

Third Edition

Rice Almanac

Source Book for the Most Important
Economic Activity on Earth

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IRRI



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Cover photo: Rice terraces in eastern Bhutan (Gene Hettel).

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General information

- Internal renewable water resources: 1,802 km³
- Main food consumed: rice, oil and fat, pulses, sugar and honey, nuts
- Rice consumption, 1999: 210.6 kg milled rice per person per year

Production season

	Planting	Harvesting
Main season	Jun-Aug	Nov-Jan
Dry season	Nov-Dec	Apr-May

Myanmar is the largest country of the Southeast Asian mainland. It lies between 10° and 29° N latitude and 92° and 101° E longitude. Myanmar has a common boundary with Bangladesh, India, China, Lao PDR, and Thailand. There are six distinct regions: the western, northern, and eastern mountain ranges; the delta area of the Ayeyarwady and Sittoung rivers; the coastal strips; and the central plain or dry zone. The land area is about 66 million ha, of which only 9.6 million ha are under cultivation for annual crops. There is a large potential for reclamation of substantial arable land.

Myanmar is largely in AEZ 2, characterized as warm subhumid tropics. The southern coast, where most of the rice is grown, however, is

under AEZ 3, humid tropics. Generally, the country receives rain from the southwest monsoon, which normally starts in May and ends in October. Being on the windward side, coastal strips and deltaic regions receive heavy rains, ranging from 2,560 to 6,150 mm annually. The leeward central plain or dry zone receives lower and erratic rainfall, ranging from 700 to 1,200 mm annually.

About 72% of the 45 million population in 1999 lived in rural areas and most of the people were engaged in agriculture. The population grew at 1.2%/year during the 1990s. About 70% of the rural labor force (26.3 million) is employed in agriculture. The agricultural labor force grew by 18% during the 1990s compared with 23% for the total labor force.

Recent developments in the rice sector

Myanmar has a predominantly agricultural economy based on rice production. The agricultural sector, including livestock and fisheries, accounts for 53% of the country's GDP. Rice is the single most important crop, grown on 6.0 million ha or about two-thirds of the country's total cultivated area. Rice production employs 40% of the total labor force and consumes 70% of total commercial fertilizers. Rice maintains its position as the main staple food crop, accounting for 97% of total food grain production. The importance of rice as a major foreign exchange earner, however, has declined over time. Before World War II, Myanmar was the largest rice-exporting country in the world. However, because of stagnation of production since the early 1960s, Thailand took the place of Myanmar in the export market, as exports declined from 1.7 million t in 1962 to 0.3 million t in 1975. Annual exports had fluctuated from 0.5 to 0.9 million t during 1976-86, a period of respectable growth in rice production. Exports in recent years have fallen below 100,000 t. Myanmar has the capacity to substantially increase rice exports, but it is constrained by poor grain quality, inadequate processing and marketing infrastructure, and an underdeveloped trading system.

To meet the increasing demand for rice and to sustain exports, Myanmar embarked on a program to increase rice production through area expansion, yield increase, and crop intensification in the early 1990s. The area under rice increased from 4.8 to 6.0 million ha during 1990-94, which raised annual rice production from 14.0 to 17.9 million t within a 4-yr period. But the growth in production could not be sustained. Rice yield increased from 3.17 t/ha in 1994 to 3.33 t/ha in 2000.

Rice environments

The rice ecosystems of Myanmar include irrigated lowland, rainfed lowland (including late-sown and Mayin area), deepwater, and upland. Late-sown rainfed lowland is the area sown during the monsoon period; Mayin area can be transplanted only after the monsoon when floodwater recedes. The rainfed lowland area is by far the largest, accounting for 52% of total rice land. Irrigated lowland accounts for about 18%. Deepwater rice is planted on about 24% of rice land; upland rice makes up only about 6%. The

area under dry-season irrigated rice has been growing in recent years with the spread of small-scale irrigation through low-lift power pumps.

Rainfed lowland and deepwater rice are confined to the delta region and coastal strip of Rakhine State. Irrigated lowlands are mainly in Mandalay, Sagaing, and Bago divisions. The upland area is mostly in Mandalay, Sagaing, and Shan states. Some upland area in Shan State occupies sloping land and is exposed to low temperatures starting in November.

Production constraints

Problems in rainfed lowland production include inadequate labor for transplanting, inadequate supply and high cost of fertilizer, and flooding in low areas. Farmers who practice wet seeding face problems of insect pests, poor crop establishment, and weeds in upper fields. Modern varieties are cultivated widely with very little application of chemical fertilizers, contributing to a decline in soil fertility.

In the upland areas at Aungban and Kyaukme (hilly regions), problems are weeds, insect pests (stem borer and white grub), low soil fertility, soil erosion, poor crop establishment, drought, and reduced fallow period.

Problems encountered in deepwater rice are unfavorable water conditions, weeds (particularly wild rice), soil physical problems, and pests (stem borer and white grub). The high cost of labor, declining rice yield, excess water, and low soil fertility are the main problems in irrigated rice ecosystems.

In the hilly region, the problems are mainly related to infrastructure—lack of good roads for transporting rice, and, in the main rice-growing areas, inadequate storage and postharvest facilities, which lower grain quality, particularly for export. The high cost of imported fertilizers and low rice prices have reduced fertilizer consumption and are considered the major constraint to the growth of rice production in Myanmar.

Production opportunities

Significant yield increases were recorded during 1977-82, from 1.95 to 3.15 t/ha. Several factors explain this impressive performance. Foremost is the introduction of high-yielding modern varieties (MVs) and technologies developed at the Central Agricultural Research Institute. Fifty MVs were



Women farmers harvesting rice in Myanmar.

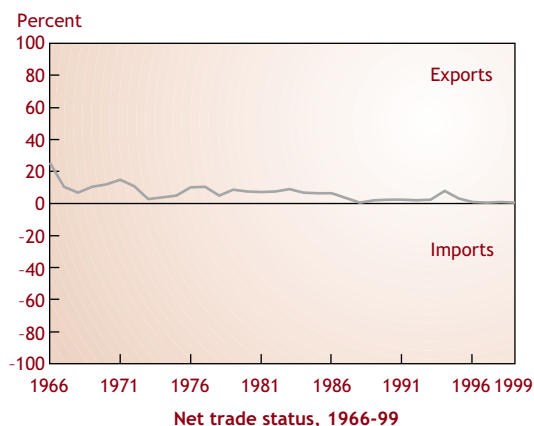
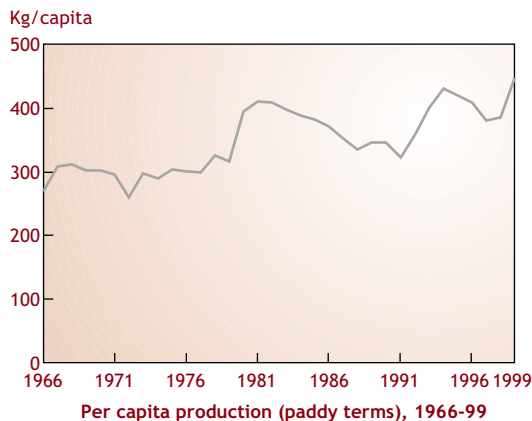
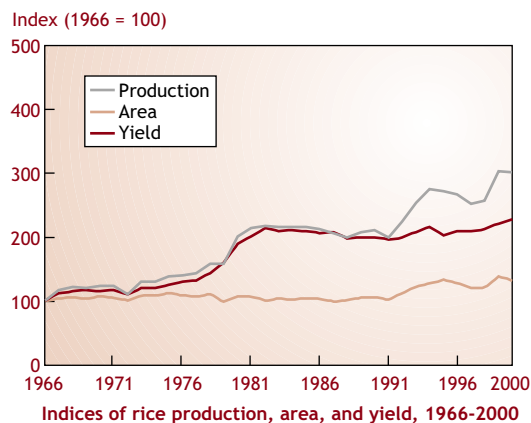
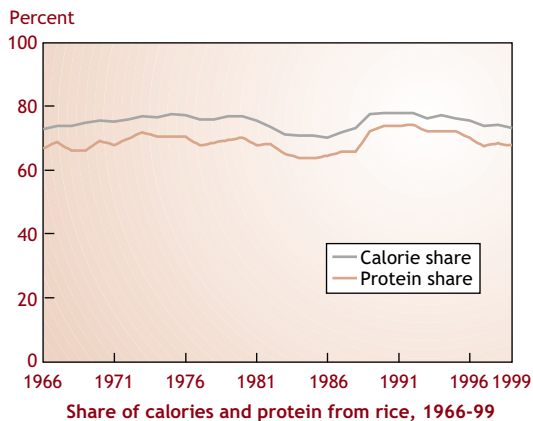
released in Myanmar from 1966 to 1990. Of these, 11 were produced by Myanmar scientists using selected genetic materials from the International Network for Genetic Evaluation of Rice (INGER), and from local rice germplasm collections. The rest were direct selections from INGER nurseries tested in Myanmar. Increased plant densities and increased fertilizer usage, particularly for MVs, also had a significant effect on production. However, yield has fluctuated around 3.0 to 3.3 t/ha since 1983 mainly because of the inadequate supply of chemical fertilizers.

To overcome the labor shortage, farmers practice the wet-seeding method of crop establishment, do late transplanting using overaged seedlings, exchange labor, and grow cash crops. They substitute gypsum and farmyard manure for expensive fertilizers, fertilize

selectively, and wet-seed the crop or change cultivars.

Choosing suitable cultivars and constructing fishponds are the solutions to the problem of excess water in lower areas. To control soil erosion, farmers construct erosion-control structures above fields and drainage and diversion canals around fields.

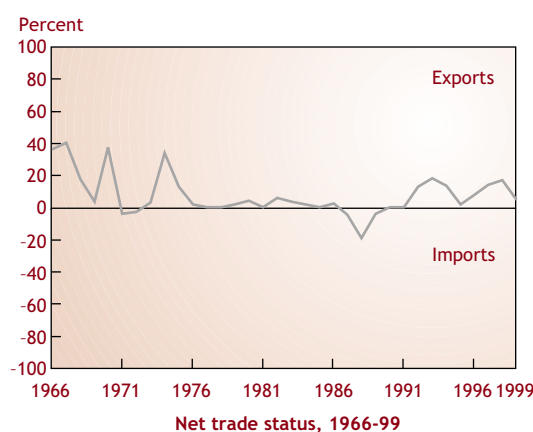
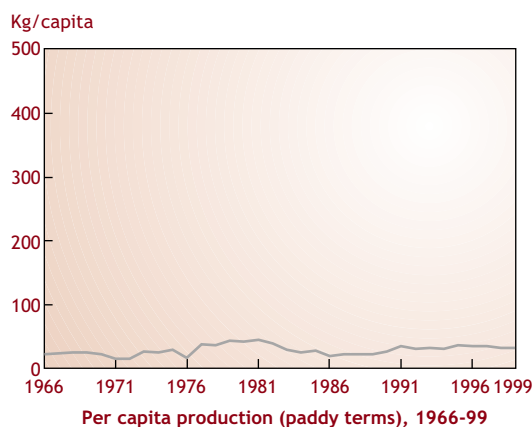
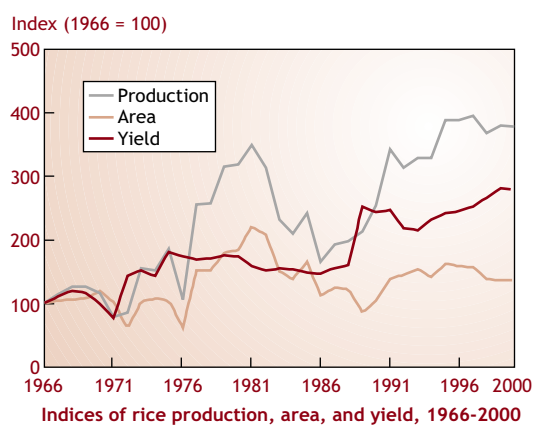
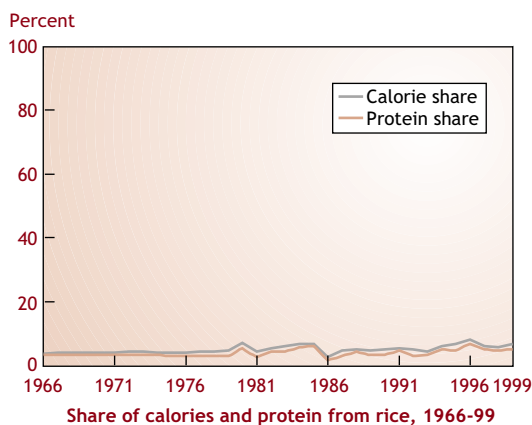
The production gains achieved by improved rice technology in the rainfed lowlands must be maintained. The government also considers it important to develop new technology for the coastal and saline rice environment and for the upland ecosystem, which experience stress from drought, erosion, weeds, insect pests, nematodes, and low temperature. The technology needs are being met in part through the Myanmar-IRRI collaborative research program.



Basic statistics, Myanmar

	1985	1990	1995	1998	1999	2000
<i>Rice</i>						
Area harvested (ha)	4,660,800	4,760,000	6,032,700	5,458,500	6,210,787	6,000,000
Yield (t/ha)	3.1	2.9	3.0	3.1	3.2	3.3
Production (t)	14,317,048	13,971,800	17,956,900	17,076,728	20,124,708	20,000,000
Rice imports (t)	0	0	0	19	19	na
Paddy imports (t)	na	na	na	na	na	na
Rice exports (t)	581,500	213,600	353,800	86,966	36,000	na
Paddy exports (t)	na	na	na	na	na	na
<i>Others</i>						
Population, total ($\times 10^3$)	37,544	40,520	42,877	44,497	45,059	na
Population, agriculture ($\times 10^3$)	27,990	29,688	30,770	31,520	31,776	na
Agricultural area ($\times 10^3$ ha)	10,429	10,428	10,450	10,505	na	na
Irrigated agricultural area ($\times 10^3$ ha)	1,085	1,005	1,555	1,592	na	na
Total fertilizer consumption (t)	194,087	70,732	179,730	171,805	na	na
Tractors used in agric. (no.)	10,026	13,000	7,818	8,528	na	na

Source: FAOSTAT online database.



Basic statistics, Venezuela

	1985	1990	1995	1998	1999	2000
<i>Rice</i>						
Area harvested (ha)	180,769	114,755	177,430	151,899	148,883	150,000
Yield (t/ha)	2.6	4.3	4.3	4.7	5.0	4.9
Production (t)	471,722	495,000	756,950	716,090	740,000	737,000
Rice imports (t)	755	352	68,077	141	127	na
Paddy imports (t)	0	519	104,429	26	8	na
Rice exports (t)	28	0	76,927	81,235	22,958	na
Paddy exports (t)	0	0	335	7,508	1	na
<i>Others</i>						
Population, total ($\times 10^3$)	17,138	19,502	21,844	23,242	23,706	na
Population, agriculture ($\times 10^3$)	2,631	2,763	2,541	2,402	2,355	na
Agricultural area ($\times 10^3$ ha)	21,740	22,145	21,790	21,730	na	na
Irrigated agricultural area ($\times 10^3$ ha)	470	480	536	540	na	na
Total fertilizer consumption (t)	477,639	427,000	298,000	242,800	na	na
Tractors used in agric. (no.)	43,500	48,000	49,000	49,000	na	na

Source: FAOSTAT online database.

Important conversion factors, by country

Country Conversion factors

Asia

Bangladesh

1 bushel = 0.73 maund = 29.17 seer = 60 lb
1 maund = 82.29 lb = 37.32 kg
1 seer = 2.05 lb = 0.93 kg
1 kg = 2.20462 lb = 1.07 seer
1 bushel per acre = 67.253 kg per ha
1 ha = 2.47109 acres
1 acre = 0.40468 ha
1 lakh = 100,000
1 crore = 10,000,000

Cambodia

1 picul = 68 kg
1 mt = 14.7059 picul

China

1 mu = 0.067 ha
15 mu = 1.0 ha
1 sheng milled rice = 1 liter milled rice = 0.5 kg
1 dou milled rice = 10 liters milled rice = 5 kg
1 dan (picul) milled rice = 100 liters milled rice = 50 kg
20 dan (picul) = 1 mt
1 dun = 1 mt = 2204.6 lb
1 dan (picul) = 100 jin
1 jin (catty) = 0.5 kg = 1.1023 lb
1 jin/mu = 7.5 kg/ha

Taiwan, China

1 kg rough rice = 0.76366 kg brown rice
1 kg ponlai brown rice = 0.93 kg milled rice
1 kg chailai brown rice = 0.94 kg milled rice
1 ha = 1.03 chia
1 chia = 0.9699 ha
1 old catty = 0.5968 kg
1 shih catty = 0.5 kg

India

1 quintal = 100 kg
1 maund = 37.3 kg = 82.29 lb
1 Madras measure rice = 54 oz = 3.375 lb
Bigha is a land measure in rural areas; its definition varies from state to state.
In Gujarat, $4/7$ bigha = 1 acre
In Rajasthan, $21/2$ bighas = 1 acre
In West Bengal, 3 bighas = 1 acre

Indonesia

1 liter rice = 0.8 kg
1 gantang rice = 8.58 liters = 0.00686 mt
1 mt rice = 145.69 gantang
Dry stalk rough rice (padi) to milled rice (beras) = 52%
Gabah kering (dry rough rice) to milled rice (beras) = 68%
Dry stalk rough rice (padi) to rough rice = 76.47%

Japan

Brown rice x 1.25 = rough rice
Milled rice x 1.37 = rough rice
Brown rice x 0.91 = milled rice
Rough rice x 0.728 = milled rice
1 koku rough rice = 187.5 kg
1 koku brown rice = 150 kg
1 koku milled rice = 136.5 kg
1 sho milled rice = 1.425 kg
1 kan = 3.75 kg
1 kin = 0.6 kg
1 picul = 50 kg
1 cho = 10 tan = 2.45072 acres = 0.99174 ha
1 ha = 10.0833 tan = 1.00833 cho
1 tan = 0.1 cho = 0.9917 ha

Korea, Rep. of

1 danbo = 0.1 jeongbo = 0.099174 ha
1 ha = 1.0083 jeongbo
1 seok milled rice = 144 kg
1 seok brown rice = 155 kg
1 seok rough rice = 100 kg
100 liters milled rice = 79.8264 kg

Malaysia

1 picul brown rice = 133.33 lb = 60.48 kg
1 gantang rough rice = 5.60 lb = 2.54 kg
1 kati = 0.60478 kg

Myanmar

100 measures rough rice = 1 basket
1 basket rough rice = 46 lb = 20.86 kg
1 basket milled rice = 75 lb = 34.02 kg
1 bag milled rice = 225 lb = 102.06 kg
1 pyi milled rice = 4.69 lb = 2.13 kg
1 maund = 0.037 mt

Nepal

- 1 mt = 26.792 maunds
- 1 khet = 1.3 ha
- 1 bigha = 0.67 ha (Terai)
- 1 matomuri = 0.13 ha = 0.25 ropani
- 1 ropani = 0.05 ha (Hills) = 4 muris
- 1 muri = 0.013 ha
- 1 seer = 0.80 kg (Hills)
- 1 seer = 0.93 kg (Terai)
- 1 mana = 0.3 kg rough rice
- 1 mana = 0.454 kg rice
- 1 maund = 37.32 kg rough rice (Terai)

Pakistan

- 1 kg = 2.2046 lb = 1.0716 seer
- 1 quintal = 100 kg = 1.96841 cwt = 2.679 maunds
- 1 metric ton = 1,000 kg = 0.98421 long ton = 26.79 maunds
- 100 kg per ha = 1.4869 bushels per acre = 1.09 maunds per acre
- 1 bushel = 0.73 maunds = 29.17 seers = 60 lb
- Before 1980, 1 maund = 37.324 kg
- After 1980, 1 maund = 40 kg

Philippines

- 1 cavan rough rice = 50 kg
- 1 cavan milled rice = 50 kg
- 1 ganta milled rice = 2.24 kg
- Before 1973
- 1 ganta = 3 liters
- 1 cavan rough rice = 44 kg
- 1 cavan milled rice = 56 kg

Sri Lanka

- 1 bushel rough rice = 46 lb = 20.86 kg
- 1 bushel rough rice = 30.69 milled rice = 14 kg milled rice
- 1 bushel milled rice = 64 lb = 32 measures of rice
- 1 measure milled rice = 2 lb = 0.907 kg

Thailand

- 1 picul = 60 kg
- 1 catty = 600 g = 6 kg
- 1 kwein = 2,000 liters
- 1 ban = 1,000 liters
- 1 sat = 20 liters
- 1 thanan = 1 liter
- 1 kwein rough rice = 1 mt rough rice
- 1 rai = 0.16 ha = 0.395 acre

Other countries

Australia

- 1 bushel rough rice = 42 lb = 19.05 kg

Brazil

- 1 bushel rough rice = 45 lb = 20.41 kg
- 1 sack (bag) rough rice = 110.23 lb = 50 kg
- 1 sack (bag) milled rice = 88.18 lb = 40 kg

<i>Egypt</i>	1 sack (bag) milled rice = 220.11 lb = 99.84 kg
<i>Ghana</i>	1 sack (bag) milled rice = 240 lb = 108.86 kg
<i>Guyana</i>	1 sack (bag) rough rice = 140 lb = 63.50 kg 1 sack (bag) milled rice = 180 lb = 81.65 kg
<i>Malawi</i>	1 sack (bag) rough rice = 150 lb = 68.04 kg 1 sack (bag) milled rice = 200 lb = 90.72 kg
<i>Mexico</i>	1 carga rough rice = 304.24 lb = 138 kg 1 carga milled rice = 352.74 lb = 160 kg
<i>Panama</i>	1 lata milled rice = 24.99 lb = 11.33 kg 1 lata rough rice = 35.99 lb = 16.32 kg
<i>Sierra Leone</i>	1 bushel rough rice = 60 lb = 27.21 kg 1 bushel milled rice = 84 lb = 38.10 kg
<i>Swaziland</i>	1 pocket milled rice = 2 lb = 0.91 kg
<i>United States</i>	1 bushel rough rice = 45 lb = 20.41 kg 1 sack (bag) rough rice = 100 lb = 45.36 kg 1 sack (bag) milled rice = 100 lb = 45.36 kg 1 barrel rough rice = 162 lb = 73.48 kg
<i>Uruguay</i>	1 bolsa brown rice = 110.23 lb = 50 kg

Sources: For Asia: Rose B. 1985. *Appendix to the Rice Economy of Asia*. Resources for the Future, Inc., Washington, D.C. For other countries: FAO Rice Report 1974-75. 1975. Rome.

Rice facts

GENERAL INFORMATION

Selected rice-consuming and -producing countries	Population (million)			Infant mortality (per 1,000 live births) 1998	Life expectancy at birth (years) 1998	GNI ^a per capita	
	1999	Projected				Per capita 2000 (\$)	Av annual growth ^b (%) 1990-99
		2020	2050				
Asia	3,634.3	4,545.2	5,268.5	- ^c	-	-	-
Bangladesh	126.9	170.2	212.5	79	58.6	1,590	3.1
Bhutan	2.1	3.5	5.7	84	61.2	1,440	2.1
Cambodia	10.9	15.5	20.7	104	53.5	1,440	1.8
China ^d	1,274.1	1,462.7	1,484.9	38	70.1	3,920	8.9
India	998.1	1,272.2	1,528.9	69	62.9	2,340	3.8
Indonesia	209.3	262.3	311.9	40	65.6	2,830	2.2
Japan	126.5	123.9	104.9	4	80.0	27,080	1.0
Korea, DPR	23.7	28.4	30.8	-	63.0	-	-
Korea, Rep. of	46.5	51.9	51.3	5	72.6	17,300	4.6
Lao PDR	5.3	8.8	13.3	96	53.7	1,540	3.6
Malaysia	21.8	29.3	37.0	9	72.2	8,330	3.9
Myanmar	45.1	56.0	64.9	80	60.6	-	-
Nepal	23.4	35.5	49.3	72	57.8	1,370	2.4
Pakistan	152.3	244.2	345.5	95	64.4	1,860	1.6
Philippines	74.5	102.4	130.9	32	68.6	4,220	1.1
Sri Lanka	18.6	22.8	25.9	17	73.3	3,460	3.8
Thailand	60.9	71.0	74.2	30	68.9	6,320	3.4
Vietnam	78.7	102.5	126.8	31	67.8	2,000	5.0
Latin America	511.3	665.1	808.9	32	69.7	-	-
Brazil	168.0	209.7	244.2	36	67.0	7,300	0.7
Colombia	41.6	56.6	71.6	25	70.7	6,060	1.0
Cuba	11.2	11.7	11.1	7	75.8	-	-
Dominican Rep.	8.4	10.7	12.3	43	70.9	5,710	3.7
Ecuador	12.4	16.9	21.2	30	69.7	2,910	-0.6
Guyana	0.9	1.0	1.2	58	64.8	3,670	8.0
Peru	25.2	33.8	42.3	43	68.6	4,660	2.4
Suriname	0.4	0.5	0.6	28	70.3	3,480	-
Uruguay	3.3	3.8	4.4	16	74.1	8,880	2.9
Africa	766.6	1,187.4	1,766.1	-	-	-	-
Côte d'Ivoire	14.5	21.8	30.5	90	46.9	1,500	0.8
Egypt	67.2	90.5	114.8	51	66.7	3,670	2.7
Guinea	7.4	11.5	16.3	124	46.9	1,930	1.7
Liberia	2.9	5.9	10.0	-	47.0	-	-
Madagascar	15.5	26.2	40.4	95	57.9	820	-1.1
Mali	11.0	18.9	31.4	144	53.7	780	1.1
Mozambique	19.3	27.8	42.9	129	43.8	800	3.5
Nigeria	108.9	168.2	244.3	112	50.1	800	0.4
Senegal	9.2	15.2	23.1	70	52.7	1,480	0.7
Sierra Leone	4.7	7.4	11.0	182	37.9	480	-6.3
Tanzania	32.8	52.5	80.6	91	47.9	520	0.4
Europe	728.9	711.9	627.7	-	-	-	-
France	58.9	61.5	59.9	5	78.2	24,420	1.3
Italy	57.3	52.9	41.2	6	78.3	23,470	1.3
Spain	39.6	37.6	30.2	6	78.1	19,260	1.8
Australia	18.7	22.3	25.8	5	78.3	24,970	2.0
USA	276.2	317.1	349.3	7	76.8	34,100	1.8
World	5,978.4	7,501.5	8,909.1	58	66.9	-	-

Rice facts

INFORMATION ABOUT AGRICULTURE

Selected rice-consuming and -producing countries	Arable land ^e per capita	Freshwater resources per capita (m ³)	Annual freshwater withdrawal for agriculture (%)	Agriculture's share (%)		Average annual growth rate		
				Labor force	GDP ^g	GDP ^g	Agriculture value added	Rice production
Asia	0.14	–	–	57	–	–	–	1.6^h
Bangladesh	0.06	19,065	96	58	22.2	4.8	1.5	2.5
Bhutan	0.07	–	–	94	38.2	–	–	2.0
Cambodia	0.35	47,530	94	71	50.6	5.5	2.2	6.0
China ^d	0.10	2,282	87	68	18.4	11.1	4.3	0.7
India	0.16	2,167	93	61	29.3	6.1	3.4	2.0
Indonesia	0.09	12,625	76	50	19.5	5.8	2.8	1.2
Japan	0.04	4,338	50	5	1.7	1.3	–2.0	–0.8
Korea, DPR	0.07	–	–	32	–	–	–	–10.1
Korea, Rep. of	0.04	1,438	46	11	4.9	6.2	2.1	–0.4
Lao PDR	0.15	55,679	82	77	52.6	6.7	4.5	4.3
Malaysia	0.09	21,046	47	20	13.2	7.7	2.0	0.5
Myanmar	0.21	24,651	90	71	53.2	6.3	5.0	3.5
Nepal	0.13	7,616	95	93	40.5	4.8	2.3	2.4
Pakistan	0.14	3,256	97	48	26.4	4.1	3.8	4.8
Philippines	0.08	4,373	61	41	16.9	3.3	1.5	1.8
Sri Lanka	0.05	2,329	96	46	21.1	5.3	1.5	0.9
Thailand	0.28	2,954	90	58	11.2	7.4	3.1	2.8
Vietnam	0.07	4,902	78	68	25.7	8.6	5.1	5.4
Latin America	0.27	27,386	77	21	7.8	3.7	2.6	2.9
Brazil	0.32	42,459	59	18	8.4	3.3	3.1	1.4
Colombia	0.05	26,722	43	22	13.5	4.2	1.6	1.1
Cuba	0.33	–	–	15	–	–	–	–0.3
Dominican Rep.	0.13	2,467	89	18	11.6	5.5	3.6	1.7
Ecuador	0.13	26,305	90	27	12.9	2.9	2.7	3.9
Guyana	0.56	–	–	19	34.7	–	–	12.2
Peru	0.15	1,641	72	31	7.1	5.9	5.5	8.0
Suriname	0.14	–	–	20	–	–	–	–2.3
Uruguay	0.38	37,966	91	13	8.5	3.9	4.2	11.3
Africa	0.24	–	–	59	–	–	–	3.3
Côte d'Ivoire	0.21	5,468	67	51	26.0	3.5	2.4	6.4
Egypt	0.04	966	86	35	17.5	4.2	2.9	5.7
Guinea	0.12	32,661	87	85	22.4	5.0	4.4	5.9
Liberia	0.07	–	–	69	–	–	–	7.1
Madagascar	0.17	23,819	99	75	30.6	1.3	1.5	0.3
Mali	0.43	9,718	97	82	46.9	3.7	3.3	9.3
Mozambique	0.17	12,989	89	81	34.3	5.7	4.8	13.5
Nigeria	0.27	2,375	54	35	31.7	2.6	2.9	1.3
Senegal	0.25	4,482	92	74	17.4	3.0	1.4	–8.2
Sierra Leone	0.11	33,698	89	63	44.2	–4.7	1.5	–0.9
Tanzania	0.12	2,842	89	81	45.7	2.9	3.7	1.6
Europe	0.40	–	–	9	–	–	–	2.7^h
France	0.31	3,029	15	4	2.3	1.5	0.4	–1.5
Italy	0.14	2,903	59	6	2.6	1.2	1.3	0.9
Spain	0.36	2,398	62	8	3.5	1.9	–2.5	6.0
Australia	2.90	18,508	33	5	3.2	3.6	1.1	4.7
USA	0.65	9,259	42	2	1.7	2.9	2.0	2.1
World	0.23	8,338	69	46	4.8	2.4	1.2	1.7

Rice facts

RICE CONSUMPTION

Selected rice-consuming and -producing countries	Total rice consumption (rough equivalent) (×10 ³ t)		Milled rice consumption per capita (kg/cap/yr)		Daily calorie supply per capita (no.)		Rice in total calorie supply (%)	
	1990	1999	1990	1999	1990	1999	1990	1999
	Asia	414,121	465,438	89	86	2,550	2,723	35
Bangladesh	25,946	33,946	157	168	2,082	2,201	75	76
Bhutan	–	–	–	–	–	–	–	–
Cambodia	2,258	3,161	156	165	1,830	2,000	79	76
China ^d	162,785	172,449	93	90	2,713	3,045	35	30
India	97,480	110,421	77	74	2,292	2,417	33	30
Indonesia	40,407	48,330	148	154	2,624	2,931	55	52
Japan	11,946	11,388	64	60	2,822	2,782	24	23
Korea, DPR	2,256	2,499	75	75	2,529	2,100	31	35
Korea, Rep. of	6,674	6,554	104	94	3,037	3,073	37	33
Lao PDR	1,060	1,325	171	171	2,159	2,152	70	70
Malaysia	2,289	2,888	86	88	2,758	2,946	30	29
Myanmar	12,760	14,875	210	211	2,620	2,803	78	73
Nepal	2,987	3,151	110	93	2,481	2,264	41	38
Pakistan	3,433	3,018	21	15	2,412	2,462	9	6
Philippines	9,160	11,088	100	100	2,364	2,357	41	41
Sri Lanka	2,486	2,789	97	99	2,203	2,328	43	38
Thailand	8,937	9,373	109	101	2,142	2,411	51	42
Vietnam	15,382	19,692	155	169	2,219	2,564	71	65
Latin America	17,000	20,098	26	26	2,683	2,847	10	9
Brazil	9,158	10,154	41	40	2,755	3,012	15	14
Colombia	1,641	1,818	31	29	2,419	2,567	13	12
Cuba	754	773	47	46	3,076	2,490	15	18
Dominican Rep	515	530	49	43	2,225	2,333	21	18
Ecuador	648	940	42	51	2,498	2,679	17	18
Guyana	101	97	93	85	2,342	2,569	34	31
Peru	1,333	1,920	41	51	1,946	2,621	22	19
Suriname	54	48	90	78	2,449	2,604	34	28
Uruguay	48	60	10	12	2,534	2,862	4	4
Africa	15,144	20,752	16	18	2,337	2,411	7	7
Côte d'Ivoire	970	1,748	51	74	2,395	2,582	20	26
Egypt	2,682	4,061	32	41	3,176	3,323	11	13
Guinea	582	747	63	62	1,988	2,133	32	30
Liberia	290	223	90	55	2,100	2,089	44	27
Madagascar	1,782	2,116	99	91	2,139	1,994	47	46
Mali	325	806	25	49	2,313	2,314	11	21
Mozambique	188	202	9	8	1,840	1,939	5	4
Nigeria	2,962	3,876	23	23	2,376	2,833	10	8
Senegal	735	980	67	71	2,316	2,307	28	30
Sierra Leone	606	635	100	99	1,986	2,016	49	48
Tanzania	714	736	18	14	2,144	1,940	8	7
Europe	2,820	4,772	4	4	3,381	3,236	1	1
France	306	413	4	5	3,505	3,575	1	1
Italy	415	511	5	6	3,591	3,629	1	2
Spain	400	452	7	8	3,248	3,353	2	2
Australia	170	224	7	8	3,218	3,150	2	2
USA	2,595	3,778	7	9	3,487	3,754	2	3
World	454,796	515,851	58	58	2,711	2,808	21	21

Rice facts

RICE PRODUCTION

Selected rice-consuming and -producing countries	Production (×10 ³ t)		Area (×10 ³ ha)		Yield (t ha ⁻¹)		Area planted to modern varieties (%)
	1990	2000	1990	2000	1990	2000	
Asia	479,421	545,477ⁱ	132,342	137,601ⁱ	3.62	3.96ⁱ	74
Bangladesh	26,778	35,821	10,435	10,700	2.57	3.35	65
Bhutan	43	50	26	30	1.65	1.67	100
Cambodia	2,500	3,762	1,740	1,873	1.44	2.01	11 ^j
China ^d	191,615	190,168	33,519	30,503	5.72	6.23	100 ^k
India	111,517	134,150	42,687	44,600	2.61	3.01	73
Indonesia	45,179	51,000	10,502	11,523	4.30	4.43	77
Japan	13,124	11,863	2,074	1,770	6.33	6.70	100
Korea, DPR	3,570	1,690	650	535	5.49	3.16	100
Korea, Rep. of	7,722	7,067	1,244	1,072	6.21	6.59	100
Lao PDR	1,508	2,155	664	690	2.27	3.12	2
Malaysia	1,885	2,037	681	692	2.77	2.94	90 ^j
Myanmar	13,972	21,324	4,760	6,302	2.94	3.38	72
Nepal	3,502	4,030	1,455	1,550	2.41	2.60	36
Pakistan	4,891	7,000	2,113	2,312	2.32	3.03	42
Philippines	9,885	12,415	3,319	4,037	2.98	3.08	89
Sri Lanka	2,538	2,767	828	871	3.06	3.18	91
Thailand	17,193	23,403	8,792	10,048	1.96	2.33	68
Vietnam	19,225	32,554	6,028	7,655	3.19	4.25	80
Latin America	15,568	22,990	6,185	6,388	2.52	3.60	40
Brazil	7,421	11,168	3,947	3,672	1.88	3.04	25
Colombia	2,117	2,100	521	440	4.06	4.77	87
Cuba	474	369	155	113	3.06	3.27	100
Dominican Rep.	428	527	89	129	4.78	4.08	81
Ecuador	840	1,520	269	380	3.12	4.00	59
Guyana	156	600	51	145	3.03	4.14	4
Peru	966	1,665	185	300	5.23	5.55	73
Suriname	196	175	52	50	3.77	3.50	92
Uruguay	347	1,175	78	185	4.45	6.35	47
Africa	12,346	17,190	6,037	7,776	2.05	2.21	-
Côte d'Ivoire	660	1,162	572	750	1.15	1.55	-
Egypt	3,167	5,997	436	660	7.27	9.09	-
Guinea	424	750	436	500	0.97	1.50	-
Liberia	180	200	175	155	1.03	1.29	-
Madagascar	2,420	2,300	1,165	1,207	2.08	1.91	-
Mali	282	810	197	350	1.44	2.31	-
Mozambique	96	158	110	136	0.87	1.16	-
Nigeria	2,500	3,277	1,208	2,061	2.07	1.59	-
Senegal	181	240	73	96	2.48	2.50	-
Sierra Leone	504	199	393	183	1.28	1.09	-
Tanzania	740	379	385	504	1.92	0.75	-
Europe	2,404	3,103ⁱ	449	614ⁱ	5.35	5.05ⁱ	-
France	121	107	20	19	5.95	5.76	-
Italy	1,291	1,300	214	221	6.03	5.89	-
Spain	571	798	90	115	6.32	6.93	-
Australia	924	1,400	105	145	8.84	9.66	-
USA	7,080	8,669	1,142	1,232	6.20	7.04	100
World	519,936	598,852	146,886	153,766	3.54	3.89	-

Rice facts

RICE TRADE

Selected rice-consuming and -producing countries	Milled rice (000 t)					
	Exports			Imports		
	1991-95 Average	1996-2000 Average	2000	1991-95 Average	1996-2000 Average	2000
Asia	11,590	16,848	16,574	7,220	11,655	10,925
Bangladesh	0	0	0	223	1,012	502
Bhutan	0	0	0	24	17	10
Cambodia	0	3	2	63	33	36
China	1,045	2,210	3,071	503	352	245
India	1,566	2,658	1,533	39	11	13
Indonesia	113	1	1	919	2,299	1,355
Japan	3	116	42	542	567	656
Korea, DPR	4	0	0	261	362	400
Korea, Rep. of	1	0	0	1	107	172
Lao PDR	0	0	0	14	20	10
Malaysia	1	1	0	400	618	612
Myanmar	386	88	142	0	0	0
Nepal	0	12	0	34	94	195
Pakistan	1,317	1,829	2,016	3	1	1
Philippines	9	0	0	93	1,096	642
Sri Lanka	15	2	1	119	235	206
Thailand	5,106	6,108	6,140	0	1	1
Vietnam	1,734	3,659	3,477	4	2	5
Latin America	1,052	1,712	1,587	2,439	2,787	2,422
Brazil	8	22	26	820	911	660
Colombia	18	0	0	98	138	59
Cuba	0	0	0	318	356	393
Dominican Rep.	0	0	0	17	60	82
Ecuador	14	60	12	1	22	6
Guyana	135	260	252	0	0	0
Peru	0	2	3	324	247	88
Suriname	75	71	49	0	0	0
Uruguay	395	662	699	4	1	2
Africa	248	362	415	3,939	4,423	4,519
Côte d'Ivoire	5	2	1	341	419	441
Egypt	177	332	393	1	2	1
Guinea	0	0	0	242	169	125
Liberia	0	0	0	109	34	35
Madagascar	1	1	1	46	65	94
Mali	0	0	0	28	49	55
Mozambique	0	0	0	75	43	34
Nigeria	0	0	0	329	603	688
Senegal	0	0	0	390	536	537
Sierra Leone	0	0	0	167	243	243
Tanzania	0	5	5	69	70	47
Europe	1,315	1,449	1,493	2,423	2,873	2,975
France	72	71	66	287	370	417
Italy	620	635	666	48	78	137
Spain	188	270	300	131	105	104
Australia	510	613	622	31	44	52
USA	2,598	2,691	2,736	202	315	305
World	17,319	23,676	23,428	16,802	22,686	21,788

Note: Regional totals include countries not shown. ^aGross national income in purchasing power parity. ^bIn per capita gross national income in constant 1995 dollars. ^c = data not available. ^dIncluding Taiwan. ^eExcluding permanent crops. Data are for single years during 1980-97. ^fGross domestic product. ^gSince 1992, Asia includes former USSR Asia and Europe includes former USSR Europe. Former Asia growth rate = 1.5, former Europe growth rate = 2.5. Former Asia and former Europe rice production are 544,982 and 2,573 × 10³ t, respectively; former Asia and former Europe rice harvested area are 137,368 and 413 × 10³ ha, respectively; former Asia and former Europe yields are 3.97 and 6.22 t/ha, respectively. ^hWet season only. ⁱHybrid rice is 40%. ^jWest Malaysia only. Sources: Human Development Report, 2000. World Bank Development Report 1999-2000. FAOSTAT, 2001. IRRI World Rice Statistics.