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Flower Bulb Industry in Japan and Holland: Trade and Production

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Contents

1.Introduction

In 1988, the Japanese market of flower bulbs was opened by lifting of plant quarantine measures for various items of tulip and lily bulbs. The measures were non-tariff barriers for foreign countries to export flower bulbs to Japan. Since then a huge number of flower bulbs were imported and particularly the Dutch bulbs shares two thirds of the Japanese market today.

As well known, the Netherlands is one of the dominant countries of flower bulb trade in the world and its contribution to the international trade shows significantly around 90% of the over all market. [1)] Her production value is also the highest in the world, followed by Japan, whose rate is almost one tenth of the Dutch one.

In this paper I shall discuss the flower bulb industry in Japan and Holland since 1970s. Section 2 demonstrates the comparisons of the international trade and production of the flower bulb sector as well as the entire floriculture between the countries, and production structures of the flower bulb industry in both countries are shown in section 3. In section 4, I shall consider a role of the flower bulb industry in terms of national economy. Overall discussion of dynamics and changes of the Japanese bulb market in the 80s and 90s follows in section 5.

2. International trade and production

(1) Export and import

(a) Holland

The total exports of floriculture in the Netherlands have increased for last thirty years as shown in Figure 1(and see Table 1-1). In 1996, its value was estimated around 462 billion yen (7.7billion guilder), evaluating one guilder as sixty yen. This figure is almost ten times bigger than the one in 1970. With a considering of inflation, it could be fare to suggest the real increase to be more than three times. The floricultural products of the Netherlands are exported to all over the world including Japan. The Dutch export rate to Japan has increased from 0.2 % in 1975 to 3.5 % in 1995. More than two thirds of the

products are flower bulbs.

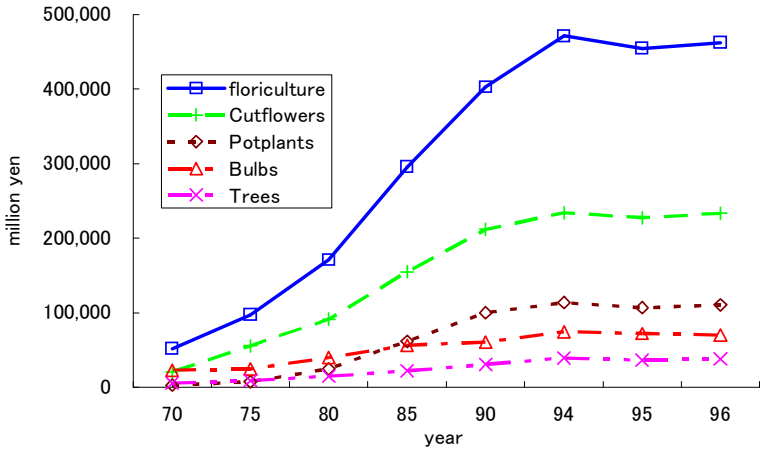

Fig.1 Dutch exports 1970-96 (1guilder=60yen)

In 1996, flower bulbs shared around 15% in the total exports of the Dutch floricultural products. Despite its increase in total value throughout the years, its share has diminished from 45% in 1970 to 23% in 1980. The Dutch bulb export to Japan has increased sharply during the 90s. Its value in 1995 is twenty times more than the one in 1985.

Main countries to be exported from the Netherlands during 1997-98 are USA, Germany, Japan, UK, and Italy, The export proportion between dry bulbs for sale and forced bulbs for cut-flower production is 4:1 in UK, 2:1 in USA and Germany, and 1:4 in Japan and Italy.[2)]

Dutch imports of floricultural products are shown in Table 1-2. Its amount is about 57 billion yen (942.9 million guilder). It is clear that her exports have exceeded her imports. Particularly the exports of cutflowers and potplants have been increasing dramatically.

(b) Japan

The development of exports and imports of floriculture in Japan are shown in Figure 2 and 3 (see also Table1-3 and Table 1-4). In 1996 the export value is only 1 billion yen

while the import is 4.7 billion yen which is around 5 times of the export.

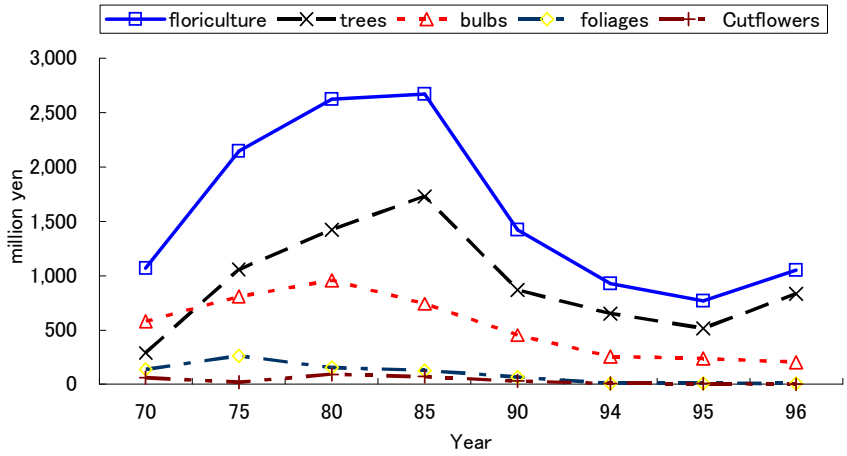

Fig.2 Japanese exports 1970-96

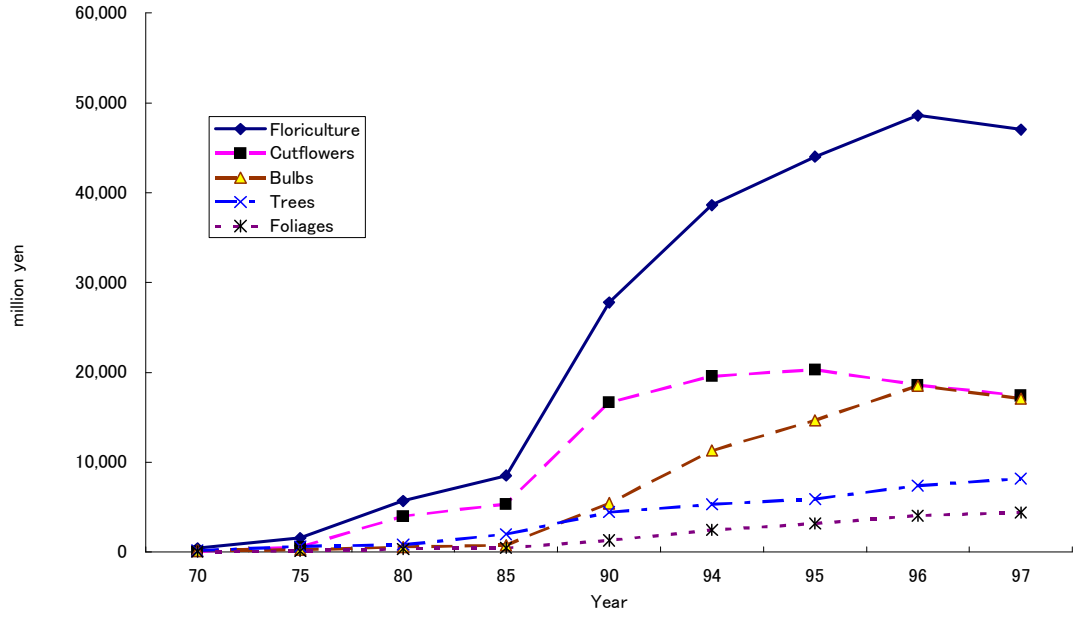

Fig.3 Japanese imports 1970-97

In 1970 Japan was one of the significant exporters in the world floriculture industry. However, Japan has changed into an importer of cutflowers in 1980. This change was mainly caused by the revaluation of Japanese yen during the 70s.

The Japanese bulb export exceeded its import in 1970. But its import exceeded its export in 1985. Since then it has increased dramatically and recently it gets to be nine times of the export, as shown in Figure 4.

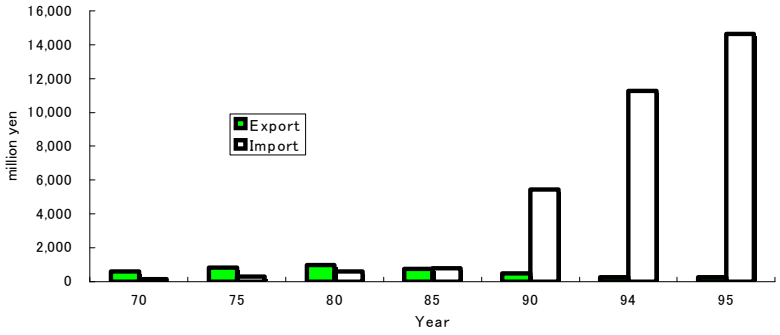

Fig.4 Japanese export and import of flower bulbs 1970-95

The most important country of exporting flower bulbs to Japan is the Netherlands, sharing 90% in the Japanese bulb imports. And others are New Zealand, the USA, South Africa, Thailand, Taiwan and China.[3)]

(2) Production

(a) Sales

The Dutch production of floriculture has increased steadily as Figure 5 shows, and the Japanese production has also increased as well as Figure 6 shows. The total value of Dutch floriculture products is around 500 billion yen in 1996. That of Japanese one is around 630 billion yen, which exceeds the Dutch one by 26 %.

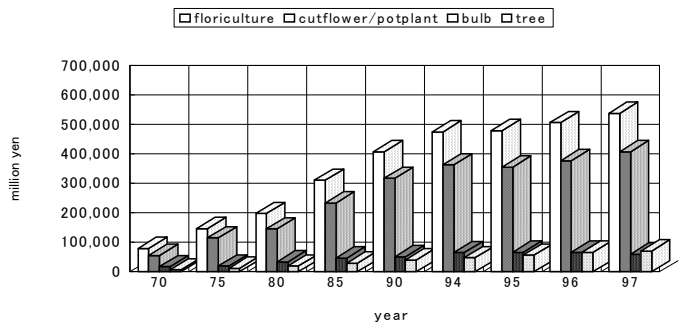

Fig.5 Dutch production 1970-1997 (1guilder=60yen)

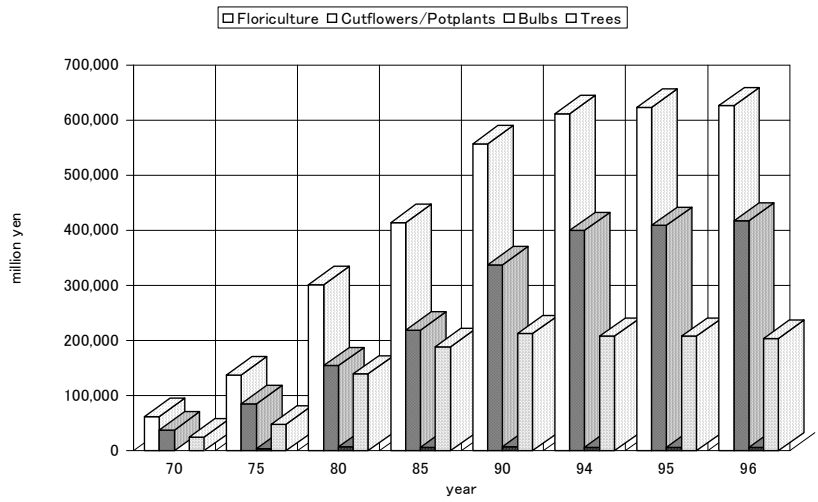

Fig.6 Japanese production 1970-96

The production value of cutflowers and potplants in the Netherlands is almost the same as that in Japan. The values have been increased as a trend in both countries.

The production value of flower bulbs in the Netherlands is around 66 billion yen (1.1 billion guilders) in 1996, which is 11 times of that in Japan. The share of bulbs in Dutch floriculture is 13%. That in Japanese one is only one percent. The production value of Japanese flower bulbs had a peak in 1990. And since then it has decreased.

(b) Acreage

In respects to cultivation area, the Netherlands has 38,000 ha of floriculture in 1997 and Japan has 48,000 ha in 1996. The Dutch acreage of floriculture has increased steadily from 23,000 ha in 1975, as shown in Figure 7 (and see Table 1-7).

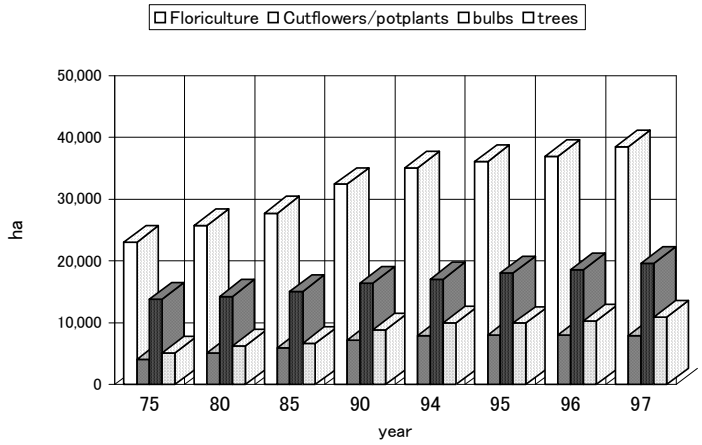

Fig.7 Acreage in Holland 1975-97

The Japanese acreage increased until 1975, decreased in early 80s, recovered in 1990, and recently is likely to be stable. The trough is 33,000 ha in 1980, and the peak is 48,000 ha in 1995 with an increase of 30%, as shown in Figure 8 (and see Table 1-8).

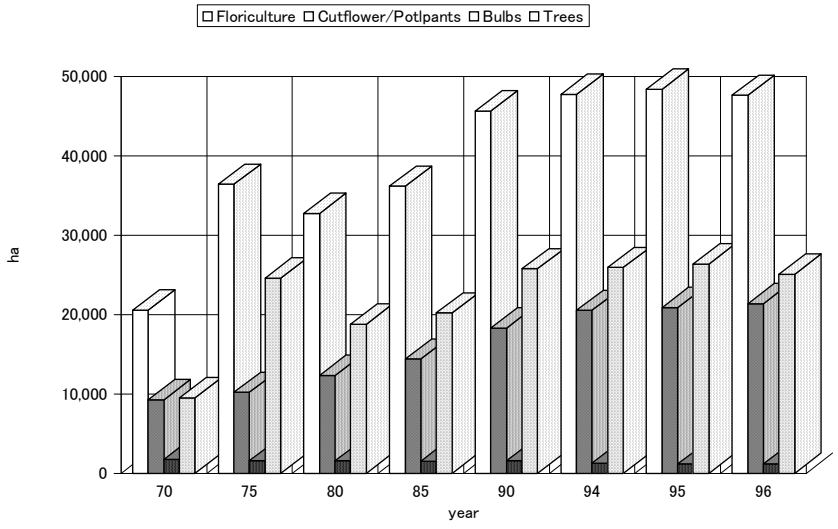

Fig.8 Acreage in Japan 1970-96

Japanese acreage of cutflowers and potplants has increased steadily. In 1995 it is 21,000 ha which is three times of the Netherlands. Their production value is almost same of the Netherlands. In the Netherlands, glasshouse production is popular. The

ratio of glasshouse acreage to total acreage in cutflower and potplant cultivation is over 70%, as Figure 9 shows (and see Table 1-7 and Table 1-8). In contract, the Japanese ratio increased to at most 50% in 1996. Therefore the cultivation method in the Netherlands is more capital-intensive than in Japan. Or the Japanese cultivation is more land-intensive than the Dutch one.

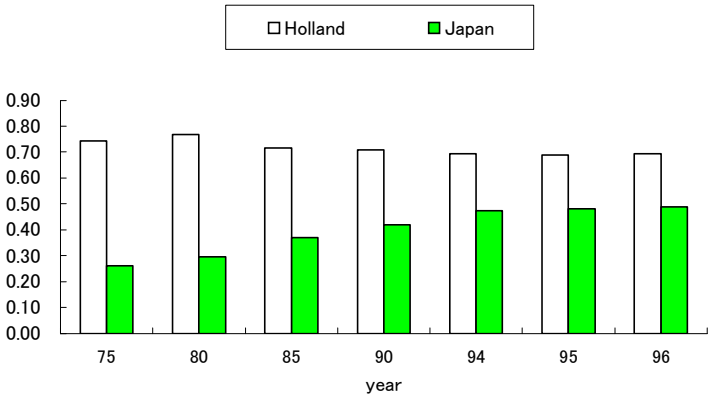

Fig.9 Glasshouse ratio in Holland and Japan 1975-96

The acreage of bulb production in the Netherlands is 19,000 ha in 1996. That of Japan is 1,200 ha, which is one-sixteenth of the Netherlands. The Dutch composition of bulb field follows: Tulips 47 %, lilies 18 %, Gladioli 10 %, Narcissus 8 %.[4] The Japanese one follows: Tulips 42 %, Lilies 24 %, Gladioli 10 %, Iris 5 %, freesia 5 %.[5] The Dutch acreage has been increasing. Japanese acreage has a log-run decline trend as a table below Figure 8 shows.

(3) Farmers and average acreage

A number of floricultural farmers in the Netherlands has been decreasing from 22,000 in 1975 to 18,000 in 1997 with a fall of 20% (see Table 1-9). That in Japan did from 162,000 to 146,000 with 10% fall (see Table 1-10). In Dutch cutflowers and potplants, the number of farmers decreased from 12000 in 1975 to 10000 in 1997. The average acreage have increased from around 30a to 80a, which is more twice than before (see Table 1-11). Japanese farmers of cutflowers and potplants have increased from 66,000

in 1975 to 93,000 in 1995. The average acreage increased from 14a to 23a by 80 %, due to an increase of cultivation area (see Table 1-12).

In respect to bulb farmers, the number in the Netherlands decreased from around 6,500 in 1975 to around 3,000 in 1997. That in Japan did from 9,800 in 1975 to 3,800 in 1996. The average acreage in the Netherlands increased from 2 ha to 6 ha by three times. That in Japan did from 16a to 30a by two times.

3. Production structure of bulb sector

(1) Cultivation scale

(a) Holland

Figure 10 shows a trend and change of number and scale distribution of Dutch bulb farmers. The number of bulb farmers decreased from 3300 in 1993 to 3000 in 1997. As Table 2-1 shows, bulb farmers cultivating land of less than 4 ha decreased from 64 % to 31%. And Bulb farmers of more than 8 ha increase from 19 % to 54 %. The number of farmers borrowing land has been increasing. In 1997 the farmers using only their own land are 23 % of total number. The farmers borrowing land of with more than 3 ha are 45 % in total farmers.

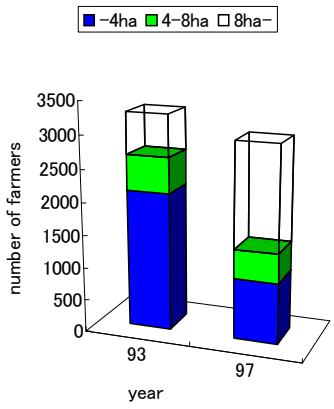

Fig.10 Farm distribution in Holland 1993-97

The Dutch specialized farm of bulb production trends to be bigger as Table 2-3 shows. In 1997 the Dutch farmers cultivate 15 ha in average. The Japanese specialized farmers have 2 ha acreage. The biggest one is at most 13 ha.

In the Netherlands half of bulb fields are of sandy soil (see Table 2-4). There is a difference of production condition between sandy and clay soil. The Dutch growers are subject to strict environmental regulation to decrease in chemicals and pesticides. [6)]

(a) Japan

The Japanese data of farm distribution of bulb growers at the national level is not available. Figure 11 shows a development of number and scale distribution of bulb growers in Toyama where is one of two main tulip bulb areas. As Table 2-2 shows, the number of bulb growers in 1996 is half of that in 1980. The share of bulb growers cultivating less than 30a land decreased from 57 % in 1980 to 36 % in 1996. That of more than 1ha increased from 5 % to 19 %. Most of Japanese bulb farmers are growing rice as well as bulbs. And the soil of bulb fields is mostly clay.

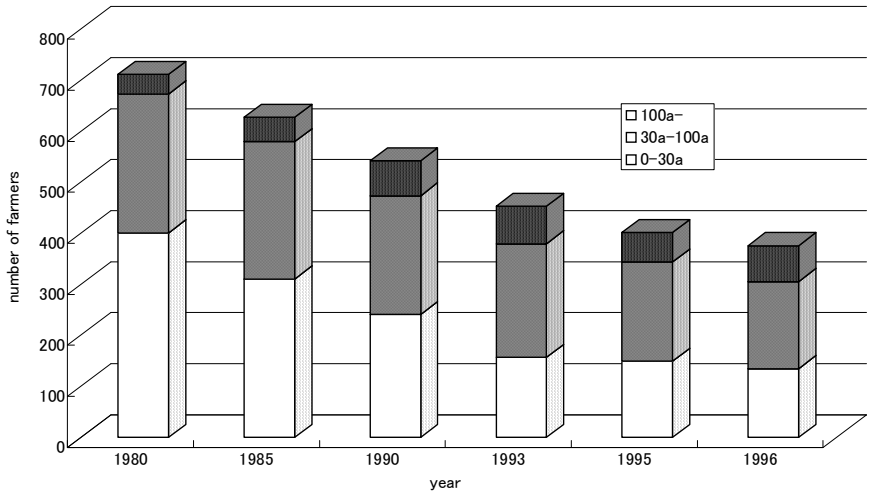

Fig.11 Farm distribution in Japan(Toyama) 1980-96

(2) Labour input

(a) Holland

The Dutch growers spent 410 hours of per 10 a in 1960, 100 hours in1980, and 75 hours in 1995 as shown in Figure 12 (see Table 2-5).

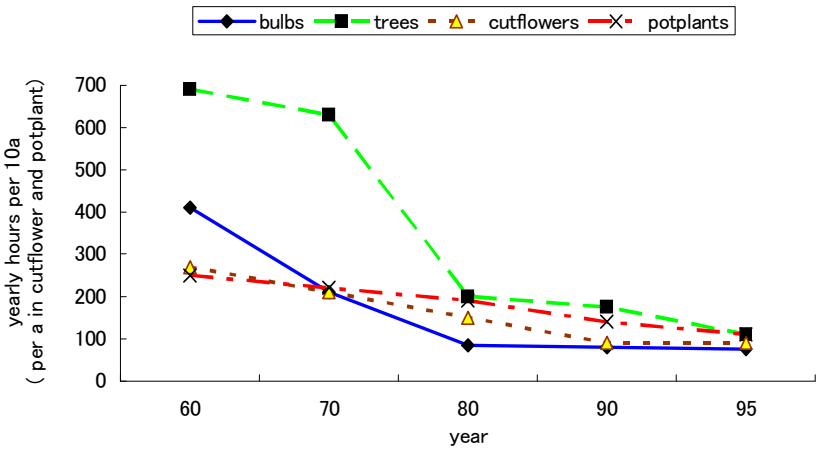

Fig.12 Labour input in Holland 1960-1995

The decline of yearly labour input has been caused by scale economy and continues technical progress. The new production methods is introduced and propagated. For recent example, net cultivation in tulip bulb on clay soil saves one third of labour input, according to my interview to a bulb grower.

(b) Japan

The Japanese growers spent 680 hours per 10a in 1958, 240 hours in 1975, and 330 hours in 1985 as shown in Figure 13 (and see Table 2-6). For recent 10 years, official data of labour input is not available. According to a personal case study, it is 240 hours in 1994.

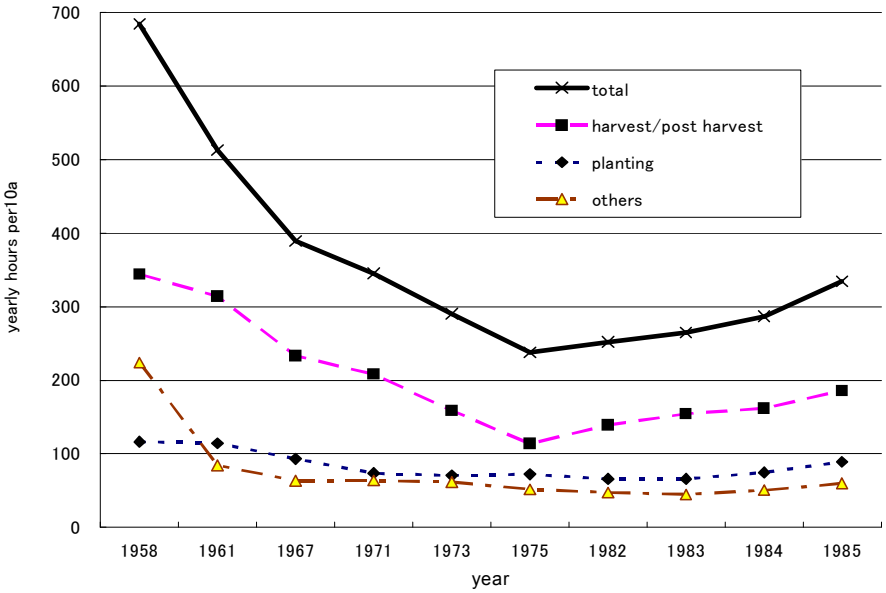

Fig.13 Labour input of Tulip cultivation 1958-1985, Toyama, Japan

(3) Income

(a) Holland

Dutch real farm income per farmer in flower bulb sector has upward trends, as shown in Figure 14 (and Table 2-7). Especially bulb income increased sharply in the early 90s because of an increase of world demand, especially from USA and Japan.

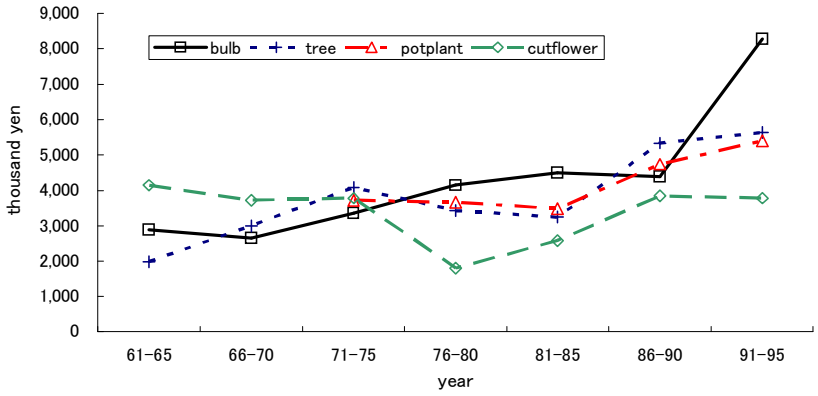

Fig.14 Dutch real farm income 1961-95, by CIP(1980)
(1guilder=60yen)

(b) Japan

Japan has no reliable data on farm management survey in floriculture. Real gross

production per farmer (deflated by CPI) is shown in Figure 15 (and Table 2-8). It shows steady growth of floricultural products during the decades of the 80s and 90s.

Although the share of farm income in gross production is not available, assuming it as 30 %, bulb growing gives bigger income per acre than rice growing does in the 80s. But recently they get lower income because bulb prices are falling.

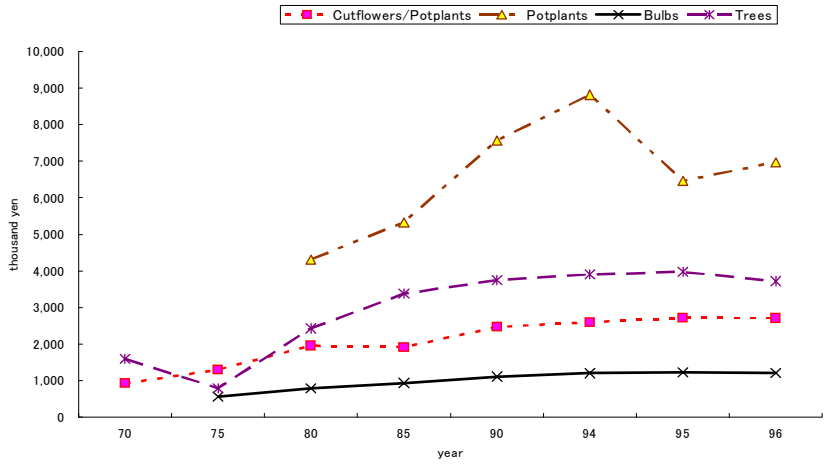

Fig.15 Japnese real farm income 1970-96, by CPI(1980)

4. Industrial structure

Table 3 shows comparisons from the viewpoint of national wide economy, in 1970, 1985, and 1995.

In 1995, Dutch GDP in nominal term is roughly one third of the Japanese one, although its value depends on the exchange rate. Per capita GDP of the Netherlands is half of that of Japan. In terms of purchasing power parity, the difference of real income between both countries is smaller. GDPs of both countries have been growing steadily

Both countries have a small agricultural sector. Dutch share of the agriculture and fisheries in GDP is around 3%. And the Japanese share is around 2 %.

The Netherlands is a trade-oriented country. Dutch export reliance is around 50 % and its import reliance around 40 %. Japanese reliance of exports is around 9 % and its reliance of import is around 6 %.

In the Netherlands total land has been diminishing since 1985. But the share of cultivated land is growing and gets to be around 24 % in 1995. In contract, the Japanese cultivated land has been decreasing and shares around 11% in 1995.

Dutch share of floricultural acreage in cultivation land has been growing and is 4.5 % in 1995. As well as the Netherlands, the Japanese share has been growing and is today 1.2 % from 0.9 %.

In the Netherlands the share of flower bulb field in the floricultural area is decreasing but amounts to 52% in 1995. In Japan its level is lower and decreasing and gets to only 2.4 % in 1995.

Figure 16 (and Table 4) shows a trend of flower consumption per family in Japan. Flower consumption per family is growing. And expenditure for gardening goods is increasing as well. Japanese people would spend a lot of money to flowers, in nominal terms. But in real terms, they would buy less flowers than the Dutch. In Japan the price of a stem of flower is expensive and flowers are some kind of luxuries.

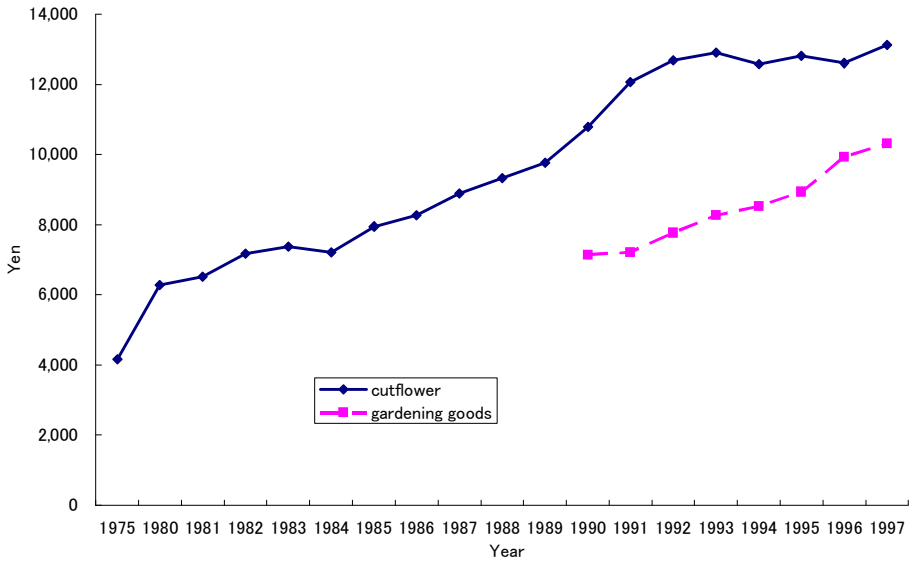

Fig. 16 Flower consumption per family

A development of foreign exchange rates among Japanese yen, Dutch guilder and US dollar is shown in Figure 17 (and Table 5). In the long run, both exchange rates of yen and guilder to US dollar have been raised, although in the middle of the 80s Dutch guilder to US dollar fell sharply. The exchange rate of Japanese yen to Dutch guilder has been raised in the in the long run. But in the late 80s it fell sharply. And in 1989 and 1990 it was cheep. Recently its value is around 60 yen per guilder in 1997.

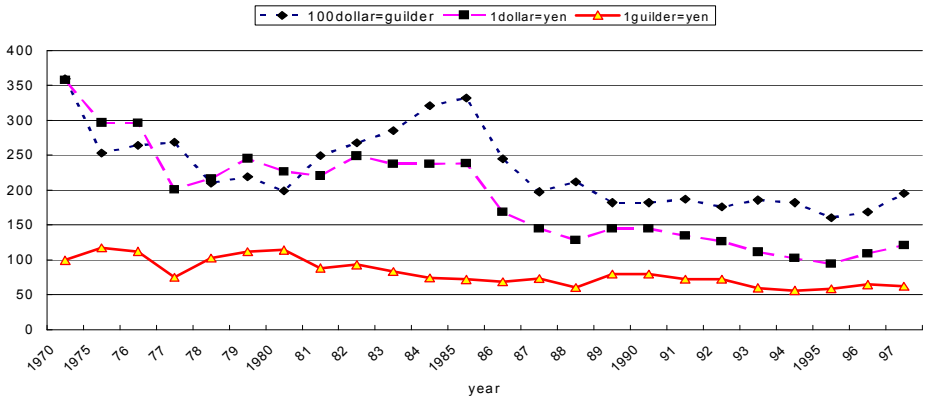

Fig. 17 Exchange rates

5. Japanese bulb market in the 80s and 90s

Table 6-1 and 6-2 are a summary of Japanese bulb market. In Table 6-2 the import reliance is calculated in terms of value and quantity. The scale of market, or domestic consumption, is defined as

Consumption = domestic production + import – export.

And the reliance of import (=1-reliance of self-sufficiency) is defined as

Reliance of import = import / consumption.

Before (in the 70s) Japan was an exporter of flower bulbs. Revaluation of Japanese yen killed Japanese export competitiveness. The equilibrium of the trade balance of bulbs was in 1983, while the volume of the imports was small and the reliance of import is around 10 %. But, after 1988 when the plant quarantine measures of bulbs begun to be left, the imports increased drastically, and the import reliance is now over 60 % in terms of volume and over 75 % in terms of value in 1997.

Peaks of the acreage in the domestic production were in 1981 and 1987. Those of volume were in 1980 and 1991. Those of production value were in 1980, 1983, 1988 and 1991. As a trend, during the 80s the production was stable. And it began to increase in the early 90s. But recently it stagnates again.

The average prices of bulbs had increased until 1983. The peak years were 1993, 1988, and 1993.

To consider inflation, let us notice the relative (real) price of bulbs defined as the average price by deflating the CPI (consumer price index) based in 1995. Figure18 shows the configuration of the relative price and quantity of flower bulbs.

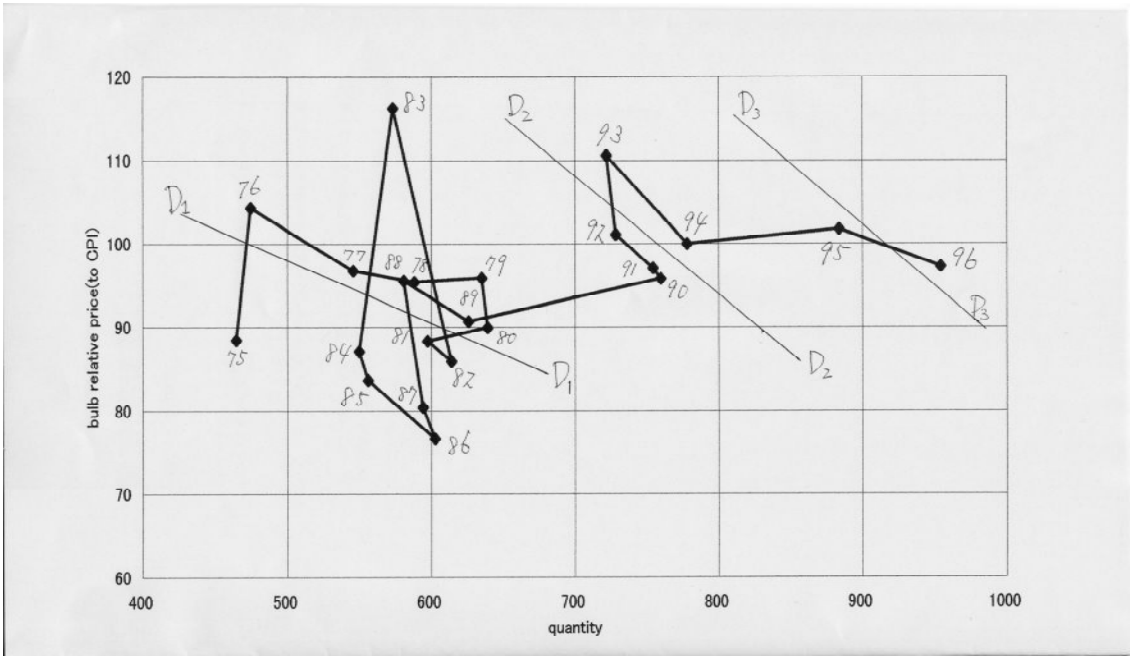

Fig.18 Japanese bulb market(1975-96)

In general, consumption demand for goods depends upon its own price, the prices of its substitutes and complements, and income as well as preference. Preference means attitude of consumption and life style of the people.

In a decade of the 80s, the Japanese economy had been under fairly good business condition as a trend, although the world economy was in stagnation. Especially during the late 80s and the early 90s it was called as a 'bubble economy'. At the time, Japan had a steady growth in her consumption. In 1988, the lifting of quarantine measures for tulip and lily bulbs made a drastic increase of imports and new kind of flower bulbs came into Japan. In 1990 a world flower exhibition in Osaka was held successfully. From 1989 to 1991, the import increased sharply. But they said it was less than what they had expected. It was because of devaluation of yen to dollar and guilder. And domestic production could be increased a little bit in 1990.

After 1994, the revaluation of yen and growing demand for bulbs pushed a great increase in imports and expanding the domestic market. The prices are likely to decrease. 'Casual flowers' have got to be popular and 'gardening boom' came in Japan,

while some of domestic growers made a shift of production from bulb to cutflowers

We could identify three periods in the Japanese flower bulb market:

(1) the late 70s and after saturation of floriculture
(2) the late 80s and after bubble economy and opening market
(3) the middle of the 90s gardening boom

Linear regressions of 1976-89 and 90-94 are drawn as D1 and D2 Curves in Figure 18, and D3 curve is added by rule of thumb.

Estimated lines: $y = -0.0811x + 139.25$ for 1976-89, $R^2=0.1217$,

and

$y = -0.1717x + 229.44$ for 1990-94, $R^2=0.4667$,

where y denotes the relative bulb price and x the consumption quantity.

Demand sifted from D1 to D2 during the period of bubble economy and opening market. And demand for flower bulbs is still moving right-forwards.

Acknowledgements

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Notes

1) See De Kleijn and Heybroek (1992) for bulb sector in the world, and Haak, Tap and Heybroek (1992) and De Groot (1998) for cutflower and potplant sector. See Also Imanishi and Hosoki (1994) for Japanese bulb sector. Recent Japanese development of cutflower sector is described by Imanishi and Ogawa(1997) and JETRO(1998).

2) See IBC(1999).

3) See JFPC (1998).

4) See IBC (1999).

5) See JFPC(1998).

6) See IBC(1997) (1998), De Vroomen and De Groot et al(1992), and De Groot (1995b).

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Tables

Talbe 1-1	Holland	Exports					(million guilder)		
Year	1970	1975	1980	1985	1990	1994	1995	1996	1997
Floriculture	868	1621	2850	4925	6710	7849	7575	7701	
Cutflowers	344	928	1520	2580	3530	3900	3790	3890	
Potplants	47	128	415	1030	1665	1894	1775	1841	
Bulbs	384	416	660	940	1010	1241	1205	1170	
Trees	94	149	245	370	515	659	607	636	
To Japan	1	3	5	15	128	273	272	259	
Table 1-2	Holland	Imports					(million guilder)		
Floriculture			305		419.9		735.6	942.9	
Cutflowers/Potplants			239		338.3		672.6	886.4	
Bulbs			36		60.8		46.8	46.6	
Trees			30		20.8		16.2	9.9	
Table 1-3	Japan	Exports					(million yen)		
Floriculture	1068	2148	2626	2673	1422	927	769	1050	1000
Cutflowers	60	20	92	72	31	9	6	1	5
Bulbs	580	809	957	743	454	256	238	205	230
Trees	288	1055	1423	1730	870	652	516	835	756
Foliages	139	264	154	128	68	10	9	9	9
Table 1-4	Japan	Imports					(million yen)		
Floriculture	412	1540	5688	8514	27803	38623	44014	48597	47029
Cutflowers	58	546	3987	5312	16645	19586	20287	18589	17412
Bulbs	144	262	575	764	5433	11284	14657	18506	17055
Trees	157	630	802	1996	4434	5297	5910	7401	8168
Foliages	54	103	333	442	1290	2456	3159	4047	4394
Table 1-5	Holland	Production					(million guilder)		
Floriculture	1320	2440	3300	5175	6791	7930	7981	8448	8960
Cutflowers/ Potplants	925	1915	2430	3900	5280	6050	5925	6285	6790
Bulbs	285	325	550	780	839	1080	1106	1098	1000
Trees	110	200	330	495	672	800	950	1095	1170
Table 1-6	Japan	Production					(million yen)		
Floriculture	62090	137772	301234	414462	557273	614200	623300	626500	
Cutflowers	29017	62856	112941	157705	244360	286000	289400	291900	
Potplants	8321	22619	41637	61214	92993	113500	119400	124900	
Bulbs		3996	7124	6574	7424	6800	6500	6000	
Trees	22459	41150	133000	175098	183241	167923	167871	160100	
Seedling	516	1006	1933	3567	7729	15200	17400	21500	
Turfs	1777	6175	4599	8090	17617	19500	17400	15800	

Cover plants				2214	3909	5270	5315	6300	
Table 1-7	Holland		Acreage					(ha)	
Glasshouse									
Floriculture		3060	4040	4370	5283	5700	5715	5760	5825
Cutflowers/ Potplants		3060	3975	4275	5140	5519	5518	5556	5541
Trees			95	100	143	180	197	204	284
Outdoor									
Floriculture		20000	21700	23400	27163	29359	30359	31187	32765
Cutflowers/ Potplants		1060	1200	1690	2103	2432	2499	2448	2416
Bulbs		13800	14300	15060	16410	17106	18086	18649	19664
Trees		5100	6160	6640	8741	9821	9774	10090	10685
Table 1-8	Japan		Acreage					(ha)	
Floriculture	20583	36410	32764	36163	45658	47789	48421	47624	
Cutflowers	8515	9304	11317	13087	16609	18700	19000	19400	
Potplants	755	914	1039	1333	1707	1840	1880	1970	
Bulbs	1788	1578	1578	1522	1546	1280	1160	1160	
Trees	6380	16714	14453	14790	16140	15035	14950	14715	
Seedling	222	134	244	271	419	726	816	964	
Turf	2923	7766	4115	5121	9158	10088	10486	9264	
Cover plants				39	80	120	129	151	
Glasshouse								(ha)	
Cutflowers/ Potplants	1658	2693	3737	5434	7851	10044	10424	10906	
Outdoor								(ha)	
Cutflowers/ Potplants	7834	7659	8863	9257	10883	11170	11244	11392	
Table 1-9	Holland		Number of farmers						
Bulbs		6515	4916	4128	3691	3160	3069	3040	2978
Cutflowers/Potplants									
in open		3378	3007	3124	3257	3129	3089	2963	2740
Under glass		8352	7923	7701	8004	7673	7399	7177	7002
Trees		3165	3637	3709	4045	4110	4074	4092	4143
Perennial plants		811	880	1105	1106	1129	1131	1260	1285
Total		22221	20363	19767	20103	19201	18762	18532	18148
Table 1-10	Japan		Number of farmers						
Cutflowers	74175	66404	57741	72678	81382	85100	83000	83300	
Potplants			10094	10728	10940	11300	10700	10300	
Seedling						5710	5770	5920	
Trees	33325	71123	54771	45739	40200	33283	32843	33255	
Bulbs	16161	9762	8997	6206	5492	4380	4130	3830	

Turf		14275	7657	6487	9305	8226	8720	8179
Cover plants				230	499	669	745	754
Total	123661	161564	139260	142068	147818	148668	145908	145538

Table 1-11	Holland		Average acreage			(ha/farmer)		
Bulbs		2.00	2.91	3.65	4.42	5.41	5.89	6.13	6.60
Cutflowers/Potplants									
in open		0.31	0.40	0.54	0.65	0.78	0.81	0.83	0.88
Under glass		0.37	0.50	0.56	2.03	0.72	0.75	0.77	0.79
Trees		1.55	1.62	1.68	3.15	2.22	2.23	2.27	2.36
Perennial plants		4.22	3.23	3.03	3.15	3.09	2.99	2.93	2.99

Table 1-12	Japan		Average acreage			(ha/farmer)		
Bulbs	0.11	0.16	0.18	0.25	0.28	0.29	0.28	0.30
Flowers	0.11	0.14	0.20	0.18	0.20	0.22	0.23	0.23
Potplants			0.10	0.12	0.16	0.16	0.18	0.19
Trees	0.19	0.24	0.26	0.32	0.40	0.45	0.46	0.44
Turf		0.54	0.54	0.79	0.98	1.23	1.20	1.13
Seedling						0.13	0.14	0.16
Cover Plants				0.17	0.16	0.18	0.17	0.20

Source: JFPC(1998), and LEI

Table 2-1 Holland

Number of farmers 1993					share			
Land	0-4ha	4-8ha	8ha-	Total	0-4ha	4-8ha	8ha-	Total
Fully owned	919	148	142	1209	76.0%	12.2%	11.7%	100.0%
0-3 ha rented	688	79	57	824	83.5%	9.6%	6.9%	100.0%
3- ha rented	509	313	440	1262	40.3%	24.8%	34.9%	100.0%
Total	2116	540	639	3295	64.2%	16.4%	19.4%	100.0%

Number of farmers 1997					share			
Land	0-4ha	4ha-8ha	8ha-	Total	0-4ha	4-8ha	8ha-	total
Fully owned	348	102	224	674	51.6%	15.1%	33.2%	100.0%
0-3 ha rented	554	168	247	969	57.2%	17.3%	25.5%	100.0%
3ha- rented	29	172	1134	1335	2.2%	12.9%	84.9%	100.0%
Total	931	442	1605	2978	31.3%	14.8%	53.9%	100.0%

Table 2-2 Japan(Toyama)

Number of farmers					share			
	0-30a	30a-100a	100a-	Total	0-30a	30a-100a	100a-	total
1980	401	273	38	712	56.3%	38.3%	5.3%	100.0%
1985	311	269	48	628	49.5%	42.8%	7.6%	100.0%

1989	260	241	60	562	46.3%	42.9%	10.7%	100.0%
1990	241	233	69	543	44.4%	42.9%	12.7%	100.0%
1993	157	223	73	453	34.7%	49.2%	16.1%	100.0%
1995	150	194	58	402	37.3%	48.3%	14.4%	100.0%
1996	135	171	70	376	35.9%	45.5%	18.6%	100.0%

Table 2-3 Holland Farm size in specialized growers (ha)

	1960	1970	1980	1990	1994	1995	1996	1997
Bulbs	2	4	6	9	13	14	15	15
Cutflowers	0.1	0.3	0.7	0.8	1.2	1.3	1.2	1.2

Table 2-4 Holland Bulb acreage by soil 1993 (ha)

	0-4ha	4-8ha	8ha-	Total
Sandy	1127	1152	5700	7979
Clay	1855	1852	5700	8858
Total	2982	2977	10878	16837

Table 2-5 Holland Labour input

	Bulbs per 10a	Trees per 10a	Cutflowers Per a	Potplants per a
1955	600		300	280
1960	410	690	270	250
1970	210	630	210	220
1980	85	200	150	190
1990	80	175	90	140
1995	75	110	90	110
1997	68	107	98	120

Table 2-6 Japan(Toyama) Lobour input by work Tulip bulb hours/10a

Year	Planting	Harvesting	others	Total
1958	116.4	344.1	224.0	684.5
1961	114.5	314.1	84.4	513.0
1967	92.9	233.2	63.3	389.4
1971	73.7	208.1	63.6	345.4
1973	70.4	158.7	61.3	290.4
1975	72.2	113.7	51.8	237.7
1982	65.9	139	47.3	252.2
1983	65.9	154.4	44.8	265.1

1984	74.7	161.8	50.5	287.0
1985	89	185.7	59.8	334.5

Speciosum lily hours/10a

Year	Planting	Harvesting	others	Total
1986	58.2	108.7	146.6	313.5
1988	60.7	124.4	146.3	331.4
1990	55.2	62.8	239.3	357.3

Table 2-7 Holland
Real farm income per farmer, deflated by CPI(1980=100) (1000guilder)

Year	Bulbs	Trees	Cutflowers	Potplants
51-55	46		43	
56-60	55	45	57	
61-65	48	33	69	
66-70	44	50	62	
71-75	56	68	63	62
76-80	69	57	30	61
81-85	75	54	43	58
86-90	73	89	64	79
91-95	138	94	63	90

Table 2-8 Japan Real gross production per farmer, deflated by on CPI(1980=100) (million yen)

	70	75	80	85	90	94	95	96
Floriculture	1.18	1.16	2.16	2.57	3.09	3.19	3.32	3.32
Cutflowers	0.92	1.29	1.95	1.91	2.46	2.60	2.71	2.70
Potplants			4.31	5.33	7.56	8.91	6.46	6.94
Bulbs		0.56	0.79	0.93	1.11	1.20	1.22	1.21
Trees	1.59	0.79	2.42	3.37	3.74	3.90	3.77	3.71

Source: JFRC (1998) and LEI,

Toyama Agricultural Statistics Section for Table 2-6

Table 3 Industrial Structure

	Holland 1970	Japan 1970	Holland 1985	Japan 1985	Holland 1995	Japan 1995
GDP(million dollar)	31650	204610	128079	1343251	395279	5134276
GDP per capita (dollar)			8845	11116	25584	41009
Per capita GDP in purchasing parity (dollar)			11839	12188	19782	21795
Share of agriculture and fishery(%)	6	8	3.9	3.2	3.2	2.1
Share of mining and manufacturing(%)	32	31	27.8	33.1	21.9	30.0
Share of other economy(%)	35	28	39.2	40	43.4	42.5
Export reliance (%)			60.5	13.0	45.9	8.6
Import reliance(%)			56.8	9.7	41.7	5.9
Land total(1000ha)	3662	36988	3729	37771	3392	37652
Cultivated land(1000ha)	824	4910	826	4209	811	3970
Share of cultivated land(%)	22.50	13.27	22.15	11.14	23.91	10.54
Acreage for floriculture(1000ha)			27.77	36.16	36.07	48.42
Share in cultivated land(%)			3.36	0.86	4.45	1.22
Bulb growing area(1000ha)			15.06	1.52	18.65	1.16
Share of bulbs in floricultural acreage (%)			54.23	4.21	51.70	2.40
Farmer population(1000persons)	835	21329	720	9786	654	6270
Agricultural workers(1000persons)	316	10760	291	4935	302	3490
Share(%)	6.0	21.0	5.0	8.3	4.20	5.30
Workers in industries(1000persons)	4789	51480	5765	59630	6835	64860
Agriculture and forest(1000persons)	291	8140	268	5090	244	3560
Share(%)	6.08	15.81	4.65	8.54	3.57	5.49
Farmers in floriculture(persons)			19767	142068	18532	145538
Bulb farmers(persons)			4128	5492	3040	3830

1) share of agriculture and fishery, and mining and Manufacturing means that of their economic activity in GDP

2) Figure of share of Agriculture and Fishery, and Mining and Manufacturing in 1995 are in 1994

3) Figures of Workers in Industries in 1995 are actually in 1996

Source: Statistics Bureau (1998)

Table 4 Japan Flower consumption per family

Year	Expenditure per family (yen)		Consumer's price index of cut-flowers	
	Cut-flowers	Gardening goods		
1975	4158			
1980	6289		67.5	
1981	6522		70.9	
1982	7170		70.7	
1983	7383		76.6	
1984	7212		77.8	
1985	7952		81.2	77.5
1986	8265		81.2	77.5
1987	8889		81.1	77.4
1988	9328		89.3	85.3
1989	9765		92.2	88.1
1990	10788	7143	100.0	95.5
1991	12062	7218	110.8	105.8
1992	12686	7770	107.2	102.4
1993	12912	8273	110.9	105.9
1994	12581	8527	108.6	103.7
1995	12822	8938	104.7	100.0
1996	12608	9939		98.0
1997	13130	10311		101.5

Source: JFPC (1998)

Table 5 Exchange Rates(yearly average)

Year	100dollar = guilder	1dollar = yen	1guilder=yen
1970	359.70	357.60	99.42
1975	252.90	296.76	117.34
76	264.39	296.55	112.16
77	268.51	200.60	74.71
78	210.44	216.36	102.81
79	219.14	245.42	111.99
1980	198.81	226.74	114.05
81	249.52	220.54	88.39
82	267.70	249.08	93.04
83	285.41	237.51	83.22
84	320.87	237.52	74.02
1985	332.14	238.54	71.82
86	245.00	168.52	68.78
87	197.66	144.64	73.18
88	212.07	128.15	60.43
89	182.09	144.79	79.52
1990	182.09	144.79	79.52
91	186.97	134.71	72.05
92	175.85	126.65	72.02
93	185.73	111.20	59.87
94	182.00	102.21	56.16
1995	160.57	94.06	58.58
96	168.59	108.78	64.52
97	195.13	120.99	62.00

Source: IMF

Table 6-1 Japanese bulb market 1

Year	Acreage Ha	Production Million bulbs	Production million yen	Import million bulbs	Import million Yen	export million bulbs	export million yen
1975	1529	456	3966	41.29	262	32.59	809
1976	1370	451	5065	49.28	293	25.80	349
1977	1427	523	5819	51.35	347	28.68	135
1978	1537	548	6239	66.40	404	26.16	1002
1979	1558	584	7003	74.97	571	23.94	1181
1980	1578	588	7124	74.69	575	23.59	957
1981	1736	560	6927	60.00	475	22.73	775
1982	1682	567	6996	67.18	627	20.31	727
1983	1575	532	9061	62.08	676	20.79	623
1984	1550	498	6485	73.17	775	21.30	648
1985	1552	515	6574	63.28	764	22.28	743
1986	1598	530	6198	93.38	1004	20.77	632
1987	1634	544	6704	65.83	1270	15.61	504
1988	1565	490	7230	99.79	1865	9.06	322
1989	1496	481	6928	152.58	2919	7.69	353
1990	1546	473	7424	294.53	5433	7.81	454
1991	1524	507	8287	254.63	7981	7.17	463
1992	1503	452	7823	281.46	9135	5.13	469
1993	1440	417	7987	329.88	9584	24.80	270
1994	1280	391	6800	399.39	11284	12.39	256
1995	1160	368	6500	518.36	14657	2.63	238
1996	1160	354	6000	602.23	18560	2.04	205
1997	1080	342.8		607.12	17055	1.97	230

Table 6-2 Japanese bulb market 2

Year	Price yen	Quantity Million bulbs	Value million yen	import reliance % (quantity)	% (value)	CPI 1995.4= 100
1975	8.697	465	3419	8.89	7.67	56.6
1976	11.231	474	5008	10.39	5.84	62.0
1977	11.126	546	6030	9.41	5.75	66.2
1978	11.385	588	5642	11.29	7.17	68.7
1979	11.991	635	6394	11.81	8.94	72.0
1980	12.116	639	6742	11.69	8.53	77.5
1981	12.370	597	6627	10.05	7.17	80.6

1982	12.339	614	6896	10.94	9.09	82.7
1983	17.032	573	9114	10.83	7.42	84.3
1984	13.022	550	6612	13.31	11.73	86.1
1985	12.765	556	6595	11.38	11.59	87.8
1986	11.694	603	6570	15.50	15.28	87.8
1987	12.324	594	7470	11.08	17.00	88.2
1988	14.755	581	8774	17.18	21.26	88.9
1989	14.403	626	9495	24.38	30.75	91.4
1990	15.696	760	12403	38.77	43.81	94.3
1991	16.345	754	15805	33.75	50.50	96.9
1992	17.308	728	16489	38.64	55.40	98.5
1993	19.153	722	17301	45.68	55.40	99.7
1994	17.391	778	17828	51.34	63.29	100.1
1995	17.663	884	20919	58.66	70.07	99.9
1996	16.949	954	24355	63.11	76.21	100.3
1997		948		64.05		

Source: JFPC(1998)