JAPANESE AGRICULTURE, RICE and SAKE

Items	Value	Remarks
Agricultural land	43.5 K Km^2	Share 11.7%
Forestry	248 K Km^2	Share 65.6%
GDP of Agriculture	4.7 Trill yen	Share 0.8%
GDP of Agriculture/Food industry	53.8 Trill yen	Share 9.6%
Food Import	8.89 Trill yen	
Food Export	0.91 Trill yen	

	Items		Remarks
Land use	Land area (total)	378 K Km^2	
	Agriculture	43.5 K Km^2	Share 11.7%
	paddy field	23.7 K Km^2	
	upland field	19.8 K Km^2	
	Forestry	248 K Km^2	Share 65.6%
Population	Total	126 Million	
	Farmers' household	4.2 Million	Share 3.3%
Labor force	Total	68.9 Million	
	Agriculture	1.3 Million	Share 1.9%

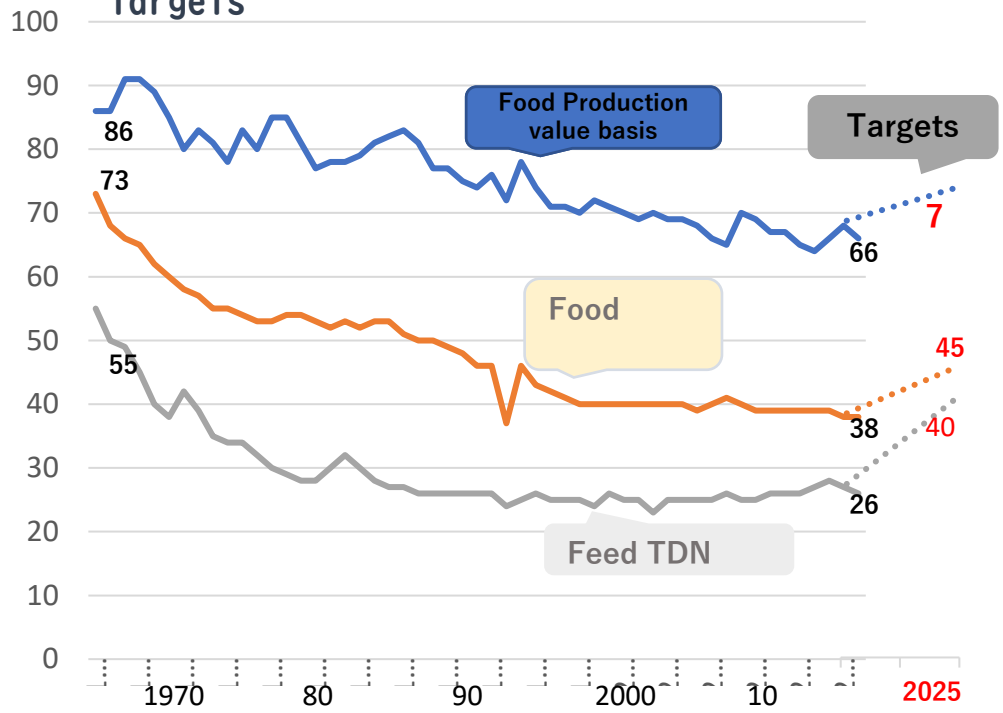
	Items		Remarks
GDP	Total	561.3 Trill yen	
	Agriculture	4.7 Trill yen	Share 0.8%
	Forestry	0.25 Trill yen	Share 0.04%
	Fisheries	0.74 Trill yen	Share 0.1%
	Agriculture/Food industry	53.8 Trill yen	Share 9.6%
Production output (Agriculture, Forestry, Fisheries produces)	Total	12.45 Trill yen	
	Rice	1.74 Trill yen	
	Vegetable	2.15 Trill yen	
	Livestock	3.21 Trill yen	

	Items		Remarks
Self-sufficiency rate	Food (calorie supply)	38 %	
	Food (production value)	66 %	
	Foliage	26 %	
Trade of Agriculture and Food	Import	8.89 Trill yen	
	Export	0.91 Trill yen	

Self-sufficiency ratio

Food self-sufficiency ratio is trending downward over the long term due to such factors as changes in dietary patterns.

Self-sufficiency ratio trends and targets

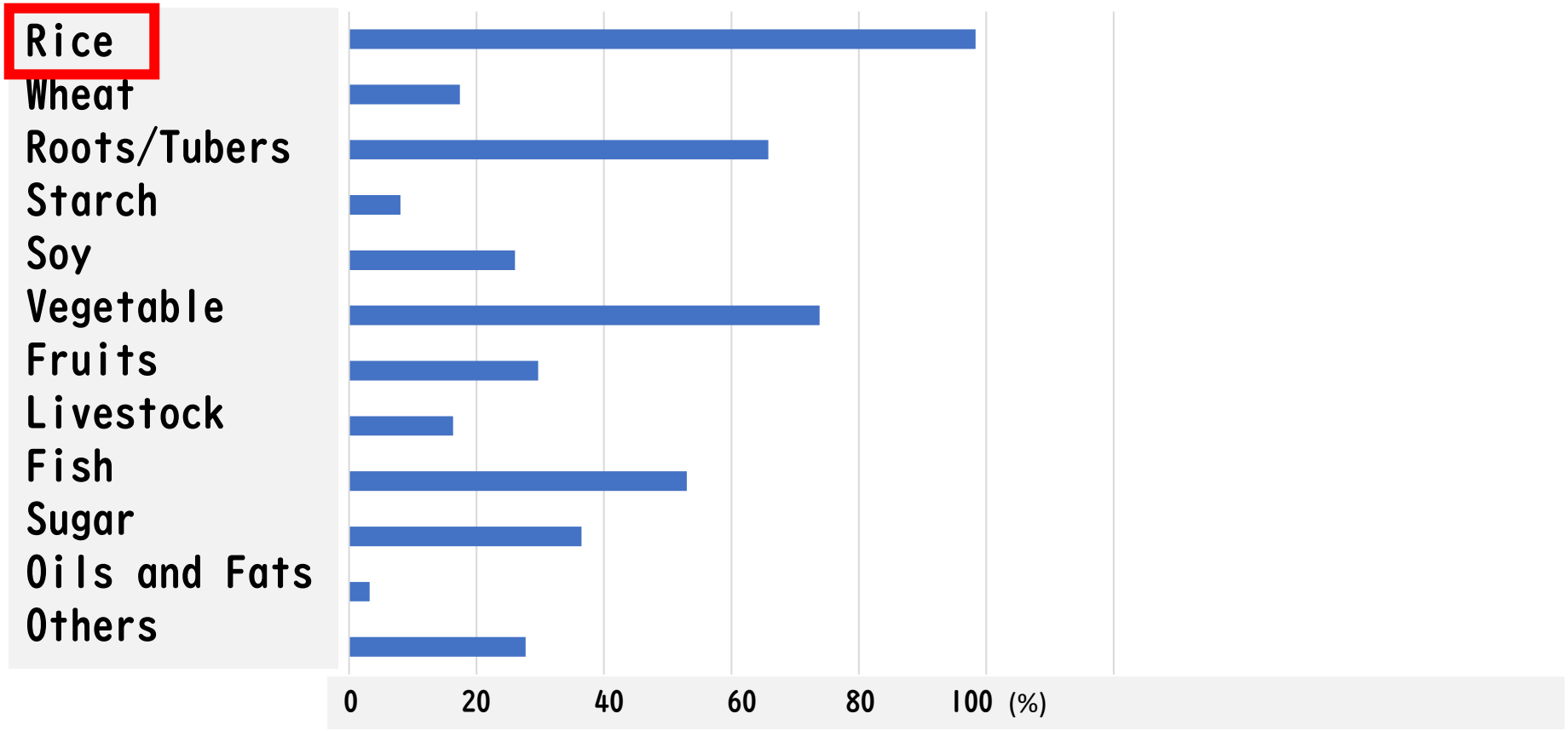


Self-sufficiency ratio of main commodities

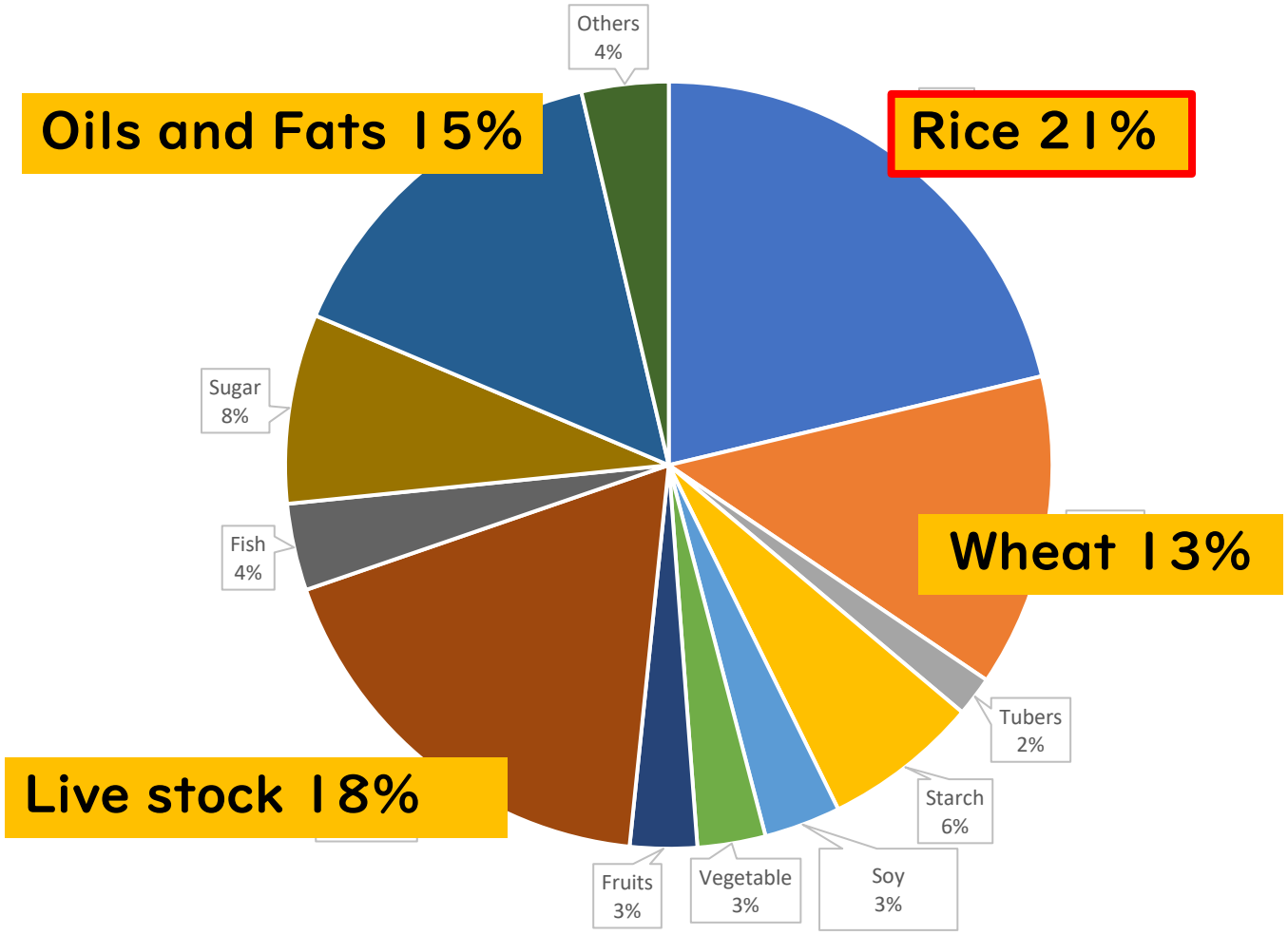
	Calorie supply basis	Production value basis
Rice	97	98
Wheat	14	15
Vegetables	75	89
Fruits	34	63
Livestock products	16	57
Fed by imported feeds	46	11
Fish and shellfish	59	47

*Livestock products fed by imported feeds is not included in self-sufficiency ratio

self-sufficiency rate



Food energy supply by each item



Supply demand situation of main crops

AS of May 2020

Million t

	Demands	Production	Import	Stock	Importing country	Remark
Rice	720	715	76	270	USA, Thailand, Australia	Public stock 100 (which will be used for processing or feed after stock period)
Wheat	640	77	564	93	USA, Canada, Australia	Warehouse storage fee for stock is subsidized
Maize (feed)	1576	-	1576	84	USA, Brazil	Warehouse storage fee for stock is subsidized
Soya Bean	345	21	324	40	USA, Brazil, Canada	

Stock of rice (270+100) mil.t is equivalent 185-day consumption.
Stock of wheat 93 mil.t is equivalent 70-day consumption

Export (Mill. US$)		Import (Mill.US$)	
Total	8,585	Total	82,491
Rice	49	Wheat	1,510
Sweet potato	19	Maize	3,261
Apple	99	Apple	17
Grape	38	Grape	131
Chinese yam	20	Banana	976
Beef	268	Beef	3,315
Dairy goods	164	Dairy goods	2,079
Scallop	292	Salmon & trout	1,851
Tuna & Bonito	189	Tuna & Bonito	1,487
Chicken	19	Chicken	1,088
Pork	16	Pork	4,406
Sweet & Snack	167	Sweet & Snack	1,503
Soy sauce	70	Tomato puree	157
Green tea	150	Black tea	89
Soft Drink	317	Coffee beans	1,051
Alcohol	659	Alcohol	2,376

Export partners:
Hong Kong, China, U.S.A
Import partners:
U.S.A, China, Canada

Oil consumption in Japan

Supply	Commodity	Amount (10k)
Import	Canola (rapeseed)	100
	Soya bean	50
	Corn (Maize)	7
	Palm	64
	Olive	6
Domestic	Rice bran	7

Japan imports Safflower oil around 1,000t/year but no domestic production. Safflower produced in Japan is used in cosmetics, dyes, etc.

RICE and SAKE

Rice cultivated area	1.462 million ha
Rice production value	1.74 trillion Yen
No. of rice variety	500
Sake production	340 million liters
No. of breweries	1,400
No. of Sake brand	More than 10,000

Type of Rice

Rice is mainly classified into Japonica (short grain, mainly eaten in East Asia and Europe) and Indica (long grain, popular in South and South-East Asia). Grain color is white as well as red and black.

Genotype	Japanese rice (Japonica)		Indian rice (Indica)
Main characteristics	Short and roundish grain, less aromatic		Long and slender grain, more common aromatic
Types	Non-glutinous rice (ordinary rice)	Glutinous rice (sticky rice)	Glutinous rice is existing in Indica rice
Contents	15-30% amylose 70-85% amylopectin	100% amylopectin (recessive gene: waxy gene)	23-31 amylose 69-77% amylopectin
Main use	Steamed moist rice, Senbei (rice cracker)	Rice cake, Sekihan, Okaki Arare (fried rice cake)	Cooked as fluffy rice
Fermented drink	Sake	Mirin	Awamori, Lao-khao, Handia
Popular variety	Koshihikari, Yamada- Nishiki	Kogane-Mochi, Himeno-Mochi	Basmati, Jasmine

Basic data of Rice in Japan

Cultivated area	1.462 million ha	33.6% of cultivated land, 3.9% of total area
Production value	1.74 trillion Yen	15.3% of Agriculture productions, 0.17% of GDP
Production volume	7.763 million ton	12th in the world, 1.4% of world production, 1st China
Yield	6.83ton/ha	14th in the world, 1st Australia (Husked rice)
Self-sufficiency ratio	97%	38% total self-sufficiency ratio (calorie base calculation)




Growing cycle

April	May	June to August	September-November
Preparing seedlings	Transplanting	Growing in Paddy	Harvest

Japanese Rice Varieties

It is said more or less 500 varieties are planted in Japan, normal (non-glutinous)varieties 300, sticky (glutinous) varieties 70, and varieties for Sake or rice wine breweries are 120.

Name	Year	Strength	Brief comment
Rikuu 132	1921	Resistant cold weather	First variety developed by artificial crossing, Grand father of Koshihikari
Norin 1	1931	Good taste, High yield	Susceptible blast, Father of Koshihikari
Koshihikari	1944	Super good taste	Low amylose (sticky), Most popular variety (more than 30%)
Nihonbare	1963	Good taste, High yield	Developed by Rapid generation-advancement techniques, Most poplar variety (1970-1978)
Sasanishiki	1963	Good taste, High yield	Second most popular variety (1990), medium sticky
Kirara397	1990	Good taste, Resistant cold weather	Developed in Hokkaido (Northern island) obtaining both charteristics of good taste and Resistant cold weather
Hitomebore	1991	Good taste, Resistant cold weather	Developed in Miyagi pref. developed as variety after Sasanishiki
Hinohikari	1990	Good taste, Heat tolerant	Developed in Kumamoto pref. developed for Heat tolerant in west side of Japan

Trivia of rice

Question	Answer
How many grains are produced from 1 rice/?	500-1,000 grains produced from 1 grain.
How many grains in a rice cup?	3,000-4,000 grains in a cup
How much the price of rice?	3,000-10,000 yen/10kg 20-65 yen/1cup
How much rice supplies food calorie	22%
How much Japanese eat rice in average?	53kg/person (118kg/person in1962)

History of sake

Era	Topics
Yayoi	Mouth chew sake (Introduction of rice)
Yayoi-Nara	Koji is introduced from China
Heian	Made from polished rice (Morohaku)
Heian	Produced under control of Imperial house (Shrine, Temple)
Kamakura	Start Commercialization =>prohibited
Muromachi	Commercialization developed <= Liquor tax
Middle of Edo	Develop production technology (basically same as current production)

Sake and religion

- Sake is deeply connected with Japanese religion, especially Shintoism.
- During the Heian period, sake was made under the control of organization in the imperial court (Mikinotsukasa, literaly Sake brewing Agency).
- Sake production became popular during the Muromachi period, Soboshu (monk sake) made in the large temple in Nara plays a major role in the development of sake manufacturing technology.
- The offering to the god called ”Shinsen” must includes sake, rice, and rice cake, and the role of rice and sake in Shinto rituals is critical.

Types of Japanese Sake

Typical Japanese sake classified by contents or degree of polish of rice. Therefore some Sake called combination of these types like a “Junmai Daiginjyo”. Number of Sake brand is said over 10,000, number of Sake breweries is 1,400, and sake production is 340 million liters.

Type	Junmai	Honjozo	Ginjo	Daiginjo
Characteristics	Brewed using only rice, water, yeast, and koji –no additives, such as sugar or alcohol.	Contains a small amount of distilled brewers alcohol to smooth out the flavor and aroma.	Polished to 60% or less remaining	Polished to 50% or less remaining

Trivia of Sake

Question	Answer
How much Sake can be made from 1 kg of rice?	1.8L sake of standard class. (1-1.2kg grape makes 0.75ml wine)
How long Sake is kept in barrel	Less than 2 weeks
Which sake is tasty cold or warm?	We can enjoy both cold or warm sake. But, in the old days, the quality of sake was poor (rice polishing technology was bad) and there were many impurities, so it is said that the aroma and taste were softened by warming.
Reason of using ash to make clear sake	A brewer who spent money in a sake brewery ran away with ashes in the sake because he was angry that he had been expelled from the brewery. However his bad behavior was found to improve sake's quality.

Barrel of Sake

Sake	Wine
Cedar or cypress covered by rice strow.	Oak
72L, 65cm x 65cm, 90kg,	225L, 95cm x 70cm, 280kg
Less than 2 weeks	1-2 years

Japanese Sake vs Beer vs Wine

	Material	Saccharification	Fermentation	Remarks
Sake(15-16%) (less than 22%)	Rice (starch)	Koji (mold) added to steamed white rice	Yeast	Saccharification and Fermentation, in parallel
Beer (5-6%)	Barley (starch)	Wort produced from malted barley	Beer Yeast	Saccharification and Fermentation, in separate
Wine (12-14%)	Grape (Glucose)	-	Wine Yeast	Saccharification in not necessary

National ranking of Alcoholic consumption per capita

Total Pure Alcoholic per capita

	Country	Amount
1	Czechia	14.3
2	Latvia	13.2
3	Moldova	12.9
4	Germany	12.8
5	Lithuania	12.8
6	Ireland	12.7
7	Spain	12.7
8	Bulgaria	12.5
9	Uganda	12.5
10	Luxembourg	12.4
13	France	12.2
21	U.K	11.4
22	Switzerland	11.2
34	Russia	10.5
35	Australia	10.4
38	Japan	10.1
39	U.S.A	10.0
93	China	6.0

Beer amount per capita

	Country	Amount
1	Czechia	188.6
2	Austria	107.8
3	Romania	100.3
4	Germany	99
5	Poland	97.7
6	Namibia	95.5
7	Ireland	92.9
8	Spain	88.8
9	Croatia	85.5
10	Latvia	81.4
17	Australia	75.1
20	U.S.A	72.7
23	U.K	70.3
26	Belgium	65.9
39	S. Korea	39.4
41	Japan	38.4
43	France	33
45	China	29

Pure alcohol by wine per capita

	Country	Amount
1	France	6.74
2	Portugal	6.25
3	Moldova	5.59
4	Slovenia	5.19
5	Luxembourg	5.03
6	Switzerland	4.38
7	Italy	4.35
8	Denmark	4.25
9	Sao Tome & Principe	4.14
10	Serbia	4.13
14	Australia	3.69
16	U.K	3.59
20	Germany	3.29
39	Canada	2.18
44	U.S.A	1.67
56	Spain	1.16
70	Japan	0.42
95	China	0.19

Export & Import of Alcoholic beverage

Export (Mill. US$)		Import (Mill. US$)	
Total(food)	8,585	Total(food)	82,491
Alcoholic beverage	659	Alcoholic beverage	2,376
Japanese Sake	224	Japanese Sake	-
Beer	54	Beer	58
Wine	3	Wine	1,558
Whisky	251	Whisky	415
Shochu	11	Brandy	44
Liquor	80	Liquor	81
Gin &Vodka	19	Gin &Vodka	30