

15. PEANUT IN JAPAN

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Demand for Peanuts in Japan

The beginning of peanut cultivation in Japan was in 1874, when Japanese government introduced peanut seeds from America and encouraged farmers to cultivate them. So, as to peanuts, the history of either production or consumption is comparatively short.

Therefore, Japanese had no custom of using peanuts as raw materials of fat and oil, staple food and side dishes like in other countries. They consumed peanuts only as roasted beans since it was introduced. Accordingly, both production and consumption were too little for the population compared with other countries. Until World War II, the annual demand for peanuts was less than 40,000 tons. In those days the need was met by both domestic production and the importation from China, which was nearly double of the former one.

After the war, demand for peanuts increased according to Japan's economic rehabilitation and stabilization of living. Naturally, improvement of processing method and development of new processed food have brought into use of raw peanuts for fried beans or various confectionaries other than roasted beans. Since 1955, the consumption showed noticeable increase, and recently it reached 15,000 tons, which is about four times of prewar home consumption, as shown in Table 1. And yet, peanuts have been scarcely used for raw materials of fat and oil even now.

**Table 1. Supply and demand of peanut in Japan
(tons in shelled nuts)**

Year	Domestic Production	Import	Demand
1930	7,400	16,600	24,000
1940	13,100	24,200	37,300
1950	18,400	26,000	44,400
1955	32,800	14,600	47,400
1960	88,100	7,000	95,100
1965	95,600	23,000	118,600
1970	86,900	57,000	143,900

Domestic production was converted to shelled equivalent using a conversion factor of 70 percent.

Because, as mentioned above, peanuts was a new crop and we had no custom of using them as a source of oil, and also the price of raw nuts was extremely high as compared with other domestic oil plants.

So, peanuts varieties cultivated in Japan are almost large seed peanut for roasted beans; namely Virginia type. While, small seed peanut, Spanish type varieties, have

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Table 2. Supply and demand of peanut by size of seed (tons in shelled nuts)

Year	Domestic production		Import		Demand	
	Large Peanut	Small Peanut	Large Peanut	Small Peanut	Large Peanut	Small Peanut
1960	69,200	18,900	1,000	6,000	70,200	24,900
1965	75,100	20,500	9,000	14,000	84,100	34,500
1970	68,300	18,600	17,000	40,000	95,300	58,600

been cultivated a little for the use of confectionaries or home consumption of farmers.

But recently, the demand for large seed peanut attained almost to the limit and kept the same level since 1968, as shown in Table 2. On the contrary, the demand for small peanut has been increasing. In 1970 it amounted to about 60,000 tons containing 40,000 tons of the imported and 20,000 tons of domestic production.

Such a change of demand for peanuts seems to be primarily due to price. Consumption of large peanuts as luxury food is in competition with not only other similar foods but also with small peanuts. Peanut consumption has varied depending on the taste and the fluctuation of price till now. Recently the small peanut has been consumed in place of large one because of rapid increase of small peanuts for the use of roasted and fried beans.

At present, inspite of the increasing demand of peanuts, the domestic production of peanuts shows a decline as well as the other upland farm products. Consequently, the imports has remarkably increased, as shown in Table 2, especially small seed varieties which are little in domestic production. As shown in Table 3, small peanuts have been mostly imported from Thailand and Indonesia in South East Asia; and Tanganika, South Africa Republic, Sudan and Nigeria in Africa. On the other hand, large peanuts

Table 3. Countries where Japan imports from and quantity of imports (tons in shelled nuts)

Country	1960	1965	1970
China, Mainland*		11,788	4,773
Thailand	281	1,205	445
Indonesia	334		8,834
Philippines	642		
India*	194	1,018	5,480
South Viet-Nam	79	1,415	
North Viet-Nam			
Tanzania		795	1,037
South Africa	40	1,721	1,605
Sudan		493	11,465
Nigeria		5,623	2,717
Senegal			1,023
U. A. R.*			2,484
U. S. A.*			7,256
Brazil			10,019

* From these countries, Japan is importing the large seed varieties of peanut.

which had been imported from the mainland of China, became not enough to meet the demand and were started to be imported from many other countries of the world; for example, the United States, India, United Arab Republic and Brazil.

Peanuts produced in Japan have been classified into some grades by means of standard evaluation as in Table 4, and separately used for various purposes. The large peanuts of the grade above the third-class are processed as roasted and fried beans, and the fourth or fifth class are utilized for raw materials of confectionaries at nearly the same price of small peanuts. Of the domestic production shown in Table 2, "Large

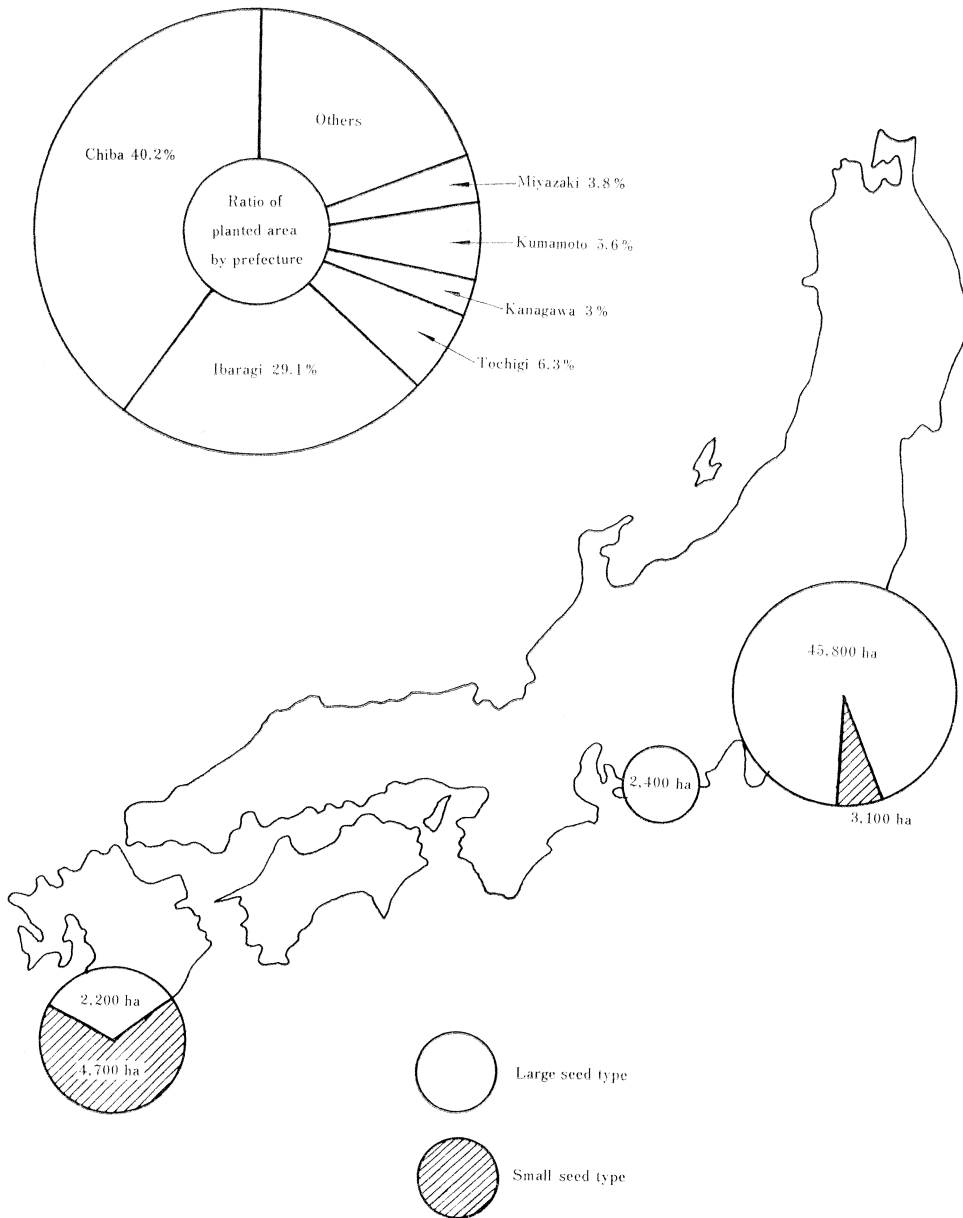


Fig. 1.

Table 4. Evaluation standard of peanut

Size of seed	Class	Minimum standard for number of seeds per 100 gr	Maximum standard (%) for		
			Moisture content	Injured seed	Admixture
Large	Special	105	9	3	0
	1st	120	9	4	1
	2nd	135	9	5	1
	3rd	170	9	12	2
	4th	220	9	14	2
	5th	270	9	20	2
	Under the regular grades				
Small	1st	175	9	4	0
	2nd	250	9	5	1
	3rd	340	9	12	2
	Under the regular grades				

peanuts" indicate therefore above the third class; and the fourth or fifth class of large ones are contained in "Small peanut" in the table; so it doesn't mean the production classified by types Virginia or Spanish.

The recent price of peanuts in Japan is about 330,000 yen (\$1,070) per ton with large peanut, and 200,000 yen or so (\$649) with small one. As for imported peanuts, the large one from China and America costs about 300,000 yen (\$974) and 230,000 yen respectively while the small good quality one costs about 170,000 (\$552).

Situations of Peanut Production

A change of peanut production in Japan is shown in Table 5. As aforesaid, from the start of cultivation in the early Meiji period till World War II, the peanut production did not advance noticeably but after that it gradually increased since the planting

Table 5. Trend of peanut production (nuts in shell)

Year	Planted area (ha)	Yield per ha (t)	Production (t)
1905	5,400	2.07	11,200
1910	7,000	1.50	10,500
1915	10,000	1.69	16,900
1920	11,200	1.50	16,800
1925	8,300	1.70	14,100
1930	5,600	1.87	10,500
1935	7,500	1.63	12,200
1940	9,200	2.01	18,500
1945			
1950	19,200	1.36	26,100
1955	25,900	1.79	46,400
1960	54,800	2.30	126,200
1965	66,500	2.05	136,600
1970	60,100	2.07	124,200

control of farm products which had been enforced during the war time and was abolished in 1950. Especially, substantial progress was made after 1955, furthermore in 1965 the planting areas became 66,500 hectares; and the production amounted to 136,600 tons which was the maximum so far. But after that, it shows a tendency to a steady decline.

The yield per hectare, before the war, had been below two tons for a long time without any big fluctuation. But after the war, it was brought, with an increase of planting areas, up to 2.3 tons or so of the highest in 1960. But after that, the yield marks its decline or falls into stagnation.

Thus the peanut production in Japan developed rapidly after World War II, with the background as follows:

(1) the demand for peanuts, just hitting the public taste, increased remarkably being released from wartime food shortage;

(2) a farming technique using small type of machinery was developed together with the breeding of high yielding variety of intermediate type (Chiba-handachi). So labor-saving and widely adaptable farming technique was established;

(3) peanuts were much more profitable than other crops such as upland rice, sweet potatoes, soy beans and maize.

As for the area of peanut in Japan (Table 1), the main regions are Kanto district and South Kyushu where climate and soil condition are favorable for peanut production. Especially, in Chiba and Ibaragi prefectures in Kanto, the production is much enough to account for 70% of the total. The reason of the popularity in these districts is their comparatively long history of peanut cultivation and good system of marketing and processing.

The postwar increase of peanut production largely depends on increase of area in some main peanut producing prefectures such as Chiba, Ibaragi, Tochigi and Kumamoto. But within a few years, the yield dropped and the quality became worse and eventually the profit became less owing to the injury by continuous cropping. The reason was the excess spread of planting area of peanut in these prefectures. Recently, peanut growing farmers being stimulated by the economical progress in other industrial sectors, are changing to the vegetables growing farmers who gain better profit comparatively. Some of them became part-time farmer in order to seek for the better earning. Naturally, peanuts are now being grown by an extensive culture in excess, decreasing the yield gradually.

Domestic peanut production is decreasing in spite of increasing demand, so that the full supply of peanuts depends entirely upon import. Then an increase of imported cheap peanuts affects on the price of domestic peanuts.

Thus, Japanese peanut cultivation is facing considerable difficulty now.

Varieties and Culture of Peanut

In Japan, peanut cultivation took the first step by sowing the seeds imported from America in the beginning of Meiji Era. Some seeds were also introduced from China through dealers, and all of them were prostrate Virginia type. But soon, breeding was started by method of pure line selection in Chiba and Kanagawa prefectures.

In Chiba prefecture, prostrate variety Chiba 43, Chiba 74 and an intermediate Chiba 55 were selected. In Kanagawa, Tachi Rakkasei 1 and Tachi Rakuda 1 were selected from the erect variety which was mutant of a prostrate variety. Out of these varieties, Chiba 43 and Tachi Rakkasei 1 were the representative ones before the war. A lot of Virginia and Spanish type varieties were also introduced through various routes, and cultivated in a few regions. The names of these varieties, however, are unknown.

After the war, in Chiba prefecture, Chiba Handachi was bred by pure line selection of intermediate variety. It was high yielding, and also very adaptable to the oper-

Table 6. History and characteristics of main peanut varieties

Variety	Type	Breeding method	Parents or original Variety	Growing district	Growing period	Plant type	Length of branch	Number of branch	Seed size	Seed color
Southern cross	S.P.	Selection	Java 13 (Introduced from Java)	Whole country	Short	erect	Medium	Few	Small	Yellowish white
Hakuyu 7-3	"	"	Hakuyuto (local variety)	Kanto, Kyushu	"	"	"	"	"	"
334A	Vir.	"	Introduced from USA	Kyushu	Long	"	Short	Many	"	"
Chiba 43	"	Selection	Local prostrate variety	"	"	prostrate	Long	"	Large	Orange-brown
Tachi-rakkasei 1	"	"	Local erect variety	Kanto	"	erect	Medium	"	"	"
Chiba-handachi	"	"	Local intermediate variety	Whole country	"	Intermediate	Short	"	"	"
Azuma-handachi	"	Hybridization	Chiba 43 × Hondazairai	Tokai, Kanto	"	"	"	"	"	"
Tekona	"	"	Chiba-handachi × Spain	Kanto	"	"	"	"	"	"
Wase-dairyu	"	"	Kairyō-wadaoka × Hakuyu 7-3	Kyushu	Short	erect	"	Few	"	Orange-yellow
Beni-handachi	Vir.	"	Chiba-handachi × Spain	Tokai, Kanto	Long	Intermediate	"	Many	"	Orange-red

ations of intertillage and harvesting as it had short branches as compared with former prostrate or erect large seed varieties. The variety rapidly prevailed in place of Chiba 43 and Tachi Rakkasei 1, and it was widely cultivated in Kanto and the southward regions spreading the peanut area.

Meanwhile, Spanish type varieties are cultivated in place of Virginia type in the northern regions of Kanto and in the south Kyushu regions because, in the former regions, the yearly mean temperature is below 13°C and the soil conditions are not suitable, and in the latter regions, the crop of Virginia type varieties is apt to be damaged frequently by the droughts or disease and insects in the fruiting stage. And furthermore, Spanish type varieties are also cultivated for the farmers' own use. The typical varieties of this type are Southern Cross and Hakuyu (White-Oil) 7-3. In addition, small seed Virginia type 334 A imported from America has been planted in a part of Kyushu.

Azuma-Handachi (1960), Tekona (1970), Wasedairyu, Bei-Handachi (1972) were released as the results of the nationwide breeding program started in 1947, and these are expected to become popular in the future.

Outline of histories and characteristics of these new varieties are shown in Table 6.

Outline of Cultivation Method

Before the War, peanut cultivation depended entirely upon human power from seeding till harvesting and threshing, as shown in Table 7, so it was considerably difficult to expand the peanut area owing to the too much labor force especially needed for harvesting and threshing.

Table 7. Labour required for peanut growing (hour/ha)

Kind of operation	Operated by		
	Man power	Small machinery	Large machinery
Land preparation	94	28	6.8
Manuring	67	40	} 8.4
Seeding	118	47	
Management	354	197	7.7
Harvesting, drying	352	132	22.4
Threshing	1,770	67	40.0
Total	2,755	511	85.3

Taking advantage of the opportunity when Merry tiller was imported from America after the war, originally for rice cultivation, farmers and dealers of farming machine of peanut area modified it for upland culture use, and designed a peanut digger, seeder and a power thresher etc., and established cultivation technique of peanut using small type farming machines. This consistent mechanized cultivation system from seeding to harvesting and threshing took the lead of mechanization of other upland crops, so that labor force was lessened, and it contributed to the progress of the postwar peanut cultivation, as shown in Table 7.

Moreover, recently the mechanization by large machines has been under research and working hours were estimated (Table 7).

In Japanese agriculture, research on the technique of crop production has been aimed towards an increase of the yield per unit area in general, but the progress of

peanut cultivation technique is a rare case which was intended to increase more labor productivity rather than land productivity as mentioned above. One of the reasons of this is that the farmers in the main peanut producing area have comparatively large farms (an average of 2 hectares), and the price of peanut was high as compared with other crops, which makes them easier to get profits by means of the expansion of cultivated areas rather than the increase of yield per unit area.

Such trend brought out a development of peanut cultivation to some extent but it is the very reason of the recent stagnation that there is a limit in the improvement of labor productivity. Moreover there is an injury by continuous cropping.

Outline of Japanese peanut cultivation by small type tiller is as follows.

(1) Seeding Time

The air temperature of April in Kyushu and May in Kanto rises up enough for germination of peanut. Virginia type varieties need comparatively high temperature and even if they are seeded early in the months, it will take more days to germinate and bloom as compared with the other type resulting in rather poor harvest due to stagnation of growth by low temperature and much rain in the rainy season, June and July. On this account, it can not be always expected to get a good effect in an early seeding of Virginia type.

Inter cropping with barley and wheat is frequently applied to peanut cultivation, and the important factor in this system is not only the temperature but also the length of intercropping period with preceeding crop. The inter cropping period should be within 25 to 30 days, otherwise it will bring out the reduction in yield. Then the optimum

Table 8. Seeding rate and yield of peanut (g/10m²)

Spacing (cm)	No. of hills/10m ²	Yield		
		Southern cross (g)	Chiba-handachi (g)	Chiba 43 (g)
15 × 10	444	3,790		
24 × 24	174	3,890	4,580	5,470
30 × 30	111		4,050	
36 × 36	77	2,770	3,640	4,300
45 × 45	49	2,420	4,180	3,610
51 × 51	38			3,780

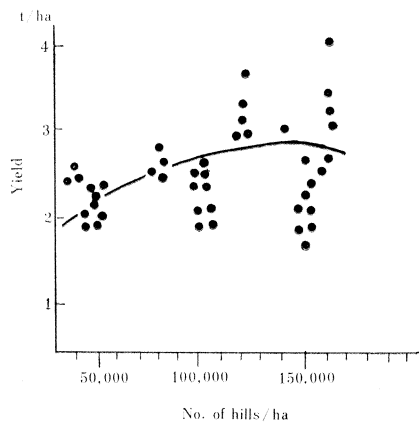


Fig. 2.

seeding time of peanut is generally from late in April to the middle of May in Kyushu, and from the beginning toward the end of May in Kanto. It had better be early in case of no preceding crop, while be late in the case of inter cropping.

(2) Seeding Rate

Many experiments have been carried out on the relationship between seeding rate and yield. As shown in Table 8 and Fig. 2, peanuts apt to increase yield by means of dense planting. But practically, two seeds per hill with 65×30 cm, approximately 10 hills per square meter, are sown to minimize the damage of disease and pest and for the convenience of small type machinery.

Hand seeding is common with hill space of about 30 cm which is the length of a short foot stride, but seeder is also being used in case of large scale cultivation.

(3) Fertilizer

Before World War II, only compost and plant ashes were applied for peanut growing.

After the war, however, mixed fertilizer of ammonium sulfate, super phosphate of lime and potassium-sulfate was used, and recently the compound fertilizer for exclusive use of peanuts has been applied and its components are N of 20 to 30 kg, P_2O_5 about 100 kg, K_2O of about 100 kg per hectare. But such an amount of fertilizer is adaptable for continuous cropping and in the case of rotation or cultivation on the fertile soil, it is enough to give one half to two thirds of it.

Since peanuts have often been intercropped on light volcanic ash soil or sandy soil, the ploughing before seeding is usually skipped. Fertilizer is applied in the seed furrows which are made between rows of preceding plant.

(4) Management Works

Nowadays, the application of herbicide right after sowing has become popular and the effect of weed killer at the beginning of growing stage is remarkable. On the volcanic ash soil in Kanto, Shimajin dust (CAT) is applied 60 to 80 kg per hectare after sowing covering all the surface of soil. The effect will last for about one month.

Inter-tillage, which has also an effect of weeding, is performed two or three times by means of cultivator from 30 days after sowing. If the preceding crop is wheat or barley, the first intertillage is carried out by small rotary machine. The last intertillage (toward the end of July in Kanto) is combined with molding.

Under proper management mentioned above, the hand weeding will not be necessary and occasional patrol of the fields to eliminate remaining big weeds will be enough.

(5) Peanut Plant Protection

a) Disease Control

In Japan, the main diseases of peanut are Leaf spot of peanut (*Mycosphaerella berkelyii*, *Mycosphaerella arachidicola*), Stem rot (*Diplodia natalensis*), and Southern blight (*Sclerotium rolfsii*) etc. But recently, Peanut mottle virus, *Botrytis cinerea*, Peanut rust (*Puccinia arachidis*) are apt to occur in many localities. For Leaf spot of peanut sulfur-dust is sprayed 30 kg per hectare. The rest are not so serious except for special cases, so the control by chemical is scarcely made, and only crop rotation and elimination of infected hills are carried out.

b) Insect Pest Control

Damage of northern root-knot nematode (*Meloidogyne hapla*) caused by continuous cropping is the most serious. Against it, EDB or DD is poured into the soil by 300 l per hectare.

As for the other insects, Wireworm (*Melanotus caudex*) at the stage of germination; Soy bean beetle (*A nomala rufocuprea*), Aphia, and bean borer (*Lathronympha phaseoli*) etc. during growing period are of frequent occurrence.

Against the Wireworm, Hepta chlor is applied in the dressing furrows and against

the developing pests Smithion powder (MEP) is dusted by 30 kg per hectare.

(6) Harvesting, Drying and Threshing

It is general to cut the tap root by means of a tiller fitted with a digger, and then to dry in the sun the haulms with pods arranging them upside down in a row in the field. After 7 to 10 days, these are accumulated at about 50 places per hectare in shape to prevent rain water. Peanuts are dried during the heaping (from November about to January), because the humidity drops down with the temperature.

During from December to January, when the field works finish, peanuts are threshed by means of power thresher. It needs about 10 hours per hectare by four heads, accordingly about 40 man-hours per hectare.

Sending peanuts to market is done without shelling and they are sold after being graded.