	1,959	.3
Tokushima	19,296	1.5	13,416	1.8
Kagawa	5,019	.4	2,527	.3
Ehime	22,612	1.7	14,986	2.0
Kochi	18,382	1.4	12,176	1.6
Fukuoka	12,652	1.0	8,302	1.1
Saga	7,749	.6	4,967	.7
Nagasaki	7,330	.6	5,192	.7
Kumamoto	38,158	2.9	24,844	3.3
Oita	21,362	1.6	13,886	1.9
Miyazaki	14,461	1.1	10,233	1.4
Kagoshima	18,825	1.4	11,193	1.5
Okinawa	2,980	.2	1,052	.1
Total	1,304,747	100.0	750,769	100.0

Office of Foreign Agricultural Relations. Norinsho Tokeihyo, 1939.
1/ Less than 0.1 percent.

Between 1915 and 1930 the area under mulberries increased from 1,092,000 to 1,718,000 acres. The latter figure represented 12 percent of the total land under cultivation in Japan, or 26.5 percent of the cultivated upland acreage. The greatest single increase occurred in 1930 (Table 47) due to the prevailing high prices in the preceding years. After 1930, with prices declining, the mulberry area declined steadily, and by 1939 had decreased to 1,305,000 acres, or by 24 percent. The decline in acreage was caused by low cocoon prices and the efforts on the part of the Government to curtail the output.

Table 47. - Area of mulberry farms in relation to total cultivated land in Japan, 1929-40

Year	Total cultivated land	Area in mulberry farms	Mulberry farms as percentage of total cultivated land
	acres	acres	Percent
1929	14,452	1,505	10.4
1930	14,498	1,718	11.8
1931	14,591	1,643	11.3
1932	14,684	1,570	10.7
1933	14,774	1,540	10.4
1934	14,795	1,499	10.1
1935	14,848	1,401	9.4
1936	14,914	1,362	9.1
1937	14,945	1,350	9.0
1938	14,895	1,322	8.9
1939	14,896	1,305	8.8
1940	-	1,308	-

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The output of cocoons prior to 1931 rose uninterruptedly, the peak having been reached in 1930 with an output of 880 million pounds. In subsequent years the trend was mainly in the opposite direction.

In 1938, the last year before the new spurt in production, the output of 620 million pounds was the lowest since 1925 and 27 percent below that of 1929. On occasions weather conditions affect the output of cocoons adversely, but normally fluctuations in the crop may be attributed primarily to changes in cocoon prices and their relation to cost of production.

Cocoon prices (Table 48) were actually below cost of production in 1930-1932 and 1934; and in 1938 they only equalled costs, while profits during the other years (1929, 1933, 1935-1937) were rather small. The situation was changed completely in 1939. The short crop of 1938 and a number of other factors relating more directly to the anticipated increased demand for silk caused cocoon prices to advance sharply. The average 1939 price was 30 cents per pound as against 16 the year previous, while the total value of the crop was 155 percent above that of 1938 and 35 percent above that of 1929. This sharp rise wiped out the price disparity between cocoons and the general commodity price level.

Dependence upon American Market: The ups and downs of the sericulturists noted here is something over which they have no control. Their fortunes are entirely dependent upon the reelers (silk manufacturers) who process the cocoons into raw silk. But the fortunes of the reelers in turn, were governed by their ability to dispose of the output at remunerative prices in the American market.

The fundamental factor and weakness of cocoon-raising and of the silk industry is that it developed in response to foreign (American) rather than domestic demand. In the years before the

Table 48. - Total production of cocoons, average cost, average price received by producers and total value of crop in Japan, 1929-40

Year	Production		Estimated cost of production		Average price		Value of cocoon crop	
	1,000 Kwan	1,000 Pounds	Per kwan	Cents	Yen	Cents	Million Yen	Million dollars
1929	102,093	844,023	6.12	34	6.42	36	655	302
1930	106,464	880,159	5.02	30	2.86	17	304	150
1931	97,072	802,514	3.62	21	2.84	17	276	135
1932	89,550	740,328	3.49	12	3.31	11	296	83
1933	101,164	836,343	3.79	12	4.94	15	500	128
1934	87,140	720,404	3.65	13	2.34	8	204	61
1935	82,066	678,456	3.75	13	4.28	15	351	101
1936	82,892	685,285	3.87	14	4.66	16	386	112
1937	85,972	710,748	3.91	14	4.88	17	420	121
1938	75,256	622,156	4.55	16	4.60	16	346	98
1939	90,813	750,769	6.01	19	9.72	30	883	229
1940	87,546	723,760	-	-	9.85	28	862	202

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Compiled from official sources.

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depression at least four-fifths of the output was exported. Exports have declined since 1929, but in view of the severity of the depression the falling off in the volume of exports prior to 1939 was not pronounced. (Table 49). The relative stability of exports maintained from 1930 through 1938 was completely upset in 1939 and particularly in 1940, when the exported volume was the smallest since 1924. Throughout this period exports to the United States accounted for a low of 80.3 percent to a high of 96.7 percent of the total volume of silk exports.

The American share of silk exports was maintained at a high level because silk was sold in this market at relatively low prices. But even at such prices, the American market for Japanese silk has been shrinking in recent years. The decrease has been continuous since 1935, and in 1940 the United States imported from Japan only 36.4 million pounds (the smallest since 1921), or nearly 43 percent below the average of 1931-35.

Judging by the underlying causes, this downward trend apparently was not a temporary phenomenon, and herein lies the seriousness of the position of the Japanese cocoon raisers and of the silk industry. Silk has been losing ground to rayon for a number of years, and immediately before the war, to nylon as well. In 1939 silk comprised only 10 percent of the combined world consumption of rayon and silk, as against 40 percent in 1929. The consumption of silk in hosiery manufacture has increased, but not in sufficient quantities to offset the loss in woven goods. By 1940 the hosiery industry had become silk's main outlet, yet even this stronghold of silk has not remained

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Table 49. - Quantity and value of raw silk exports from Japan and proportions going to each country, 1929-40

Year	Quantity	Value	Percentage going to:						
			Million pounds	Million yen	Million dollars	United States	England	France	Others
1929	77	781				96.7	0.5	1.7	1.1
1930	63	417				95.7	0.7	1.9	1.7
1931	74	355				96.1	1.3	1.4	1.2
1932	73	382				94.2	2.4	1.9	1.5
1933	63	391				91.0	3.7	3.9	1.4
1934	67	287				83.5	5.1	7.0	4.4
1935	73	387				84.3	5.1	6.3	4.3
1936	67	393				85.0	5.7	5.5	3.8
1937	63	407				80.3	7.3	6.4	6.0
1938	63	364				82.4	7.0	6.6	4.0
1939	51	507				85.9	7.1	3.6	3.4
1940 1/2	38	-				-	-	-	-

Office of Foreign Agricultural Relations. Compiled from official sources.

1/ Preliminary.

unassailed with the introduction of the new synthetic fiber - nylon.

Whether nylon will displace silk in the manufacture of hosiery to the same extent as rayon has displaced silk in the textile field will depend upon the consumers' acceptance of the quality of nylon; upon the rapidity with which the fiber is perfected, and, of course, upon the price relationship between silk and nylon. There is enough evidence now that nylon is a real threat to Japanese farmers. Domestic consumption of silk can hardly be maintained at the abnormal war levels; nor can government measures, if judged by past experience, artificially maintain the price of silk at a level that would induce the farmers to raise cocoons. It is not unlikely, therefore, that post-war Japan will be confronted with the problem of finding new subsidiary occupations for hundreds of thousands of farmers who have hitherto relied upon the cocoon crop as their principal source of cash income.

PART IV. FOOD SUPPLY AND CONSUMPTION

Pre-war, 1936

In order to estimate the quantity of food consumed in Japan, two sets of tables have been prepared. Table 50 attempts to summarize the total and per capita disappearance ^{1/} of all foods that make up the Japanese diet. Tables 51 and 52, on the other hand, show in detail the Japanese food consumption ^{1/} in 1936 and the estimated consumption in 1943.

In 1936, the food disappearance of Japan amounted to 74 billion pounds (Table 50). Of this quantity nearly 10 billion pounds, or 13 percent of the total, were net imports. Approximately 8.0 billion pounds of the imports originated in Japanese colonies, i.e. Korea, Formosa and Manchuria. Thus, net imports of foodstuffs from foreign countries accounted for only 3 percent of the total disappearance. Before the war, therefore, the dependence of Japan proper upon imported foodstuffs from foreign countries, as distinguished from the colonies, was very limited.

^{1/} In estimating the quantity of food consumed in Japan, or for that matter in any country a distinction must be made between the terms "disappearance", "consumption" and "ingestion." The latter refers to food that actually goes into the mouths of the consumers, and does not enter into this appraisal of Japan's food supply. "Consumption" refers to food that passes over the thresholds of houses and eating places. Finally, "disappearance" is, roughly speaking, the food produced domestically during a given period, plus stock at the beginning and minus stocks at the end of the period, plus imports less exports.

Table 50.- Total and per capita disappearance of foodstuffs in Japan, 1936 and 1943

Product	Apparent disappearance			
	1936 ^{1/}		1943 ^{2/}	
	Total	Per capita	Total	Per capita
	Million pounds	Pounds	Million pounds	Pounds
Rice	23,526	340	23,858	328
Wheat	3,216	46	3,419	47
Barley	3,905	56	3,122	43
Other grains	1,381	20	1,721	19
Soy beans	2,299	33	2,425	33
Other beans	943	14	646	9
Potatoes	10,540	152	16,460	226
Tuber roots and vegetables	15,213	220	12,171	167
Sugar	2,112	30	2,094	29
Fruits	2,848	41	2,182	30
Animal products:				
Fish	^{3/} 6,664	95	^{3/} 5,053	66
Meat & poultry	399	6	249	3
Eggs	443	6	454	6
Milk and dairy products	615	9	291	4
Total	74,104	1,068	74,146	1,010

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^{1/} Based on official sources.^{2/} Estimated.^{3/} Consumption.

Table 51. - Apparent food consumption in Japan proper, 1936

Crop	: Apparent : : disappearance:		: Non-food use: :	: Seed :	: Bran, other : : milling offals : : and waste 2/:		: Apparent : consumption : as food	: Calories per: : metric ton	: Total calories : (000,000)
	1/ : 1,000 m. tons:	3/ : 1,000 m. tons:			Percent :	Percent :			
Rice	10,671	3/ 1,915	3	9.5	4/ 7,696	3,500	26,936,000		
Wheat	1,459	-	9	20	1,072	"	3,752,000		
Barley	1,771	5/ 273	3.5	35	853	"	2,985,000		
Corn	389	6/ 389	-	-	-	-	-		
Millet	152	6/ 78	-	-	74	3,500	259,000		
Soy beans	1,043	-	7	15	868	4,000	3,472,000		
Other beans	428	-	7	14	339	2,900	983,000		
Sweet potatoes	3,571	-	4	10	3,071	800	2,457,000		
Irish potatoes	1,210	-	9	10	980	"	784,000		
Sugar	958	5	-	-	953	3,900	3,717,000		
Fruits	1,292	-	-	7/ 20 - 40	1,012	375	379,000		
Daikan 3/	2,523	-	-	4	2,422	13	315,000		
Other vegetables	4,377	-	-	22	3,414	450	1,536,000		
Oils 2/	-	-	-	-	238	9,000	2,142,000		
Animal food									
Fish	5,674	776	-	40	2,939	1,800	5,290,000		
Whale, edible meat	23	-	-	-	23	1,500	34,000		
Aquiculture	153	-	-	60	61	1,000	61,000		
Dressed meats	181	-	-	30	127	2,000	330,000		
Eggs	201	-	-	10	181	.570	284,000		
Milk and dairy products	279	-	-	-	279	735	205,000		
Miscellaneous	-	-	-	-	-	-	500,000		
Total							56,421,000		

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1/ Production plus or minus trade and in case of rice, carry-over at the beginning of the year minus carry-over at the end of the year.

2/ Includes milling waste (bran, etc.), inedible portions such as shells, peelings, stems, etc., and losses due to shipping.

3/ Estimated amount consumed of rice used for sake, mochi, miso, jellies, pastes, etc. The calories are mainly lost through fermentation. These products are essential, especially in normal times, as adjuncts to the diet.

4/ Arrived at by the following process: Carry-over plus production, plus imports, minus exports, minus carry-over (end of year), minus 3 percent of production for seed and minus volume of non-food consumption and minus 9 percent for bran, other milling offals and waste.

5/ 22 percent of common barley and 12 percent of naked barley allowed for feed.

6/ Livestock feed-seed.

7/ 40 percent on imported and 20 percent on domestic.

8/ Giant radish.

9/ Assumed to be 4 percent of total calories.

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Table 52 - Estimated food consumption in Japan proper, 1943.

Crop	: Apparent : : disappearance:		: Non-food use: :	: Seed :	: Bran, other : : milling offals : : and waste		: Apparent : consumption : as food	: Calories per: : metric ton	: Total : calories : (000,000)
	1/ : 1,000 m. tons:	3/ : 1,000 m. tons:			Percent :	Percent :			
Rice	10,822	1,275	3	7	8,626	3,500	30,191,000		
Wheat	1,551	-	9	20	1,129	"	3,915,000		
Barley	1,416	300	3.5	35	700	"	2,450,000		
Corn	64	1/ 64	-	-	-	-	-		
Millet	178	1/ 78	2/ 5	-	91	3,500	318,000		
Soy beans	3/ 1,110	-	7	15	911	4,000	3,644,000		
Other beans	359	-	7	14	293	2,900	850,000		
Sweet potatoes	4,811	-	4	10	4,155	800	3,324,000		
Irish potatoes	2,655	-	9	10	2,174	"	1,739,000		
Sugar	4/ 950	5	-	-	943	3,900	3,678,000		
Fruits	5/ 990	-	-	20	792	375	297,000		
Daikan 6/	2,000	-	-	4	1,930	130	250,000		
Other vegetables	3,500	-	-	22	2,730	450	1,288,000		
Oils	68	-	-	1	67	9,000	603,000		
Animal Food									
Fish 7/	3,820	-	-	40	2,292	1,300	4,126,000		
Whale, edible meat	15	-	-	-	15	1,500	22,000		
Aquiculture	117	-	-	60	47	1,000	47,000		
Dressed meat	113	-	-	30	77	2,000	200,000		
Eggs	206	-	-	10	185	1,570	290,000		
Milk and dairy products	132	-	-	-	132	734	97,000		
Miscellaneous	-	-	-	-	-	-	300,000		
Total							57,629,000		

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1/ Livestock feed and seed.

2/ Seed and waste.

3/ Of which 600,000 imported from Manchuria and 80,000 from Korea.

4/ Of which 814,000 imported from Formosa.

5/ Estimated on the basis of 30 pounds per person, and no imports from Formosa.

6/ Giant radish, essential in the Japanese rice diet as a digestive.

7/ Estimated at 25 percent below that of 1939.

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The question to consider now is the degree of food self-sufficiency in Japan before the war. Self-sufficiency in foodstuffs is not necessarily synonymous with adequacy of food supply or a rise in standard of living. The per-capita consumption, both in volume and quality of food, in Great Britain, for instance, which depended upon imports to a large degree, is greater than in many a self-sufficient country. On the other hand, Korea is self-sufficient in rice, the main article for food; but for reasons to be indicated elsewhere the per-capita consumption has been steadily declining. In other words, underconsumption is sometimes the basis of a country's self-sufficiency.

In applying these observations to Japan, it is well to note the per-capita consumption of principal food items over a period of years. Consumption of rice increased from 288 pounds in 1888-97 to 363 pounds in 1917-26. In the years following it declined to about 352 pounds (1932-36), and in the single year 1936, it stood at 340 pounds. Even this figure shows that the Japanese consumed 18 percent more rice than in the last decade of the nineteenth century. Wheat consumption rose from 25 pounds during 1888-97 to 44 pounds in 1918-27 and remained at 43 pounds during the period 1928-37. Per-capita consumption of less important cereals and, to a smaller degree, of potatoes, has declined, whereas consumption of vegetables has expanded. Soybean consumption rose from 17 pounds in 1912-16 to 43 pounds in 1936. Consumption of fish with 95 pounds in 1936 is another advance over previous years. Sugar consumption rose from

10 pounds in 1896-98 to 30 pounds in 1936. Although meat and dairy products play such a small role in the Japanese diet, their consumption, too, has shown an upward trend.

Generally speaking, the level of food disappearance has risen, even though in the past decade disappearance of some principal items of the diet has not advanced, and, in fact, has declined slightly. The conclusion is that the large increase in population has not been accompanied by a lowering of the standard of living, and that Japan's self-sufficiency has not been achieved at the cost of lower level of disappearance.

It is possible that despite the increase in per-capita disappearance, the 1936 level is below Japanese nutritional requirements. If such were the case, Japanese self-sufficiency would be more apparent than real. In order to ascertain the degree of self-sufficiency, Japan's per-capita food consumption in 1936 (derived from Table 51) in terms of caloric intake is compared with the caloric requirements worked out by a leading Japanese nutritionist, Dr. Tadasu Saiki. It appears then that in 1936 the average per-capita consumption amounted to 2,232 calories, while requirements were 2,252 calories.

The difference between the requirements and the availability of food in 1936 is too negligible to be of any significance; what is important is the composition of the food supply as distinguished from the quantity. An analysis of its composition reveals glaring deficiencies, largely because of the fact that food of vegetable origin, rather than animal, predominates. A disproportionate amount

of cereals - especially rice - is consumed in relation to other classes of food. The level of animal foods consumed is low; from 10 to 12 percent of the caloric intake is of animal origin, as against 30 or 40 percent in Western Europe.

A diet of this nature is certain to be low in efficient protein, in minerals and in vitamins. Fish is the principal source of animal protein but it is a less frequent source of good quality protein than soy beans and other foods of vegetable origin for most households. This is especially true when, as is the case in Japan, many foods are processed in such a way as to reduce their content of the above-mentioned nutrients.

Thus, even if the quantity of food consumed were in accordance with the standard requirements, there still remains the factor of poor quality. In the opinion of a student of Japan's food:

The consumption of quantity without quality is in some respects more dangerous than starvation, for the latter is obvious and a remedy is sought; the former may remain a hidden source of evil, gradually reducing the vitality of the people. This appears the great danger of Japan. The polishing of rice, the milling of other cereals and the manufacture of various products ... prepared from cereals [and soybeans] lead to a loss of valuable factors and especially accessory factors or vitamins. The same remarks apply to the practice of salting and drying fish and the manufacture of fish products, the canning of fish and fruit, the sterilizing of milk and the use of milk powder and condensed milk, the salting and pickling of vegetables and fruits, practices all too common in Japan. As a result of artificial interference with the natural food supply of Japan, it would appear that, calculated in terms of solid edible materials, 90 percent of food has been deprived partially or wholly of its vitamins before it reaches the consumer 1/

1/ Grey, Egerton Charles, "Food for Japan," League of Nations, 1928, p.40

Developments since 1939

Such were the basic features of the food supply and food consumption prior to 1939. Since then the situation has undergone considerable changes, caused by poor harvests in Japan proper and in the colonies, by agricultural dislocations in consequence of the war, and by the conquest of the world's principal and surplus rice-producing areas.

In 1939 the Japanese Empire harvested one of the poorest rice crops in two decades. The rice crop of Japan proper (in 1939) was smaller than that of 1938, and Korea, Japan's principal colonial rice source, suffered a crop failure. Formosa's crop, too, was the smallest in five years. Nor were the Japan proper rice crops of 1940, 1941 and 1942 outstanding, despite strenuous efforts to increase agricultural production.

The explanation lies in Japan's war economy which antedates Pearl Harbor days, and its effects upon agricultural production. A considerable number of farmers joined the army, and as these mobilized soldiers represented the most able-bodied of the farmers, the mobilization marked a decline in agricultural manpower. A certain portion of the available farm labor was absorbed by the expanding munition and other industries, thereby accentuating the shortage of farm labor.

A large number of horses were commandeered by the army and this was bound to affect agricultural efficiency, since the labor power of one horse is commonly regarded as equivalent to that of

4 or 5 men. The shortage of horse power is felt with especial keenness in the northeastern districts where the period of agricultural production is short and where, consequently all farming operations have to be carried out within a limited period.

The augmented agricultural output is predicated upon an increased supply of fertilizer, but all objective conditions point to a decline in supply since 1939. As the war continues Japan is being forced to divert an increasing proportion of the chemical otherwise available for fertilizers for munition purposes. Again, the shortage of farm labor is likely to reduce the output of green manure, while the requisitioning of horses is likewise diminishing the production of farm-yard fertilizers. This shortage in the supply of labor, animal power and fertilizer - if not arrested - will compel agriculture to become more extensive, and will result in a corresponding decrease in the total supply of agricultural products. Most of the enumerated factors existed even before Japan's attack upon Southeastern Asia and the United States, and they have undoubtedly become aggravated since then.

During the period under consideration Japan has been attempting to make good the existing and prepare for potential shortages by a series of domestic measures, and by tapping the rice resources of the subjugated countries of Southeastern Asia.

The first reaction to the Empire's crop failure of 1939 was the restriction in the use of rice for sake or rice wine (October),

followed by an order to reduce rice polishing to 70 percent. In April of 1940 the first local rationing system went into effect in Aikochi, Shikoku, and by October over 4,000 villages and cities had introduced ticket systems. During the late summer and fall of that year the mixture of wheat, barley, buckwheat and even beans with rice was enforced by local officials in various areas, and a year later rice rationing was put into effect in Tokyo, Osaka and Kobe with allowances ranging from 570 grams per day for performing extra-heavy tasks down to 300 grams for persons over 61 years of age not engaged in manual labor. (Table 53).

Free trade in rice was prohibited; the Government became the sole purchaser of rice from the farmers, leaving them with a volume sufficient for their personal needs. The rice thus collected is stored by the authorities and distributed in accordance with the rationing system. Strenuous efforts on the part of the government have been made to increase production, the chief weapon along that line being the increase in the price of rice paid to the farmer. In the fall of 1942 the price of rice was raised from 43 to 49 yen, and in the spring of 1943 to 62.50 yen per koku. To meet this deficit an "Encouragement Fund" or a subsidy of 650,000,000 yen was appropriated.

There is no evidence that the measures to increase production above the pre-1939 level in Japan or in the colonies, have been successful. The mentioned handicaps from which Japanese agriculture

Table 53. - Daily rice rations effective in Tokyo prefecture since April 1941 with their caloric equivalent, compared to total caloric requirements

Age	:Calories : Total :			
	Rice	from rice	needed	from rice
	: Grams per day:	:Calories :	:Calories:	:Percent
From 1 through 5	: 120	: 420	: 880	: 47.7
From 6 through 10	: 200	: 700	: 1,400	: 50.0
From 11 through 60:				
Office workers, light workers:	: 330	: 1,155	: 2,200	: 52.5
Heavy workers:				
Male	: 390	: 1,365	: 3,000	: 45.5
Female	: 350	: 1,225	: 2,700	: 45.4
Extra heavy workers:				
Male	: 570	: 1,995	: 3,800	: 52.5
Female	: 420	: 1,470	: 3,500	: 42.0
Over 61:				
Office workers	: 300	: 1,050	: 2,000	: 52.5
Heavy workers:				
Male	: 350	: 1,225	: 2,500	: 49.0
Female	: 320	: 1,120	: 2,250	: 49.8
Extra heavy workers:				
Male	: 480	: 1,680	: 3,400	: 49.4
Female	: 380	: 1,330	: 2,700	: 49.3

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suffers militate against the maintenance of rice production at normal levels, let alone of increasing the crops. Japan resorted, therefore, to measures other than those aiming to increase production and restrict consumption. In the spring of 1940 heavy imports began to arrive from French Indo-China, Siam and Burma, in addition to imports of colonial rice, although on a much reduced scale. Imports have continued through 1942 with the result that stocks on hand reached an estimated 2,195,000 metric tons on October 31, 1942, as compared with a normal carry-over of 1,170,000 metric tons.

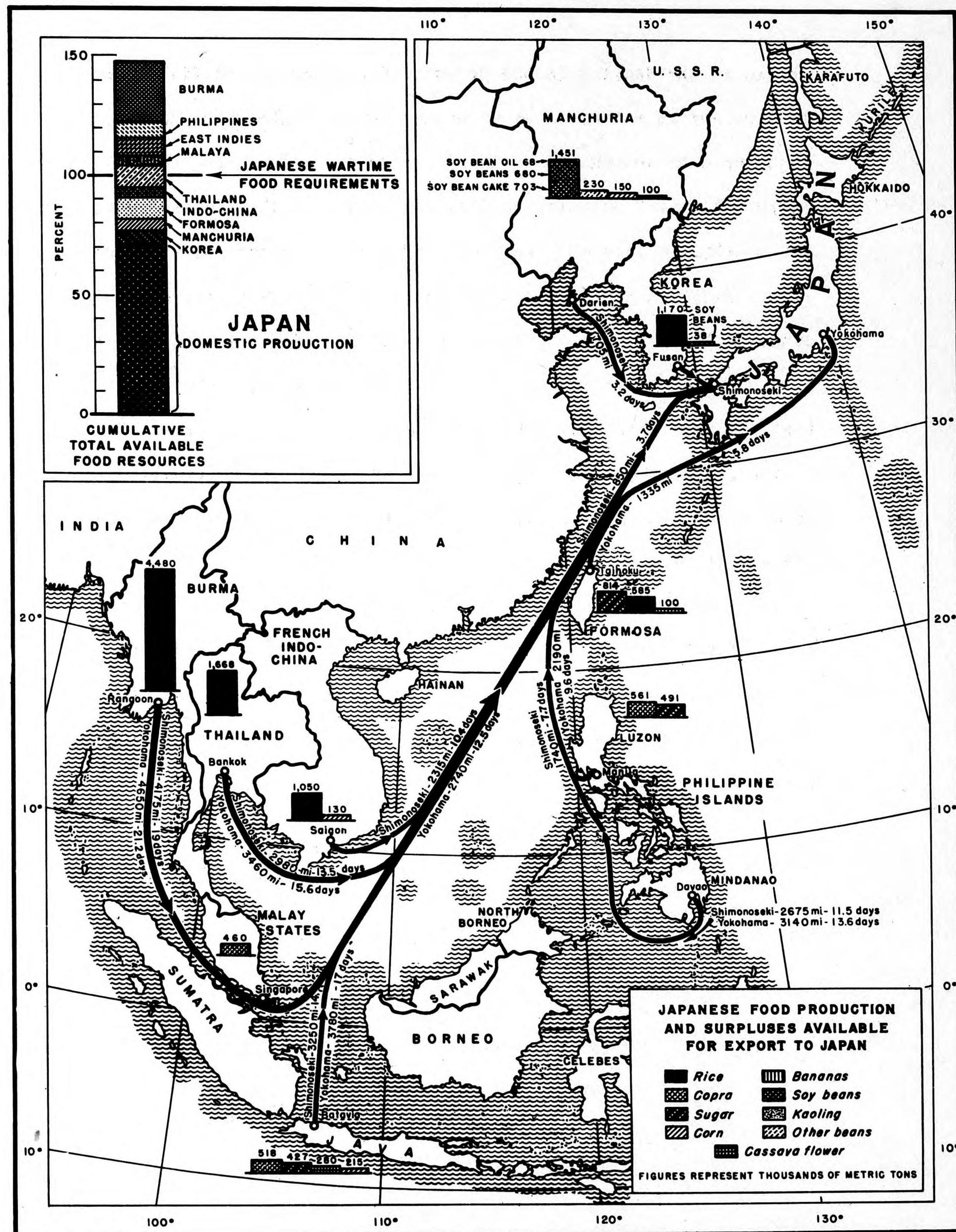
Extensive storage of rice in the warehouses in the large cities was officially announced in June 1942. This program was put into effect in order to insure sufficient supplies for the civilian population in case of severe damage to the transportation facilities by air raids. Special warehouses were designated to supply each section of the city in case of emergency, and rice dealers assistants were retained to handle the distribution. Other foods such as canned fish were also stocked in these warehouses. Further evidence of unusually large rice supplies was noted during the winter of 1942. Independent witnesses mentioned the storage of foreign rice in Kohe, and the use of railway sheds as storage places in various areas.

Food Supply and Consumption, 1943

With the conquest of Burma, Siam and French Indo-China, Japan came into control of areas which produce 95 percent of the

rice normally entering international trade. Before the war these three countries exported an average (1935-39) of about six million metric tons annually, very little of which was shipped to Japan. Theoretically then, the country has acquired a huge source of rice and other food products, which foods, if made available to the Japanese population, would have raised Japan's 1943 food supplies to 150 percent of its caloric requirements. (Fig. 14) This is predicated upon the availability of shipping, and upon the invulnerability of shipping lanes and port facilities to sea and air attack. The fact is, however, that not one of the mentioned conditions holds good, and some rice must be shipped from the surplus to the deficit rice-consuming regions of Southeastern Asia. Under the circumstances, the estimated Japanese food takings from the conquered territories are much smaller than the normally available resources.

The total 1943 food disappearance in Japan proper, (Table D), is about the same as 1936, but in view of the increase in population the average per capita disappearance is estimated at 1,010 pounds as against 1,068 in 1936, or a decline of 6 percent. A detailed examination of the data shows that aside from the decline in the total per capita volume of disappearance, some important changes have taken place in the items that make up the totals. Notable are the 48 percent increase per-capita disappearance of potatoes and the 24 percent decline in other vegetables. But the most significant



change is the decline in the per-capita consumption of fish. The 1943 volume is estimated at 66 pounds compared with 95 pounds in 1936, or a reduction by one-third. Fish being Japan's principal source of animal protein, the adverse effect of this decline upon the health and economic efficiency of the people must be stressed.

Table 52 represents an estimate of the volume of food consumption in 1943 in terms of caloric intake. The relative meagerness of information imposes certain limitations, with the result that the data presented may not be correct in every respect. The belief is, however, that the possible errors of underestimation or of overestimation are not sufficiently large to invalidate the general picture.

A number of assumptions that underlie Table 52 may be stated here. First, and perhaps the principal one, is that imports of foreign rice, as well as colonial, were small. In 1943 Japan's volume of rice (disappearance) is estimated at 10,822,000 metric tons. This amount is made up from the following sources:

	<u>Metric Tons of Brown Rice</u>
Production in Japan Proper	9,067,000
Imports from Korea	292,000
" " Formosa	439,000
" " Fr. Indo-China	800,000
" " Thailand	224,000
Total	<u>10,822,000</u>

The unusually small takings from Korea resulted from the poor crop of 1942. The 1943 crop has also suffered from a drought; but the latter being less severe than that of the preceding year Japan in 1944 may be in a position to obtain 400,000 tons of rice from Korea.

Imports from foreign countries presently dominated by Japan are estimated at only 1 million tons. Burmese rice stocks constitute the largest single export surplus in Asia, aggregating 4.5 million tons. There is no evidence, however, that any significant volume of this rice has moved to Japan or to any part of the Inner Empire. Lack of shipping, hazard of sea transportation both from undersea and aircraft, and distance are the chief handicaps. Rangoon, the principal rice port of Burma, is 4,810 miles from Yokohama.

The second assumption is that Japan's rice carry-over at the end of 1942, estimated at 2.1 million tons, the largest on record, will be left untouched during 1943. This carry-over represents 12 percent of the 1943 total caloric requirement; if these stocks should be drawn upon, the difference between the available supplies and requirements could be made up by reducing the stocks by approximately two-thirds.

Finally, it has been assumed that the Japanese troops obtain substantially all their food from the countries which they occupy. While this is undoubtedly true in the main, some

[The 1944 rice fiscal year is the most difficult in our Nation's food situation and it is an important year. It is extremely important that foreign rice be completely excluded from our usual plans. Soldiers at the front say they are worried lest the home front might be eating roots of grasses, but we say, please do not worry about us; our food condition in Japan is firm and sound.]

This is an extremely grave pronouncement that must be interpreted very cautiously. But there is undoubtedly serious concern in Japanese official circles about the country's food supply now that the war has assumed a protracted character. The recent warnings and exhortations stem, primarily, from the poor rice, wheat and barley crops of 1943; the second factor centers around the shortage of shipping, which makes it unwise or impossible to rely on Indo-China and other distant areas for rice and other food. According to Yamazaki ships heretofore used in transporting foreign rice will be used for military purposes only. Hence the emphasis upon food imports from the nearby Manchuria, Korea and Formosa. The newly conquered surplus rice, and other food-producing countries are being ruled out as a bread basket for Japan. It is not unlikely, however, that the results of the 1943 crop will yet compel Japan to risk shipping in order to import foodstuffs from southeastern Asia.

The rice, wheat, and barley crops, 1943. The rice crop was officially estimated at 9,067,000 metric tons, as against an expected output of 10,384,000 tons. Accepting the official figure

at its full value, the output is 13 percent below the plan and is equal to the crop of 1942. The total 1943 rice disappearance was estimated at 10,822,000 tons. Even on the assumption that the 1944 disappearance would not exceed that of 1943, Japan would have to import 1,741,000 tons to make good the deficit. But in view of the sharp reduction of wheat and barley, Japan must increase the imports of rice by another 630,000 tons, or a total of 2,371,000 metric tons.

A Japanese dispatch of November 11, 1943, reported that the barley and wheat harvests of 1943 in Japan proper decreased 21 percent compared to last year's crops. The following data indicate the changes that have taken place in the output of wheat and barley.

Table 54. - Production of Rice, Wheat and Barley in Japan. 1942 and 1943

Crop	P r o d u c t i o n			1943 Production	1943 Production
				as a percentage	as a percentage
	1942	1943		of 1942	of 1943 Plan
	M. tons	Actual M. tons	Plan M. tons	Percent	Percent
Rice	9,067,000	9,067,000	10,384,000	100.0	87.0
Wheat	1,409,000	1,113,000	1,895,000	79.0	58.7
Barley	1,614,000	1,274,000	2,089,000	79.0	61.0

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Wheat and barley production in 1943, as against that of 1942, declined by 296,000 and 340,000 metric tons, respectively. This represents a loss of 1.7 trillion calories, or nearly 3 percent of

the 1943 estimated caloric intake in Japan. In addition, there is a loss of bran and other mill by-products for livestock feed. For these reasons, this loss must be made up by a corresponding tonnage of imported rice if the food position is to be maintained and stocks are to remain intact.

Meeting the Deficit. In order to make good the shortage of 2,371,000 tons of rice, Japan can get from Korea an estimated total of only 400,000 tons and approximately 550,000 tons from Formosa, or a total of 950,000 tons. This leaves a balance of 1,421,000 metric tons which Japan must secure from French Indo-China, Thailand and Burma in 1944. To this must be added an additional 250,000 tons of French Indo-China rice that has been shipped by Japan to Occupied China and other areas in 1943, and that will have to be provided again in 1944. Thus, Japan's 1944 total rice requirements from the southern regions may be estimated at 1,650,000 metric tons. The rice is available, and it is safer to assume that Japan probably will succeed in laying claim to it regardless of the attitude of the rice producers of those countries. Perhaps more important are the problems of available shipping tonnage and of safe passage. Unless they are overcome, Japan will have to resort to its stocks, and with no likelihood that they will be replenished at a later date.

PART V. ECONOMIC POSITION OF THE JAPANESE FARMER

In preceding pages an attempt has been made to describe the physical conditions within which Japanese agriculture operates, the land and population, and the economic conditions of the various groups that cultivate the land and the food supply of the country. The low standard of living of the vast majority of the farmers is one answer to the question of how it is possible for Japan's small acreage to support such a great number of people engaged in farming. The results of numerous family budget studies carried out by the Ministry of Agriculture indicate that, generally speaking, the average peasant cannot make ends meet solely by farming.

Farm Income and Standard of Living

An investigation covering one year (September 1926 - September 1927), conducted by the Bureau of Statistics of the Japanese Government, revealed the following: The average monthly income of the 670 farm families investigated was barely sufficient to cover monthly expenditures. Even the peasant proprietor, who owned the land he cultivated, had a yearly income of 1,350 yen as against an expenditure of 1,315 yen, or a surplus of only 35 yen. The status of tenants was considerably worse. If all the investigated groups, owners, part-tenants, and tenants, had relied solely upon income from agriculture, every one would have incurred a regular monthly deficit.

Subsidiary occupations yield an important part of the income of the majority of farmers. A survey of the income of farmers from all sources for the period 1913-1934 revealed that, with the single exception of 1913, agricultural income each year fell short of meeting

household expenditures, and forced the farmers to fall back upon non-agricultural income to make up the deficit. The income from subsidiary occupations ranged from 23 percent to 31 percent of the total income. Of those persons engaged in such occupations in 1937, 8 percent augmented their income from forestry enterprises, 6 percent from fishing, 10 percent from industry, 13 percent from commerce, and 63 percent from "other" activities.

A somewhat similar situation is revealed by the results of family budget investigations, covering the years 1943, 1935 and 1936-38. The year 1936 may be taken as a representative one, for while farm conditions then were not as good as those of 1937 and 1938, they were much better than those of 1932 and 1935. A total of 84 owners, 103 part-owners and 86 tenants were subjects of the investigation. The owners averaged a total net income of 1,030 yen as against total household expenditures of 841 yen, or a balance of 189 yen; in the case of the part-owners and tenants the respective balances were 161 and 101 yen. (Table 55). Here, too, subsidiary occupations played their role. But for the subsidiary occupations, the tenants would have shown a deficit of 49 yen, while the owners and part-owners would have enjoyed surpluses of only 59 and 31 yen, respectively.

The household expenditures of these groups throw light upon the low standard of living of the Japanese farmers. In 1936 such expenditures on the part of the farm owners averaged 841 yen or 2.30 yen per day. ^{1/} As these households averaged three able-bodied adults

^{1/} Average annual rate of exchange for 1936: yen = 29 cents.

TABLE 55. - SOME RESULTS OF FAMILY BUDGET INVESTIGATIONS IN JAPAN, 1932 AND 1935-1938

	Owners					Part-owners					Tenants				
	1932	1935	1936	1937	1938	1932	1935	1936	1937	1938	1932	1935	1936	1937	1938
Number of families investigated	96	94	84	84	78	96	102	103	104	99	90	92	86	91	81
Average number of members per family	6.44	6.45	6.49	6.56	6.45	6.31	6.46	6.43	6.34	6.36	6.30	6.67	6.49	6.46	6.47
Of which working (in able-bodied man-units)	2.95	2.93	3.01	3.05	2.91	2.90	3.01	2.98	2.91	2.94	2.95	2.97	2.99	3.01	2.90
Area cultivated (in tan):															
Owned	12.21	12.32	12.31	12.32	12.62	6.11	6.51	6.72	6.02	6.32	0.61	0.81	0.87	1.92	1.02
Rented	0.63	0.63	0.50	0.51	1.83	6.31	6.30	6.32	6.92	6.72	11.53	11.73	11.53	11.41	11.04
Total area incl. building sites, forest, wasteland, etc.	17.70	17.41	18.23	18.83	20.02	14.62	14.83	14.90	15.01	15.51	13.42	14.00	13.63	13.33	13.51
Capital used in Agriculture (yen)															
Own capital:															
Land	5837	5758	5659	5863	5948	3067	3044	3156	2980	3037	417	522	508	526	600
Buildings	675	694	683	660	632	215	459	465	471	463	404	356	317	332	331
Agr. implements	194	187	185	157	202	183	183	180	177	184	141	144	143	144	156
Animals	90	105	105	129	150	72	93	96	107	134	62	70	70	61	93
Plants	272	266	281	301	278	158	174	166	177	181	135	124	120	124	128
Improvements in land	4	5	7	5	6	1	3	4	4	3	—	1	1	1	1
Materials	302	399	464	485	570	237	311	357	324	390	180	226	246	248	301
Total	7374	7414	7384	7640	7780	4233	4267	4424	4240	4398	1339	1443	1407	1456	1613
Borrowed capital:															
Land	319	298	229	230	240	2953	2834	2755	2912	3042	4960	4516	4807	4841	4715
Other	1	5	4	4	24	13	5	8	4	3	14	5	25	20	14
Total Borrowed	320	303	233	234	264	2966	2839	2763	2916	3045	4974	4921	4832	4861	4729
Own capital used in household	964	1000	938	934	983	705	729	739	721	773	586	597	575	599	590
Assets minus liabilities (debts excluded)	9222	9434	9400	9819	9931	4963	5016	5199	5105	5538	1897	2085	2081	2206	2360
Gross revenue from agriculture (yen)															
From Rice	464	613	648	732	809	482	653	724	744	819	491	653	711	738	817
Barley and wheat	47	84	91	122	121	55	85	106	131	130	48	81	90	113	116
Sericulture	138	131	154	152	117	104	119	135	136	122	80	81	91	91	70
Vegetables	59	74	77	99	117	85	89	80	93	98	74	100	99	123	112
Poultry	17	50	55	60	54	21	47	41	29	24	27	16	20	23	25
All others	126	195	225	273	387	123	199	219	256	326	130	156	167	197	225
Total	851	1147	1250	1438	1605	870	1192	1305	1389	1519	850	1087	1178	1287	1369
Sales of agricultural products (yen)															
Rice	266	344	408	429	476	179	249	320	281	331	121	141	176	178	209
Wheat and barley	29	53	56	70	92	29	51	72	84	91	25	44	56	65	84
Cocoons	136	131	154	152	116	103	119	135	136	122	80	81	91	91	70
Vegetables & fruits	45	61	62	100	117	75	94	77	90	107	59	91	93	118	107
Animal products	28	84	81	115	71	31	61	56	63	71	36	35	35	36	54
Mfr. & processing of agr. products	9	13	17	19	27	24	26	28	43	58	18	18	19	27	40
Other	52	70	76	78	93	38	72	82	78	84	51	58	58	68	71
Total sales	563	756	874	963	992	479	672	779	775	864	386	468	528	583	635
Business expenditure (relating only to agriculture) (yen)															
On animals	8	33	24	38	8	5	10	13	12	28	7	11	12	8	10
On fodder	24	50	55	62	54	25	49	48	51	38	35	30	32	33	33
Fertilizers	81	100	118	134	164	82	117	135	144	155	74	116	127	128	144
Rent	18	26	14	15	20	137	179	191	209	221	242	321	329	351	378
All other expenses	176	168	191	183	175	132	138	161	148	157	94	106	104	106	106
Total	307	377	402	432	421	381	493	548	564	599	452	584	604	626	671
Of which in money	292	324	357	383	366	221	294	338	335	358	202	254	269	270	239
in kind (rent)	16	22	12	13	17	128	167	178	192	206	222	303	311	329	356
Agricultural receipts (yen)	851	1147	1250	1438	1488	870	1192	1305	1389	1519	850	1087	1178	1287	1369
Receipts from subsidiary occupations	128	144	140	144	155	120	137	136	166	189	122	162	166	178	190
Household receipts	40	54	51	58	42	34	44	47	46	54	29	37	52	46	62
Total receipts	1019	1345	1441	1640	1685	1024	1373	1488	1601	1762	1001	1286	1396	1511	1621
Agricultural expenditures	307	382	402	432	421	381	490	548	564	599	452	584	604	626	671
Expenses of subsidiary occupations	10	10	10	14	16	12	6	6	14	12	11	19	15	20	12
Total expenditures	317	392	412	446	437	393	496	554	578	611	463	603	619	646	683
Net income from agriculture	554	765	849	1007	1067	489	702	757	826	920	397	503	574	661	698
Net income from subsidiary occupations	119	134	130	130	139	108	131	130	152	176	112	143	150	158	178
Net Domestic income	40	54	51	58	42	34	44	47	46	54	29	37	32	35	33
Total net income	703	954	1030	1194	1248	632	877	933	1024	1150	538	683	777	865	917
Total household expenditures:	632	794	841	893	938	558	695	772	771	867	487	627	676	695	768
Balance	71	160	189	301	310	74	182	161	253	283	51	56	101	170	169
Details of household expenditures (yen)															
Housing	27	31	27	28	28	22	25	23	23	23	20	20	18	21	
Food	334	357	396	427	427	330	354	374	412	412	321	348	356	387	
Light, fuel	37	38	37	48	48	33	34	33	40	40	29	30	32	35	
Clothing	76	86	84	95	95	67	74	69	83	83	51	58	62	80	
Utensils	24	26	31	33	33	21	24	20	21	21	15	21	15	20	
Total of above	498	538	575	631	631	473	511	519	579	579	436	477	483	543	
Education	22	19	20	21	21	11	12	14	20	20	10	9	13	15	
Culture	10	11	12	12	12	7	7	8	9	9	5	6	7	7	
Social intercourse	59	68	79	80	80	54	64	61	68	68	46	49	56	60	
Luxuries	34	35	39	37	37	29	31	30	34	34	25	27	28	28	
Amusements	5	6	6	7	7	3	5	3	7	7	4	4	3	4	
Health	40	44	43	42	42	29	38	41	56	56	22	23	29	33	
Marriages, funerals, etc.	70	64	60	58	58	43	51	46	40	40	39	39	27	31	
Various charges	15	17	14	14	14	11	12	11	10	10	8	8	8	7	
Interest on debts	12	8	7	8	8	11	11	9	11	11	11	9	8	7	
Others	29	31	38	35	35	24	30	29	33	33	21	23	24	33	
Total of above	295	302	318	314	314	222	260	252	288	288	191	199	212	225	
Grand total	794	841	893	945	945	695	772	771	867	867	627	676	695	768	

are distributed among all the members, the actual expenditure per person is less than one-half of a yen. It is only through such small expenditures, which are reflected in the budgets dealing with the principal items of household expenditures, (Table 55) that the meager incomes permit the majority of Japanese farmers to engage in farming.

In summary, agriculture is not a profitable enterprise for the majority of Japanese farmers, especially for tenants and part-tenants. The Bureau of Statistics of the Japanese Government was aware of this when it stated that the average tenant and part-tenant can count upon a surplus only when the area of his farm is larger than 4.5 acres. The very fact that by far the largest number of farmers till an area of less than 2.4 acres is clear evidence of the difficulty of Japanese agriculture as a business. Even the industry and thrift of the Japanese farmer cannot vitiate the fact that the income of a farm family is the product not only of output per acre but of the number of acres as well. In Japan the output per acre is very large compared to most western countries, but the acreage per farm is so small as to make the total income per family only a fraction of that in most western countries.

Farm Indebtedness

Closely related to the meager income and low standard of living are the debts shouldered by the Japanese farmers. Prior to World War I, the total farm debt was estimated at less than a billion yen.

Since then, the increased disparity between income and expenditure has led to a rapidly mounting indebtedness, variously estimated before 1937 at from 4 to 6 billion yen, or 800 to 1,000 yen per farm household. Most of the indebtedness is carried at high interest rates. A survey prepared by the Japanese Ministry of Agriculture of the amount of loans to farmers by various financial institutions showed that the Hypothec and Agricultural and Industrial Bank, established primarily to facilitate agrarian financing, accounted for only 14 percent of the total loans. On the other hand, private banks and money lenders accounted for 13 and 56 percent.

The average debt is sufficiently heavy even if carried at a 6 percent rate of interest, but such a rate is the exception rather than the rule. It was estimated officially that in 1932 nearly 43 percent of the debt was carried at rates ranging from 7 to 10 percent, 51 percent of the loans at a rate varying from 10 to 15 percent, and the remainder at a rate above 15 percent.

In reality, however, the rates are considerably above the official estimates. According to one observer, 57 percent of the farm loans have been advanced by private lenders at a nominal rate of 12 percent and a real rate of between 20 and 30 percent. Assuming that the rate on the total indebtedness was only 12 percent, the yearly charge was between 480,000,000 and 720,000,000 yen, or 25 to 38 percent of the average net yearly farm income during the 1931-35 period.

Taxation

To the other direct and indirect charges upon Japanese agriculture must be added taxation that weighs more heavily on land than on trade and industry. Detailed information on farm taxation in Japan is not available to the writer; on the other hand, the evidence at his disposal indicates that until very recently - and it is not altogether clear whether the condition is not true to this day - farmers paid more in taxes in proportion to their income than the more prosperous manufacturers and traders.

In the last decades of the 19th century, when Japan embarked on a policy of industrialization, most of the cost was paid by taxing agriculture. In feudal times this was epitomized in the saying: "The peasant is like a sesamum; the more you squeeze, the more you get." In modern times the process of exacting taxes from the farmer has been regularized and given legal forms, but they are still the "beasts of burden." Hence the observation of a Japanese, writing on his country's agrarian problems: "The all-round progress from the feudal regime to the modern capitalistic system was achieved at the expense of farmers. The land tax, customs tax, consumption tax and local taxes were levied, whether intentionally or otherwise, as a means of facilitating this policy."

An investigation carried out by the Japanese Government in 1929 (Table 56) shows that the farmers carried a proportionately heavier tax burden. The data, based on the returns of 120 farm landowners and 100 business proprietors show that the per capita

taxes on the farmers were approximately twice as large as those levied upon the latter. In recent years the government has been trying to lessen the inequality in the incidence of taxation, by reducing the land tax. With that view in mind a new Land Tax Law was enacted under which the tax is assessed on the basis of the rental value of land, instead of the absolute value of land, on which the land tax was formerly assessed. As the new rental values were determined on the basis of the depreciated price of rice, they have been fixed at a rate of almost 20 percent lower than the old rental values. Consequently, the landtax for the fiscal year 1938-39, when the new rental values came into force, amounted to 55 million yen as against 69 million yen in the previous year.

Table 56.- Relative Burden of Direct Taxes on Land-Owners and Business proprietors in Japan, - 1929

Annual income in Yen	Per-capita taxes					
	Paid by farm land-owners			Paid by business proprietors		
	Total	National	Local	Total	National	Local
Yen	Yen	Yen	Yen	Yen	Yen	Yen
1,200	270	68	202	126	44	82
2,000	530	144	286	230	88	142
3,000	874	259	615	366	157	207
5,000	1,395	457	938	701	316	385
10,000	3,485	1,187	2,298	1,603	814	799
30,000	12,097	4,956	7,141	6,819	3,737	3,081
100,000	53,225	22,168	31,057	30,058	17,883	12,175

Ouchi, Hiroye, Tax Burden on Salaried Men and Farmers as Revealed by the Official Survey of Their Livings, XIX Session de l'Institut International de Statistique, Tokyo, 1930, p. 9. Cited in Harold J. Moulton's Japan, Washington, D. C., Brookings Institution, 1931, p.341.

It is important to note, however, that so far as the farmers are concerned, the real burden stems from local taxes rather than from the land tax, which is a national tax. There is no indication that any reductions have taken place along this line; on the contrary, many taxes were increased and new taxes were levied since Japan invaded China and particularly since the attack upon the Western Powers.

Cooperatives

The brighter side of Japan's agricultural economy is in the widespread development of the cooperative movement which, beginning with the turn of the century, has been sponsored and financially aided by the Government. The main functions of the cooperative societies are confined to providing credit, making sales and purchases, and the joint utilization of warehouses, milling establishments, farm machinery, and workshops. Almost half of the cooperatives combine all the mentioned activities.

From an initial establishment of 21 cooperatives in 1900, the number grew to 15,232, with a membership of 6,766,479 in 1939. The cooperatives serve predominantly the needs of the farmers. The latter represent 70 percent of the total membership, while the percentage of farmers affiliated with the cooperatives was 72.4 (1935) of all farm families.

Table 57 - Cooperative movement in Japan, 1934-39

	1934	1935	1936	1937	1938	1939
Total number of cooperatives	14,815	15,028	15,460	14,512	15,328	15,232
Total membership (in 1,000)	5,238	5,506	5,795	6,127	6,206	6,766
Farm membership Number (in 1,000)	3,874	4,061	-	-	-	-
Percent of total	70.3	70.0	-	-	-	-
Total number of farm families (in 1,000)	5,617	5,611	5,597	5,575	5,519	5,492
Percent farm families are members of cooperatives	69.0	72.4	-	-	-	-
Number of cooperatives engaged in credit, selling, purchasing and utilization	7,206	8,430	9,831	10,362	11,671	11,839
Changes in volume of business as indicated by Deposits of credit societies (in million yen)	1,179	1,268	1,378	-	1,748	2,208
Value of products sold (in million yen)	261	313	377	478	599	746
Value of products purchased (in million yen)	156	197	249	282	354	433

Office of Foreign Agricultural Relations, Korinsho Toketshyo, 1939

The movement has been playing an increasingly important role in Japan's farm economy, primarily by virtue of advancement of loans, joint sales of agricultural products, and joint purchases of products the farmers need. Within the period 1920-1934 sales of rice increased ninefold. The same is true of wheat and to a lesser extent of cocoons. In 1934, 28 percent of all marketed rice, 27 percent of the wheat and 12 percent of the cocoons were sold through the cooperatives. In 1939 nearly a third of the rice was sold through the cooperatives. On the purchasing side, the main efforts of the cooperatives are concentrated on the purchase of fertilizers; in 1934 they were responsible for one-third of the volume of fertilizers purchased by the farmers. Joint purchasing and selling through cooperatives is proving of special importance to the smaller farm owners and tenants. Formerly practically all such transactions were in the hands of middlemen who, knowing the farmers' urgent need for funds, often took unfair advantage of them. Such practices are on the decline now in the Japanese villages.

The cooperative credit societies extend loans for productive purposes such as the purchase of land and agricultural machinery. Until recently, about 70 percent of the loans were granted without security, but on the basis of a minute examination of the financial, moral and political standing of the borrower. Of late there has been a reversal of this policy; the tendency is to grant loans only against some tangible form of property. The rate of interest is rather high, ranging as it does from 8 to 12 percent per annum. There is little difference between these rates and those charged by commercial banks. They generally do not relieve the rural population of the necessity of securing loans from private individuals at usurious rates. This is especially true in

the case of the poorer peasants. In the light of these facts, it is apparent why rural indebtedness to the cooperative credit societies comprises only from 10 to 15 percent of the total farm debt.

The cooperative movement has benefited Japan's agricultural economy, but the benefits are not evenly distributed. The more prosperous sections have profited most. Pre-war plans for increasing the importance of the cooperative movement in the Japanese village might not have been without its positive effects on the well-being of the least prosperous groups. But the widely held view, particularly in official circles, that the very solution of Japanese agricultural problems is closely tied up with the cooperative movement, is exaggerated; it can and it has alleviated certain burdens, but agricultural cooperatives are in no position to remove these problems altogether.

AGRICULTURAL POLICIES

Japanese agriculture has developed under the watchful eye and active guidance of the Government. This has called for certain policies, and a statement concerning their nature will help to explain the two striking attributes of the country's agricultural economy: large output per unit of land on the one hand, and a practically unchanged rural social structure on the other.

The Basic Principle

With the opening of Japan to the West, the country, like England in the early nineteenth century, was confronted with the following issue: either to promote industry and sacrifice agriculture or to promote agriculture and sacrifice industry. But unlike Great Britain,

Japan chose to sacrifice industry. Japan felt that the country must attain a maximum self-sufficiency in food supplies and become industrialized at the same time in order to give employment to the growing population. In actual practice, this has meant rapid industrialization largely at the expense of agriculture. The farmers were called upon to provide the industrial segment of the country with cheap food, thereby keeping real wages down and thus favoring exports. This in turn stimulated further industrial expansion.

Technical Aid; Its Limitations

Augmented farm production at low cost being the main task assigned to the farmers, the Government spared no efforts to attain that end. It has successfully promoted measures for the increase in yields. It has established and financed experimental stations, where improvements in the fertilization of the land, the selection of seed, and the development of new varieties first took place and subsequently applied with telling results. This was, in the words of a student of Japan's economy, "a chemical and botanical revolution," fostered by the Government. With the aid of better means of transportation, the scientific achievements have led to the partial passing of local self-sufficiency and changed some of Japanese agriculture from subsistence to cash-crop farming.

Since governmental policies concerned themselves mainly with technical improvement of farming, the revolution was limited in scope. It was superimposed on a mediaeval and feudal social structure. Its meaning to the average farmer has been indicated elsewhere. But it is significant that for a long time the Government paid little or no attention to the welfare of the farmer and his problems. Only early in the

1930's did it really become aware that something was amiss in the farm village and that remedial policies were in order. The nature of those policies is described in the subsequent pages, but it should be noted at the outset that they dealt mostly with depression phenomena; for all practical purposes, they evaded any basic change in the economic and social conditions in the village.

Political Unrest and Change in Policies

Prior to 1930 Japan's agricultural problems failed to attract serious official attention, one of the important reasons being the farmers' inability to express their grievances in an articulate manner and their failure to secure the support of the country's dominant political groups. But when, among other causes, that of the farmer also was taken up by the military, the agrarian problem, to quote ex-Premier Saito, immediately "caught fire." In the attempted assassination of Premier Hamaguchi on November 14, 1930, resulting in his death a few months later, rural discontent played no small part. The motives behind the subsequent bewildering series of assassinations of Japan's leading political and industrial figures* were tinged by a combination of military and agrarian interests.

Under the impact of these events, agricultural reform became the watchword of every important group. The army wanted a contented and peaceful village, not only because of the close ties binding the two, but also because, as General Araki put it, "the agricultural population constitutes Japan's first line of defense." The manufacturing interests

*Minister of Finance, Inouye, was murdered on February 9, 1932, the managing director of the vast Mitsui interests, Dan, on March 5, 1932, and Premier of Japan, Inukai, on May 15, 1932.

also realized that they too were suffering as a result of the sharp decline in the farmer's purchasing power and therefore approved of agricultural reform the more so because they wanted to dispel the belief that industrial progress had been achieved at the expense of agriculture.

Numerous programs, therefore, were drawn up to ease the farmers' lot. These plans called for such fundamental reforms as the re-adjustment of farm prices, equalization of the tax burden, reduction of farm indebtedness and land tenancy, control of fertilizer prices, and crop insurance.

Price Stabilization

The conditions under which farmers worked and lived gradually had been undermining Japan's agricultural economy for many years prior to the depression of the late 1920's and 1930's, but the full significance of the fundamentally adverse factors was not revealed, chiefly because of the relatively high prices of the two staple products, rice and silk.

The first sign of a downward trend was noted in 1926; by 1929 the price of rice had declined 30 percent and that of cocoons 37 percent, with a similar decline noticeable in the prices of other products. In 1939 the total value of agricultural output declined to 3.5 billion yen as against an annual average of 4.6 billion yen during the period 1919-1928. But the real slump came in 1930 and 1931, particularly during the latter year, when the output was valued at only 2.2 billion yen, or less than 50 percent of the 1919-1928 average. The price disparity between manufactured and agricultural products aggravated rural economic conditions.

The decline in the prices of goods and services purchased by the farmers was less marked than the decline in farm prices, and in the all-important case of fertilizers prices were actually rising. In an attempt to stabilize agricultural prices the Government devoted its attention particularly to rice, silk and fertilizers.

Rice - The decline in rice prices is closely related to the competition of cheaper rice grown in Korea and Formosa. Imports from these colonies have been increasing steadily. Even during the years of depression the takings of colonial rice showed a marked increase from 38 million bushels in 1929 to 55 million bushels in 1930 and 72 million bushels in 1933.

The volume of colonial rice reaching Japan indicates that the Government policy, inaugurated in 1920 with a view to making Chosen and Taiwan a source of food supply for Japan Proper, has proved successful. Japan Proper, which once enjoyed a monopolistic price due to its exclusive taste, began to lose its advantage to the colonial rice. Colonial rice is produced at lower cost than Japanese. In 1931 the cost of producing one koku of rice in Chosen was estimated at 16.37 yen. It is believed that this figure has changed but little since then. Investigations carried on by the Japanese Department of Agriculture show that in 1932 and 1933 the cost of producing one koku of rice in Japan was 20.86 and 22.15 yen respectively. Hence there is the estimated price disparity of almost 5 yen in favor of colonial rice.

On account of its lower cost of production, colonial rice tended to depress the general price level of the commodity and usually drove

the home-grown rice into a difficult position, particularly whenever prices advanced in Japan. The farmers of Chosen and Taiwan use cheap foreign rice or millet and ship a great deal of their own rice into Japan Proper. Yet, because of close political ties between the colonies and Japan, the existing tariff and other restrictions imposed on foreign rice entering Japan did not apply to the imports of colonial rice. The result was that, though assuring Japan of adequate supplies, imports of rice from Korea and Formosa added greatly to the very complicated problem of regulating the price of rice, a problem with which the Japanese Government has been concerned for many years.

In order to regulate the price of rice, government policies were directed toward stabilization, maintaining prices at a level that would reconcile producer-consumer differences, with an edge in favor of the producer. The origin of this policy goes back to post-First World War days, but its basic principles were definitely formulated in a law enacted on March 29, 1933. The Government was thereby authorized to fix each year a minimum and maximum price at which it would buy or sell rice in order to maintain the market price between the two fixed levels. The minimum was to be based on cost of producing, the maximum on the cost of living. To carry out the main provisions of the law, the Government established a special rice fund of 800 million yen, which could be increased to a total of 1,150 million.

This law, which proved to be a financial burden on the Government, was modified by the Autonomous Rice Control Law of 1936. In accordance with the provisions of the latter, farmers were to be organized in local and federal Rice Control Associations with a view to storing their surplus

of rice. The Department of Agriculture was authorized to grant special bounties to cover storage expenses and to make loans at a low rate of interest against the stored supplies. The surplus was to be held until such time as the current market price should rise above the minimum official price.

Efforts to assist the farmers through price control were only partly successful, despite the more than 200-million yen loss sustained by the Government in the course of the operation of the rice laws. It may be argued, of course, that without government aid prices would have declined below prevailing levels; but from the producers' point of view, prices on many occasions were not sufficient to cover costs of production, much less provide a margin of profit.

Silk - The minimum price of rice guaranteed to producers did not satisfy them, yet they were assured of a certain income. A similar situation did not exist in the case of cocoons. Government attempts to aid cocoon raisers consisted chiefly of measures to improve quality and reduce costs of production. In the middle of the 1930's sales of cocoons were placed under Government supervision, with the stipulation that the quality of the product offered for sale must meet with official approval.

On occasions, as in 1930 and 1931, farmers engaged in sericulture have secured loans from the Government, amounting to 120 million yen. While intended as a relief measure, the Government utilized these loans as a means for controlling production. But the reduction in output was ineffective as a method of raising the price of cocoons because of a lagging demand for silk. Since prices of cocoons are governed by

prices of raw silk, the Government then promulgated numerous measures to increase silk prices. These measures included such devices as loans, subsidies, purchases of surplus silk, and restrictions on silk output and sales. Yet, judging by price movements, all such measures to aid the farmer by raising cocoon and silk prices failed. The prosperity of Japanese sericulturists depended upon the rising curve of economic activities in the United States rather than upon any other factor.

Generally speaking, the advance in all agricultural prices became pronounced from 1935 on. The estimated value of 1939 agricultural production (5.5 billion yen) was 22 percent greater than the 1919-1928 average. But here, too, the rise in farm prices lagged considerably behind those of manufactured articles. Furthermore, whereas devaluation of currency, low wages and a highly nationalized industrial organization have given Japanese exports an important price advantage in foreign markets, there has been no such escape for agriculture. It has benefited only indirectly, and to a small degree, from the expansion of manufacturing and trade, because the exports which have risen rapidly are cotton goods, rayon, and a variety of miscellaneous manufactured articles for which raw materials must be imported.

Perhaps the greatest recovery in farm prices coincided with the war waged by Japan against China, but some question exists as to whether the latter event was a boon for Japanese agriculture. The demand for farm products has been stimulated, but many farmers, having no surpluses to throw on the market, have not been able to reap the benefits of higher prices. In addition, the war deprived many farmers of their

principal workers, absorbed considerable numbers of livestock, and utilized so much fertilizer that the farmers have been experiencing difficulty in obtaining a sufficient volume for their own use.

In spite of these considerations, the advantages of rising farm prices need not be underestimated. Prices recovered sufficiently to lessen the acuteness of some of the problems resulting from the depression and war; they failed, however, to solve the basic difficulties which handicap Japan's agricultural economy.

Fertilizers - Aside from the attempts to aid agriculture through various schemes of price stabilization of the principal crops, the Government concerned itself also with the problem of lowering costs of production. To achieve this, emphasis was placed upon less costly supplies of artificial fertilizers. Because of the monopolistic character of the industry, fertilizer prices were rigidly maintained even during the years of severest depression, although farm prices were at record low levels.

The complaints of farmers against price disparity became so vociferous that on May 18, 1936, a law was enacted to correct the situation. The association of fertilizer manufacturers created by this law was prohibited from controlling production, determining sales policies or fixing prices of the product without Government approval.

Whether the Japanese farmers ultimately would have been able to secure fertilizers at reduced prices is a moot question; meanwhile, wholesale prices of fertilizers have been higher since the enactment of the law. The Japanese invasion of China increased the demands