

*University of Toyama Faculty of Economics*

Working Paper

No. 215

March 2007

**Time Budget of Tulip Bulb Farmers in Japan and Holland<sup>#</sup> :  
In Busy Season**

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<sup>#</sup> This paper is an English edition of Tachi and Niisato(2000)

## Time Budget of Tulip Bulb Farmers in Japan and Holland: In Busy Season

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### **Abstract**

In 1999 we compared time budget structures of tulip bulb farmers in the harvest and post-harvest season in Japan and the Netherlands, by interview and questionnaire survey. Our results are as follows: 1) In Japan there are two peaks in monthly allocation of yearly labour input, June - July (harvest and post-harvest) and October (planting). In contrast, there is one peak in the Netherlands, June - July (harvest and post-harvest). In Japan labour time fluctuates month by month, while in the Netherlands it does not. 2) During the harvest and post-harvest season (9 days), Japanese farmers work for twelve to thirteen hours and sleep for less seven hours, while Dutch farmers works at most for ten and half hours and sleep for eight hours. 3) One of the reasons for the above fact is that Japanese farmers work even on Saturday and Sunday but Dutch ones do not so.

**Key words:** Flower bulb, Workload, Working time, Time budget

JEL classification: J22, Q16.

## 1. Introduction

While Japanese production of floriculture as a whole has strongly grown, the gross production value and cultivation area of Japanese tulip bulbs have been stagnate. This is because, firstly, Japanese farmers of tulip bulbs have excess workload with hand work in busy season, secondly the number of them has decreased and they are aged, thirdly it is difficult to get employed workers, and forth they have difficulty in expanding their scale of production because of a required large fund of equipment investment. And according to time budget research and CFSI (Cumulative Fatigue Symptoms Index), they have a grate excess burden of agricultural work<sup>1</sup>.

In contrast, the production value and cultivation area of Dutch tulip bulbs have steadily risen. The Netherlands is the largest country in production and export in the world<sup>2</sup>. In Holland large - scale farming is dominant and there is a strong network from research and development to production, sales, distribution and exporting. Therefore the flower bulb farming is established as a distinct industry<sup>3</sup>.

In this paper we shall compare time budget structure of tulip bulb farmers in busy season and discuss workload with respect to time allocation in Japan and Holland. And this comparison will be a useful basic research for improvement of working and life conditions in Japanese growers.

In literatures of international comparison of time budget, firstly, a group led by Dr. Szalai in Hungary gave a gland investigation of twelve countries in 1964 - 66, excluding Japan and Holland<sup>4</sup>. In 1993 a group led by Dr. Suzaiki in Japan, with cooperation of Dr. Harvey in Canada, made an international comparison of time budget in 7 countries including Japan and the Netherlands<sup>5</sup>. The investigation gave general features of time budget structure. We shall focus time budget of tulip bulb farmers in Japan and Holland

## 2. Research method

### 2.1 informants

We investigated two farms, A and B in Japan. Informants of farm A were a manager (40 years old man) and his wife (40 years old). Those of farm B were a manager (47) and his wife (42). In Holland we investigated three farms, C, D and E. The informant of farm C was a manager (26 years old man), that of farm D was a manager (48), and that of farm D was a manager (47).

### 2.2 investigation period

The investigation period in Japan was 9 days between the 11th and the 19th of June in 1999, and that of Holland was too 9 days between the 1st and the 9th of July in 1999, however the data of farm A was edited from annual record of 1995<sup>6</sup>. Around 10 days are desirable as an investigation

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<sup>1</sup> See Tachi et al (1997b,c).

<sup>2</sup> See Niisato(1999a,b).

<sup>3</sup> See Kobayasi(2000).

<sup>4</sup> See Szalai(1972).

<sup>5</sup> See NHK(1995).

<sup>6</sup> See Tachi et al(1997c).

period of time budget analysis<sup>7</sup>. Therefore we selected 9 days as the investigation period. And the period was busy season of tulip bulb cultivation in each country.

## **2.3 sheet and interview**

### **(1) time budget sheet**

Japanese and Dutch informants wrote down their time budgets in their time sheets before going to bed. However, the sheets had some difference in Japan and Holland. Dutch sheets were simpler than Japanese ones.

In Japanese sheet, time distance of time budget was 10 minutes. The sheet had records of 6 persons' time budgets at the same time, written by a representative of a farm. In the other hand in Dutch sheet, time distance was 15 minutes and 7 kinds of behaviors were prepared in advance and selected by each informant. After collecting data, we adjusted Japanese sheets to Dutch ones.

### **(2) interview**

We interviewed farmers to ask some contents and conditions of their works in a year and interpret the time budget sheets.

## **3. Some results**

### **3.1 outline of the investigated area**

As Table 1 shows, the population of the Netherlands is 12.4% of that of Japan in 1996. And the total land of the Netherlands is 10.8% of that of Japan. The share of agricultural land in the total of Japan is relatively small of 13.2%(4,994,000ha), and that of the Netherlands is relatively large of 48.3%(1,972,755ha). The Japanese acreage of flower bulbs is 1,160ha. The Dutch acreage is 21,355ha, which is 18.4 times of the Japanese. The Japanese acreage of tulip bulb fields is 487 ha. The Dutch acreage is 10,374ha, which is 21.3 times of the Japan. The Dutch history of tulip production has more than 400 years while the Japanese history has only 80 years<sup>8</sup>.

The Japanese two farms are located in Toyama prefecture. The Dutch three farms are nearly at Horn in 'Nord Holland' province. The prefecture and the province are both famous for a tulip cultivation area in each country. Toyama has a share of 48.7%(237ha) in tulip bulb fields of Japan. And also 'Nord Holland' amounts to a share of 55.6%(5,763ha) in tulip bulb fields of the Netherlands. And the investigated farms in Japan and Holland are both located in sandy loam fields.

### **3.2 outline of farms**

#### **(1) composition of labour power**

Table 2 shows outline of farms. In composition of labor power, Japanese farm A had three farmers which were a couple of husband and wife and his mother. It employed seasonal part-time workers which amounted to 1,358 man days a year. Farm B had three farmers, too, which were a couple of

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<sup>7</sup> See Kosugo(1963).

<sup>8</sup> See Tachi(1997a).

husband and wife and his mother. It employed seasonal part-time workers which amounted to 1,700 man days a year.

Dutch farm C was a joint business of which owners were two family managers, and each family managers were composed of father and his son. It employed 14 fulltime workers and seasonal part-time workers which amounted to 2,900 man days a year. Farm D had one manager. And it employed 6 fulltime workers and seasonal part-time workers which amounted to 2,348 man days. Farm E was a joint company which was owned by two brothers. It employed only one worker and seasonal part-time workers which amounted to 453 man days. The employment of farm E was rather small because of the partial work contract.

### **(2) cultivation area**

The Japanese farm A had 12.0ha and farm B had 12.7ha. The Dutch farm C had 42.0ha, farm D 21.5ha and farm E 30.0ha. In all farms in both countries, most of their cultivation acreage were rented and their own lands were rather small.

### **(3) crops**

Main crops of our investigated farms were tulip bulbs. The Japanese two farms were multiple farming with tulip bulbs and paddy-rice. In the other hand the Dutch two farms of C and D produced tulip bulbs and cut-flowers, and farm E managed tulip bulbs and onions.

### **(4) partial farm work contract**

The Japanese farms had partial farm work contracts of paddy-rice cultivation, but the Dutch farms did not have them.

### **(5) machines**

Dutch farms have higher quality of machines and equipments than Japanese ones. Japanese growers dig up tulip bulbs every 1.10 meter by using harvesting machine which are equipped with a tractor, eliminate soil of bulbs by chain conveyer in the back of the tractor, and pick up bulbs to ridges in the rear. Around ten employed workers put the bulbs in their baskets by hand( picture 1).



**picture 1**

In the sandy loam area in the Netherlands, net-cultivation method was introduced around in 1995. The Dutch informants use this production system. Owing to this system, bulbs are planted in pipe-shaped nets, and growers work by the special planting and digging machine equipped with a tractor. In the previous digging machines a lots of lumps of soil were mixed in a storing box of tulip bulbs, but in the net method there is few of lumps of soil (picture 2).



picture 2

The standard unit of fields in Japan is in general a square of 100 times 30 meters (0.3ha) while that in Holland is 400 times 100 meters (4.0ha).

#### **(6) production quantity and sales value of tulip bulbs**

According to our interview, Japanese farm A produced 1,780 thousands of tulip bulbs and farm B did 1,400 thousands. The sales value of farm A was 42,500 thousands yens and that of farm B was 30,000 thousands yens.

Dutch farm C produced 14,000 thousands bulbs, farm D 9,000 thousands, and farm D 10,000 thousands bulbs. The sales value of Farm C was 120 million yens, that of Farm D was 54 million yens, and that of farm E was 60 million yens, calculating one guilder as 60 yens.

### **3.3 Allocation and content of labor input**

Table 3 shows monthly allocation of total labor input in Japanese and Dutch farms and Table 4 shows working season in Japan and Holland. In Japan there are two peaks. The one is June and July, and the other is October. In the Netherlands there is one peak of June and July. The level of the peak labor in the Netherlands is smaller than in Japan. June and July is a harvest and post-harvest season in tulip bulb cultivation. October is a planting season in Japan.

Table 5 shows monthly allocation of farmer's labor input in Japan and Holland. In Japan all four farmers have large seasonal fluctuation. Especially in farm B the manger and his wife have small labour input in winter season. In the case of farm A winter is a busy season because of cut-flower cultivation, and they have busy time through a year. In the Netherlands there is only small seasonal fluctuation in labour input, however labour input in winter is a little short.

In respect to yearly labor input of each farmer, farm A is 2,734 hours, farm B 2,190 hours.

Dutch farm C is 2,400, farm D is 3,120, and farm E is 2,490 hours. Farm A and D have relatively large amount of total labour input.

### **3.4 time budget structure**

#### **(1) daily classification of time budget**

We distinguish working and off-working time. Working time means the time between the beginning and the end of work. It is constitute of labour time, morning and afternoon breaks, lunch time, and relax time. The off-working time that consists of breaks, lunch and relax time during working time is denoted as off-working time(A), and all time but working is denoted as off-working time(B). In the investigation period we can classify four types of off-working time(B) as the first column shown in Table 6.

During the investigation period, farmers in Japan and Holland were in busy season and therefore they, except farm E, did not have holiday. So they seemed to have great workload.

#### **(2) Average time budget and daily fluctuation**

Table 7 shows the structure of average daily time budget during 9 days (harvest and post-harvest season). Total daily life time in average amounted to 1,440 to 1,457 minutes for all informants. It should be 1,440 minutes (i.e. 24 hours) if we count it starting from 0 a.m. But we considered the cyclical period of their life behavior and it had some personal difference.

The Japanese managers worked for 12 to 13 hours. The Dutch ones worked for 7 or 8 hours to 10 hours. They worked for shorter time than the Japanese ones. The off-working time(A) was 52 or 89 minutes in the Japanese managers. In the Netherlands, it was 102 to 122 minutes and longer than Japanese one.

The total of off-working time(B) means a distance time of working, except farm E. That of Japanese farm A and B was 11 hours and 9 hours and half, while that of the Dutch farm C and D was 14 hours and 11 hours and half. The total of off-working time(B) of farm E was more than 15 hours. Japanese off-working time(B) was shorten by long working time and was rather shorter than the desirable time of 13 or 14 hours<sup>9</sup>, however Dutch off-working time(B) includes one or two hours of housekeeping which maybe be counted as working time.

Sleeping time of the Japanese managers was less than 7 hours owing to short distance of working while that of the Dutch ones was around 8 hours.

In respect to women, we cannot compare it because of lack of the Dutch data. But we can describe the Japanese case. Japanese women had long time of housekeeping. Especially respecting to time of housekeeping in off-working time, the wife of farm A had 3 hours, and the wife of farm B had almost 5 hours. The wife of farm B had also another 30 minutes of housekeeping in working time(A). Therefore adding up working time and housekeeping time, the wife of farm A had about 13 hours, the wife of farm B had 11 hours of restricted time.

Table 8 shows daily fluctuation of working time in Japan and Holland. The Dutch fluctuation was lager than Japanese one. Especially Dutch working time on Sunday was very short. Japanese

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<sup>9</sup> See Tachi(1997a).

one had no relation to day of week.

Table 9 shows daily fluctuation of sleeping time in off-working time(B). Japanese sleeping time is not variable while Dutch one on Saturday is more than 10 hours for every farm.

### **(3) average daily time budget and daily fluctuation**

Table 10 shows average time of getting up and going bed in the harvest and post harvest season. Japanese males get up at 5:50 and 5:36 while Dutch males get up in the early half of 7 a.m. Japanese managers go to bed around at 11 p.m. In the case of Dutch managers, one person goes to bed in the early half of 11 pm, and two persons in the late half. Therefore Dutch managers sleep more than Japanese ones by one hour.

Japanese managers begin to work at 6:49 and 5:53 while Dutch ones do after 7 a.m. The Japanese managers end to work at 19:53 and 20:33 while Dutch ones do at 18:00, 20:00, and 18:34. Japanese managers have 2 hours and 54 minutes, and 2 hours and 35 minutes as free time between the ending of work and going to bed, while Dutch ones do 5 hours and 33 minutes, 3 hours and 8 minutes, 5 hours and 13 minutes.

The wake-up time and bed time of Japanese females are almost same to their husbands. But their beginning time of work is later than that of their husbands, and their ending time is sooner than that of their husbands. It is because they engage in housekeeping.

Table 11 shows a comparison in Japanese farm A and Dutch farm C respecting to dairy fluctuation of the wake-up and bed time, and the beginning and ending time of work. Japanese farm A does not have so much fluctuation. In contrast Dutch farm C has some fluctuation. On the 3<sup>rd</sup> of July, he waked up and started as usual, but finished farm-working in the morning, did housekeeping at home in the afternoon and enjoyed leisure outside of home from 6:15 p.m. to 2:45a.m. in the next day. After then he took sleeping for 11 hours, waked up 1: 45 p.m., and worked another one hour for preparing farm working in the following day.

## **4. Discussion**

### **4.1 informants**

The investigated farms are large farms in cultivation scale in Japan and Holland. According to a survey of Toyama prefecture in 1996, farms cultivating less than 30a are 36 %(135 farms), farms of 30 to 100a are 45 %(171 farms), and farms of more than 1 ha is 19 %(70 farms) in total farms<sup>10</sup> . Farm A had 7.9ha of tulip bulb field, farm B had 6.8 ha of tulip bulb field and 0.2 of other bulb fields. Therefore they are very large bulb farms in scale.

According to a survey of 1997, there is 31 %(931 farms) of less than 4.9ha, 15 % (442 farms) of 4.0 to 8.0ha, and 54 % (1605 farms) of more than 8ha in Holland. Farm C and D had more than 20.0ha of tulip bulb field. As Table 1 shows, the cultivation area of tulip bulbs is 5.28ha in all Holland. Therefore they were very large bulb farms.

We selected the investigated farms which were large in both countries, because large-scale

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<sup>10</sup> See Niisato(1999a,b).

farms tended to prevail in both countries<sup>11</sup> and therefore we could get some implication on workload, however our informants were only 2 farms ( 4 persons) in Japan and 3 farms ( 3 persons) and they recorded their time budgets only for 9 days. It is of course difficult to generalize our result, but we can get some information of growers' workload in the present.

#### **4.2 allocation of yearly labor input**

In Japan there are two peaks in monthly allocation of yearly labour input, June – July (harvest and post-harvest) and October (planting). In contrast, there is one peak in the Netherlands, June – July (harvest and post-harvest). In Japan labour time fluctuates month by month, while in the Netherlands it does not.

This is because Japanese bulb farmers depend on seasonal employment even in large farms while Dutch farmers employ permanent workers, constant allocation of labour input through a year is obtainable and they have high level of mechanization.

#### **4.3 time budget structure in busy season**

Prof. M. Yano says in *Sociology of time budget*, “The best approach to features of Japanese life is comparing with foreign countries. And industrialization in any countries makes their mode of production standardized though countries. This standardization of mode of production causes standardization of mode of life style however each country keeps its uniqueness. It is helpful for understanding Japanese future life to realize the uniqueness”<sup>12</sup>.

Dr. Suzuki et al summarized Japanese features of time budget, comparing the 6 advanced European and American countries (the Netherlands, UK, Denmark, Finland, USA, and Canada): 1. short sleeping time (especially female), 2. long working time, 3. short housekeeping of men, 4. long total working time, including transport and housekeeping, which is 30 minutes longer than the 6 advanced countries because Japanese males does not do housekeeping, 5. a large difference of male and female respect to working and housekeeping time, and “males go to work and females do housekeeping”, 6. short leisure time, particularly in positive leisure such as friendship<sup>13</sup>.

Table 12 shows a comparison of time budget in Japan and Holland. It is extracted from NHK(1995). The standard Dutch has short sleeping time but relatively much room in life time in the 6 advanced countries. The Dutch adult women have short working time and a definite role of play in housekeeping. In contrast Japanese adult women have a double burden of long work and housekeeping time.

The above features of time budget in Japan and Holland are applied to our comparative investigation of males (managers) in both countries. The busy season makes the differences between Japan and Holland clear. Especially, Japanese managers' working time amounts to twelve or thirteen hours. This fact cuts the other time of life and causes less than 7 hours of sleeping time. In Dutch managers get around 8 hours of sleeping time in spite of their tight time budgets in the

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<sup>11</sup> See Niisato(1999a,b).

<sup>12</sup> See Yano(1996) pp.153-164.

<sup>13</sup> See NHK (1995).

busy season.

Beside above the social background in Japan, the reasons of long working time in busy season are the following: 1. A manager have to take skilled work of operating tractors at digging up tulip bulbs<sup>14</sup>. 2. The busy season is a rainy season and there is few of days workable in fields. 3. Shipping days of tulip bulbs are set earlier (the end of July) because Japanese bulbs should be sold out before Dutch bulbs are imported. 4. Tulip growers work on Saturday and Sunday as week days by the above 2 nd and 3rd reasons.

Tachi(1997a) and Tachi et al(1997c) say that Japanese tulip bulb growers have excess working time in busy season. Our research makes it clear by comparing with the Dutch growers. Estimating from the above quantity of production and sale value, the Dutch unit price of tulip bulbs was less than 10 yens while Japanese one was more than 20 yens. In the international competitiveness Japanese bulb prices slumped down and farm B wanted to keep bulb production and expand rice field because his rice production did not need another employment and extra investment of equipment. This made further workload to him.

In this paper we did a comparative research about only one kind of farms (large-scale farm) of tulip bulb farmers in busy season. It is not to say that it is necessary for improvement of work and life conditions to compare yearly time budget investigation.

## 5. Summary

We compared time budget structures of tulip bulb farmers in the harvest and post-harvest season in Japan and the Netherlands, by interview and questionnaire survey. Our results are as follows:

1) According to our interviews, in Japan there are two peaks in monthly allocation of yearly labour input, June - July (harvest and post-harvest) and October (planting). In contrast, there is one peak in the Netherlands, June - July (harvest and post-harvest). In Japan labour time fluctuates month by month, while in the Netherlands it does not.

2) During the harvest and post-harvest season (9 days), Japanese farmers work for twelve to thirteen hours on average and sleep for less seven hours, while Dutch farmers works at most for ten and half hours and sleep for eight hours on average.

3) One of the reasons for the above fact is that Japanese farmers work even on Saturday and Sunday but Dutch ones do not so.

## Acknowledgments

LEI(Agricultural Economic Institute) in the Hague cooperated with us for this investigation of Holland in July 1999. We would like to thank Drs. Nico de Groot, Mr. J. Bremmer and Mr. J. Hammerstein at LEI for their research assistance.

And we would thank Prof. Rokuro Kosugo at Shyoin Women's university, Prof. Naoki Sakai at Univ. of Tsukuba, Tsuyosi Kawakami at Institute of Science of Labour, Mr. Hitosi Ohomote at Toyama Flower Bulb Association for their helpful assistance and advice of this research.

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<sup>14</sup> See Tachi(1990).

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## Tables

*Table 1 Outline of the investigated areas in 1996*

	Japan		Holland	
	Toyama	All Japan	Nord Holland	all Holland
population (men)	1,126,000	125,864,000	2,486,000	15,654,000
working population (men)	615,000	67,110,000	11,000,000	6,971,000
workers in agriculture (men)	33,000	3,499,000	10,892	302,000
percentage of agricultural workers in total (%)	5.4	5.2	1.0	4.3
total land (ha)	424,647	37,776,387	351,800	4,084,400
agricultural land (ha)	63,600	4,994,000	138,781	1,972,755
cultivation area of flower bulbs (ha)	260	1,160	12,240	21,355
cultivation area of tulip bulbs (ha)	237	487	5,763	10,374
share of bulb area in total land (%)	15.0	13.2	39.4	48.3
share of bulb area in agricultural land (%)	0.4	0.02	8.8	1.1
share of tulips in bulb area (%)	91.2	42.0	47.1	48.6
total farms	44,610	2,513,270	7,535	104,873
flower bulb farms	382	3,830	1,471	2,970
tulip farms	306	971	1,153	1,964
share of bulbs in total farms (%)	0.9	0.2	19.5	2.8
share of tulip in bulb farms (%)	80.1	25.4	78.4	66.1
cultivation area of flower bulbs per farm (a)	68	30	832	719
cultivation area of tulip bulbs per farm (a)	77	50	500	528

Source of Japan: Japan statistic year book 1998, Outlook of Toyama 1998, Flower Data Book 1998, and History of Toyama Bulb Association:50 years

Source of Holland: World statistic year book 1998, and LEI 1998

Table2 Outlook of farms

Farm	Japan		Holland		
	A	B	C	D	E
farmers (men)	3	3	4	1	2
fulltime workers (men)	0	0	14	6	1
employment (man days)	1358	1700	2900	2348	453
own land (a)	163	130	0	50	1000
rental land (a)	1039	1140	4200	2100	2000
Total (a)	1202	1270	4200	2150	3000
crops					
tulip bulbs (a)	790	680	4200	2150	2000
other bulbs (a)	0	20	0	0	0
tulip flowers (pieces)	20,000	0	10,000,000	2,200,000	0
peony (a)	0	20	0	0	0
rice (a)	412	550	0	0	0
onion (a)	0	0	0	0	1000
rice(contract work)					
bed making (pieces)	1538				
plowing (a)	277	130			
puddling (a)	277	130			
planting (a)	837	130			
harvesting (a)	413	90			
post harvest ( t)	19				
machines					
tractor	4	4	2	2	4
planting	1	1	1	1	1
sprayer	1	1	1	1	1
harvesting	1	2	1 (net)	1 (net)	1 (net)
sorting	1	1	1	1	1
rice planting	1(6rows)	1(5rows)			
rice combine	1(5rows)	1(3rows)			

- 1) man days = yearly hours/8 hours
- 2) Farm A was investigated in 1995 and the others were in 1999.
- 3) Farm A has 4 tractors(80ps,48ps,42ps,32ps).
- 4) Farm B has 4 tractors(70ps,32ps,31ps,26ps).
- 5) Farm C has 2 tractors(94ps,80ps).
- 6) Farm D has 2 tractors(65ps,65ps).
- 7) Farm F has 4 tractors(120ps,100ps,100ps,80ps).
- 8) Each of A and B has 1 planting machine(wheel,6rows).
- 9) Each of C, D and E has 1 planting machine(net).

*Table 3 Allocation of labour input by month* (hours)

	Japan		Holland		
	A	B	C	D	E
Jan	499	20	2800	1400	500
Feb	494	20	2800	1400	500
March	721	200	2800	1400	500
April	1132	1200	2800	1500	500
May	1321	1000	2400	1500	800
June	4525	5500	3200	2700	1800
July	3663	5000	2400	4000	1200
August	480	500	2400	2200	600
September	1382	1200	2800	1500	600
October	2909	2500	2800	1500	600
November	590	800	2800	1400	500
December	312	200	2800	1400	500
Total	18027	18140	32800	21900	8600

- 1) Farm A was investigated in 1995.
- 2) Farm B, C, D, and E were interviewed in 1999.

*Table 4 work season by crops*

farm	crops	planting	harvest	post-harvest	
Japan	A	tulip bulb	Oct6–Oct31	Jun4–Jun29	Jun4–July31
		rice	May7–May15	Sep5–Sep26	Sep14–Sep30
	B	tulip bulb	Oct5–Oct31	Jun3–Jun30	Jun5–July25
		rice	May7–May14	Sep12–Sep22	Sep12–Sep22
Holland	C	tulip bulb	Oct15–Nov15	Jun1–July31	Jun1–Aug15
	D	tulip bulb	Oct1–Nov1	Jun15–July15	Jun15–Aug7
	E	tulip bulb	Oct15–Nov15	Jun20–July20	Jun20–Aug15
		onion	Mar10–Mar20	Sep10–Oct1	Jan1–Mar31

Table 5 Farmer's labour input by month

(hours)

	Japan				Holland		
	A		B		C	D	E
	manager	wife	manager	wife	manager	manager	manager
Jan	158	142	20	0	200	240	180
Feb	161	156	20	0	200	240	180
Mar	212	184	100	50	200	240	180
Apr	268	209	240	160	200	280	180
May	274	217	200	150	200	280	210
Jun	342	277	360	240	200	280	240
Jul	244	271	300	240	200	280	240
Aug	169	148	160	100	200	280	240
Sep	256	180	240	150	200	280	240
Oct	325	214	300	200	200	240	240
Nov	150	115	150	100	200	240	180
Dec	177	99	100	50	200	240	180
total	2734	2211	2190	1440	2400	3120	2490

1) Farm A was investigated in 1995.

2) Farm B, C, D, and E were interviewed in 1999.

Table 6 Types and days of off-working time(B) in the investigation period

(days)

	Japan				Holland		
	A		B		C	D	E
	manager	wife	manager	wife	manager	manager	manager
Type A	9	9	9	9	9	9	5
Type B	0	0	0	0	0	0	2
Type C	0	0	0	0	0	0	2
Type D	0	0	0	0	0	0	0
total	9	9	9	9	9	9	9

Type A: from work-ending to work-beginning in the next day(continuous working days)

Type B: from work-ending to getting up in the next day(working day and holiday)

Type C: from getting up to beginning of work(holiday and working day)

Type D: from getting up to next getting up(two holidays)

Table 7 Time budget structure of an average day in busy season

(minutes)

	Japan				Holland		
	A		B		C	D	E
	manager	wife	manager	wife	manager	manager	manager
working time	733	592	791	364	508	638	423
off-working time (A)							
sleeping	0	0	12	28	0	0	0
eating and getting dressed	52	92	64	101	102	120	120
leisure and others	0	0	12	0	0	0	0
housekeeping	0	0	0	29	0	2	0
no entry	0	0	0	0	0	0	0
total	52	92	89	158	102	122	120
off-working time (B)							
sleeping	417	429	392	433	468	482	462
eating and getting dressed	126	122	58	77	32	28	112
leisure and others	120	10	107	97	200	120	278
housekeeping	0	185	14	290	130	0	52
no entry	7	10	2	33	0	67	5
total	669	756	572	930	830	697	908
total	1454	1440	1452	1452	1440	1457	1451

Table 8 Working time in busy season of tulip bulb cultivation

(minutes)

	Japan				Holland		
	A		B		C	D	E
	manager	wife	manager	wife	manager	manager	manager
6/11(7/1)	<u>800</u>	<u>570</u>	830	380	570	540	600
6/12(7/2)	850	630	850	420	585	660	570
6/13(7/3)	540	570	<u>820</u>	410	285	510	450
6/14(7/4)	530	360	<u>770</u>	390	<u>75</u>	<u>315</u>	<u>0</u>
6/15(7/5)	730	600	1010	390	630	615	585
6/16(7/6)	870	730	970	390	660	690	0
6/17(7/7)	690	600	780	390	600	930	480
6/18(7/8)	<u>805</u>	<u>660</u>	550	390	570	795	465
6/19(7/9)	780	610	540	120	600	690	570
average	733	592	791	364	508	638	423

1) figures in ( / ) are month and date in Holland

2) figures on underline are on Sunday

Table 9 Sleeping time in busy season of tulip bulb cultivation (minutes)

	Japan				Holland		
	A		B		C	D	E
	manager	wife	manager	wife	manager	manager	manager
6/11(7/1)	<u>420</u>	<u>410</u>	390	450	450	435	435
6/12(7/2)	420	390	390	420	435	390	435
6/13(7/3)	450	450	<u>420</u>	<u>420</u>	660	660	600
6/14(7/4)	390	480	360	420	<u>405</u>	<u>480</u>	<u>405</u>
6/15(7/5)	420	420	310	420	435	480	660
6/16(7/6)	420	420	400	480	465	480	390
6/17(7/7)	450	450	420	420	450	405	390
6/18(7/8)	<u>420</u>	<u>420</u>	420	450	450	510	420
6/19(7/9)	360	420	420	420	465	495	420
average	417	429	392	433	468	482	462

1) figures in ( / ) are month and date in Holland

2) figures on underline are on Sunday

Table 10 Time cycle of a day in average in busy season of tulip bulb cultivation

	Japan				Holland		
	A		B		C	D	E
	manager	wife	manager	wife	manager	manager	manager
wake-up time	5:50	6:03	5:36	5:53	7:20	7:13	7:27
beginning	6:49	8:06	5:53	9:04	7:50	7:38	7:09
ending	19:53	19:31	20:33	17:33	18:00	20:00	18:34
bedtime	22:47	22:51	23:08	22:47	23:33	23:08	23:47

1) Farmer E was investigated during 7 days and the others were during 9 days

Table 11 Time budget in busy season of tulip bulb cultivation

	Japan(Farm A, farmer)				Holland(Farm C, farmer)			
	wake-up	beginning	ending	bedtime	wake-up	beginning	ending	bedtime
6/11(7/1)	<u>5:30</u>	<u>5:30</u>	<u>20:00</u>	<u>23:00</u>	6:30	6:45	18:00	23:00
6/12(7/2)	6:00	6:50	21:00	23:00	6:30	6:45	19:15	23:15
6/13(7/3)	6:00	7:30	18:00	23:00	6:30	6:45	12:00	2:45
6/14(7/4)	6:30	6:50	18:00	22:00	<u>13:45</u>	<u>16:30</u>	<u>17:45</u>	<u>23:45</u>
6/15(7/5)	4:30	7:00	19:30	23:00	6:30	6:45	19:30	23:15
6/16(7/6)	6:00	6:40	21:30	23:00	6:30	6:30	19:30	22:45
6/17(7/7)	6:00	7:00	19:00	22:30	6:30	6:45	18:30	23:00
6/18(7/8)	<u>6:00</u>	<u>7:00</u>	<u>21:00</u>	<u>23:00</u>	6:30	6:45	18:00	23:15
6/19(7/9)	6:00	7:00	21:00	22:30	6:45	7:00	19:30	23:00
average	5:50	6:49	19:53	22:47	7:20	7:50	18:00	23:33

1) figures in ( / ) are month and date in Holland

2) figures on underline are on Sunday

Table 12 Weekly time budget in Japan and Holland

	Japan				Holland			
	adult men		adult women		adult men		adult women	
	h. m	rank	h. m	rank	h. m	rank	h. m	rank
sleeping time	7.47	6	7.20	7	7.42	7	8.03	6
working time	7.15	1	3.49	1	4.19	7	1.20	7
housekeeping	0.31	7	4.41	2	2.03	3	4.53	1
work+commute+housekeeping	8.36	1	8.52	1	6.51	7	6.24	7
leisure and etc.	5.05	7	4.57	7	7.02	2	7.00	2

1) data is made from NHK(1995).

2) figures of Japan are in 1990, and those of Holland in 1985.

3) h.m. means hours and minutes.

3) rank shows a position among Japan, Holland, UK, Denmark, Finland, USA, and Canada.