



General information

- GNI per capita PPP\$, 2000: 27,080
- Internal renewable water resources: 547 km³
- Main food consumed:
- Rice consumption, 1999: 59.9 kg milled rice per person per year

Production season

	Planting	Harvesting
Main season, North	May-Jun	Aug-Sep
Main season, Central	Apr-May	Aug-Oct
Main season, South	Apr-May	Sep-Nov

The Japanese islands are located between 20° and 45° N latitude and 123° and 146° E longitude. They lie off the eastern coast of Asia, roughly in a crescent shape. The country consists of four main islands with about 4,000 smaller ones. The northern limit of rice cultivation is 44° N. Rice is grown up to 1,400 m altitude in the central region of the main island.

Japan is in AEZ 8, characterized as cool subtropics with summer rainfall. The climate is humid temperate and oceanic with four distinct seasons. Rainfall during the rainy season in June and July is indispensable to rice cultivation. Temperature and solar radiation from April to October are ideal for rice growing.

The population in 1999 was about 127 million. While 21% of the population now lives in rural areas, the agricultural population has declined from about 29 million in 1960 to just 5 million today because of diversification of the economy. Population growth is just 0.2% per annum.

The changing role of rice cultivation in Japan*

Rice cultivation in Japan, which dates back more than 2,000 years, was introduced from China in the late Jomon era. From that time until the present, rice farming has exerted a considerable influence on the social structure and culture of the

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country. This is because rice has ever since been the staple food for people in Japan, and it has been the mainstay of Japanese agriculture.

Recently, rice cultivation in Japan has been besieged with a host of problems both within the country and overseas for the following reasons: (1) rice farming is being increasingly considered as a part-time occupation, (2) the rural population is getting older, (3) the scale of operations is too small, (4) the gap between the price of rice in Japan and abroad is increasing, and (5) there is a pressing call for the liberation of the market.

In addition, since the productive capacity of the paddy fields in Japan exceeds the demand for rice, the conversion of paddy fields for the cultivation of other crops has become inevitable. Therefore, the Ministry of Agriculture, Forestry and Fisheries has enacted a policy of wider use of paddy fields in agriculture with a view to increasing the productivity of both paddy rice and other crops, on the basis of the alternative use of fields.

“The paddy fields save the world,” as the saying goes. Indeed, under the natural environmental conditions prevailing in Japan, including abundant precipitation of 1,600–1,700 mm per year and steep slopes, the role of reservoirs played by the paddy fields is equivalent to that of a dam with a capacity of 5.1 billion tonnes. In addition, the contribution of paddy fields to land conservation and water purification as well as to the welfare of the population is quite remarkable.

Based on the various inherited circumstances of rice cultivation, Japan was able to raise rice yield by 250% during the past 100 years, in spite of suboptimal solar intensity. The conditions that resulted in such marvelous achievements were (1) the narrow and highly populated country, which demanded highly labor-intensive farming, (2) the respectful and “religious” attitude of the Japanese for rice, and the fact that they had been longing for an abundance of rice, which had never been achieved before, (3) carefully maintained watersheds—hills and mountains covered with trees and grasses—as the sources of irrigation water, (4) well-developed canals, irrigation systems, and water reservoirs covering most of the rice lands throughout the country, and (5) farmers who were industrious and well prepared for new technologies.

From the Meiji Restoration to the end of World War II, rice cultivation in Japan began to experience initial but substantial changes in fertilizer use and mechanization. These changes led to modernization in the next period: changes

from self-supplied manure to purchased fertilizers with higher nitrogen content and other elements and from high inputs of manual labor in tillage, weeding, threshing, and so on to the use of more labor-saving tools and machinery. Such changes affected the characteristics of rice cultivars, resulting in adoption of those more adapted to higher soil fertility or with better resistance to shattering. Together with the pursuit of higher yields, a tendency also appeared for favoring better grain quality, although that ceased temporarily with the outbreak of World War II.

As a result of these improvements, the national average yield increased from about 2.0 t/ha in 1890–1900 to 2.0–2.5 t/ha in the late 1900s, and to 2.5–3.0 t/ha in 1910–20, while the labor needed in rice cultivation decreased from 300 days/ha in 1910–20 to 200 days in the early 1940s.

The progress made in various sectors during the 50 years following World War II was so rapid and revolutionary that Japan attained self-sufficiency in rice in the 1970s. Developments were especially remarkable in breeding for cold tolerance and yield; in controlling diseases, pests, and weeds by means of chemicals; and in mechanization of such arduous tasks as tilling, transplanting, applying fertilizers and other chemicals, harvesting, and threshing/drying. During this period, rice yields increased from about 3.3 to 5.0 t/ha and labor required decreased from 2,200 to 500 hours per hectare. This labor efficiency allowed farmers to leave villages to work in urban industries, causing the average age in rural areas to increase rapidly. Mechanization was required not only in farming but also in various urban industries, and its success resulted in the emigration of workers in their prime of life to urban areas, leaving villages to their wives and to the elderly. However, this tendency is not particular to Japan; it is becoming common also in other rice-growing countries.

As the relative value of the rice industry in the national economy declines, new environmental problems are arising. One example is the abandoned fields in hilly/mountainous areas. Lowland forests, an important source of irrigation water and manure, are also being neglected and sometimes make floods more serious instead of containing them. The pursuit of economic efficiency with minimal sacrifice of natural resources and the provision of favorable environments should be our main goal as a legacy for our descendants.

Although more than 200 leading varieties of nonglutinous rice are cultivated on about 1.8

million ha in Japan, the top ten varieties now occupy about 80% of the cultivated rice area. The major variety, Koshihikari, is grown on more than one-third of the total rice area. The demand in Japan for rice with good eating quality continues to increase.

Recent developments in the rice sector

Agriculture contributes about 3% to GDP. Rice is the most important crop, accounting for 54% of crop area harvested. Because potential rice production now exceeds the demand for rice, the government has encouraged crop diversification. While rice accounted for 47% of calories and 28% of protein in the early 1960s, those shares have declined to just 23% and 12% today. Wheat currently accounts for about 13% of caloric intake and 11% of protein.

Japan is largely self-sufficient in rice, but Japanese consumers today face extremely high rice prices compared with those on the world market. These high prices have made other rice producers eager to compete in this market, but trade restrictions made this impossible until recently. Under the auspices of the World Trade Organization (WTO), Japan now provides market access to imported rice equal to 7–8% of base-period (1986–88) consumption. About 85% of wheat consumption is imported.

Rice environments

Rice ecosystems in Japan occur across a wide range of latitudes, including the subtropical, temperate, and subfrigid zones. Almost all rice is grown under irrigated conditions in the summer. Most rice fields are on the plains of the major river basins. Many rice fields are also found in terraces and valleys.

Rice cultivation in the higher latitudes is a distinguishing characteristic of Japanese rice culture. To cope with cold weather in the northern part of Japan, early maturing varieties resistant to cold weather were developed. Rice growing in the cold area is characterized by the use of good-quality older seedlings for early transplanting, deepwater irrigation to protect the crop from low night temperature, windbreak nets, and the application of organic matter to improve soil fertility.

Production constraints

Rice is occasionally damaged by drought, but the injury is not so serious in irrigated fields. Cold damage experienced in summer is serious in some years in northern Japan. Usually, incidence of rice

blast disease is severe in cool summer weather. Heavy rainfall at the end of the rainy season causes local flooding. Rice is sometimes damaged by typhoons, especially in the southern regions. Early season culture has been established to avoid typhoons in southwestern Japan.

Because potential rice production exceeds rice consumption, it is important to find multiple uses for rice fields. However, many rice fields do not have separate irrigation and drainage systems, and this is an important constraint to the use of rice fields for other purposes.

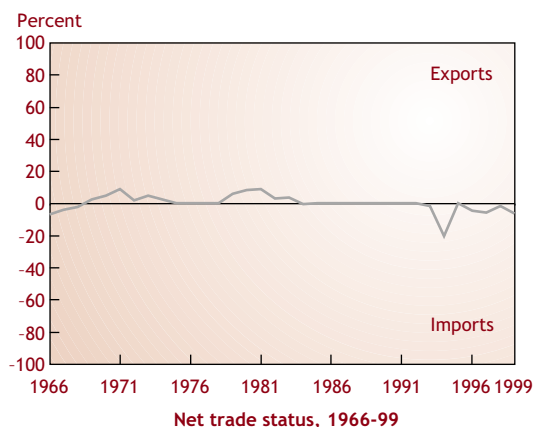
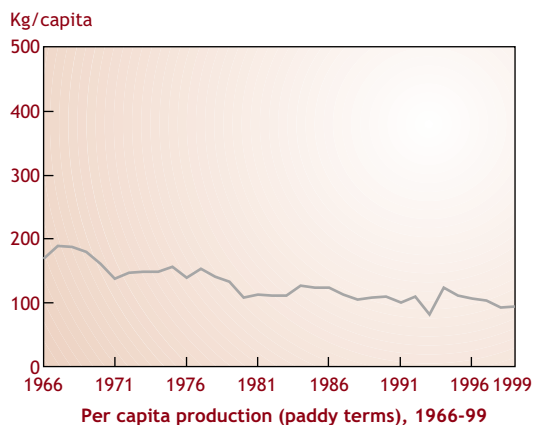
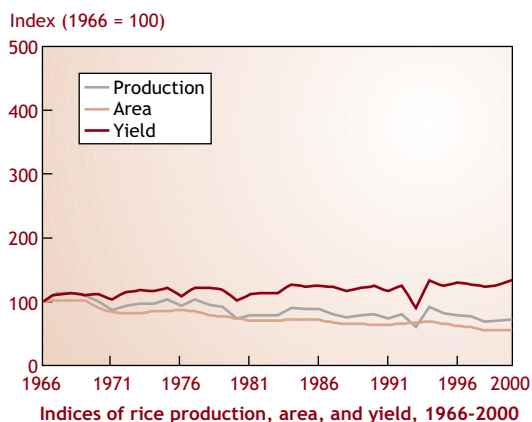
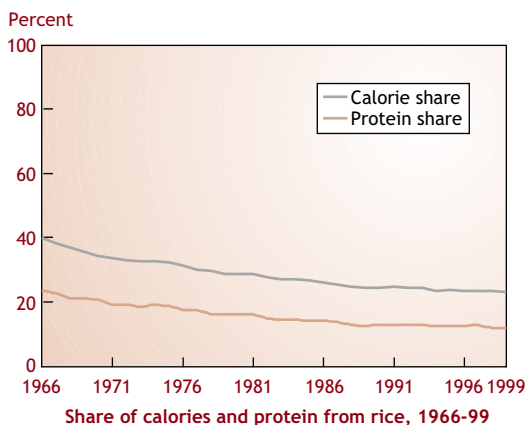
In spite of substantial farm subsidies and price support provided by the government, rice farming cannot compete with other economic activities, and income from it is lower than nonagricultural earnings. Farming operations have been fully mechanized. Nearly all rice seedlings are transplanted using mechanical transplanters. Despite this mechanization, production costs are many times higher than in tropical Asia because of exorbitant land prices and the high opportunity cost of farm labor. Young people are not interested in rice cultivation, which today is carried out mainly by older people. Many Japanese consumers now want environment-friendly rice grown without heavy use of agrochemicals. Some farmers have started producing rice through organic farming to meet this demand.

Production opportunities

Rice research is conducted in research institutes and experiment stations affiliated with prefectural governments as well as with the Ministry of Agriculture, Forestry, and Fisheries (MAFF). [The rice genome research program (RGP), begun in 1991, aims to establish a comprehensive DNA map of rice. Its eventual goal is to isolate genes with useful agronomic traits and use them for human welfare. The RGP is funded by MAFF and the Japan Racing Association.]

As some of the problems encountered in Japan are shared by other Asian countries, cooperation with IRRI is often essential for their solution. Japanese rice research will also help solve problems in neighboring low-income rice-growing countries of South and Southeast Asia.

Reduced production cost, increased productivity through the application of advanced technology, and multipurpose use of rice fields in agriculture are important for sustaining rice cultivation in Japan.



Basic statistics, Japan

	1985	1990	1995	1998	1999	2000
<i>Rice</i>						
Area harvested (ha)	2,342,000	2,074,000	2,118,000	1,801,000	1,788,000	1,770,000
Yield (t/ha)	6.2	6.3	6.3	6.2	6.4	6.7
Production (t)	14,578,000	13,124,000	13,435,000	11,200,000	11,468,800	11,863,000
Rice imports (t)	19,606	18,333	28,971	499,383	664,227	na
Paddy imports (t)	na	na	na	na	na	na
Rice exports (t)	142	16	12,568	358,178	143,953	na
Paddy exports (t)	1	0	1	na	na	na
<i>Others</i>						
Population, total ($\times 10^3$)	120,837	123,537	125,472	126,281	126,505	na
Population, agriculture ($\times 10^3$)	10,486	8,893	6,736	5,685	5,371	na
Agricultural area ($\times 10^3$ ha)	5,879	5,743	5,538	5,405	na	na
Irrigated agricultural area ($\times 10^3$ ha)	2,952	2,846	2,745	2,679	na	na
Total fertilizer consumption (t)	2,034,000	1,839,000	1,641,200	1,420,000	na	na
Tractors used in agric. (no.)	1,853,600	2,142,210	2,123,000	2,210,000	na	na

Source: FAOSTAT online database.