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Production Costs of Tulip Bulbs in Japan and the Netherlands

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Abstract

Recently, tulip bulb production has greatly decreased in Japan because of massive imports of cheap bulbs from the Netherlands. The production volume of Japanese tulip bulbs is one-third of that in the last peak, 1993, and the market share of Dutch bulbs in Japan has reached 80%.

The aim of this paper is to compare farm management conditions in Japan and the Netherlands to find some comparative features of production costs of tulip bulbs. In November 2009, I conducted interviews with Japanese and Dutch bulb farmers and surveyed production costs.

The main results are as follows: (1) the average price of tulip bulbs produced in the Netherlands is less than half of those produced in Japan. (2) The production per hectare (ha) in the Netherlands is more than twice of that of Japan. (3) The scale of farms in the Netherlands is more than four times that of Japan. (4) The production system of the Netherlands is more mechanized with bigger tractors and machinery. As a result, for example, Dutch farmers plant by 3 ha per day, whereas Japanese farmers plant only 0.3 or 0.4 ha per day. (5) The wage share in production costs of the Netherlands is less than that of Japan. (6) The capital depreciation share in production cost of the Netherlands is more than that of Japan. (7) The farm income share in terms of the production price in the Netherlands is less than that of Japan.

Keywords: farm management, cut-flowers, rice, yield, wage, depreciation, income

JEL Classification: Q11

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INTRODUCTION

Tulip bulb production has recently decreased massively in Japan because of massive imports of cheap bulbs from the Netherlands. The production volume of Japanese tulip bulbs is around one-third of that in the last peak, 1993, and the market share of Dutch bulbs in Japan has reached 80%. In 1993, Japan produced 135 million bulbs, and imported 133 million. In 2006, it produced about 50 million, and imported is 205 million (more than 90% of these were Dutch bulbs). See Niisato (2009) for further details.

In Japan there is no official data on the production cost of tulip bulbs. Nevertheless, Toyama prefecture investigated this aspect in 2006-2007. In the Netherlands, the agricultural economics research institute (LEI) has a farm data system for horticulture and can provide official data on the production cost of tulip bulbs.

To investigate the farming system and economic conditions as a background when growing tulip bulbs in Japan and the Netherlands, I visited three farms in the Netherlands in the first week, and two farms in Japan in the second week of November 2009 and interviewed the farmers. The three Dutch farms are located near Horn in 'Nord-Holland'. The two Japanese farms are located at Tonami and Takaoka in the Toyama prefecture. Both these areas are famous for tulip bulb production in their respective countries. Tachi and Niisato (2007) investigated tulip bulb farming in the same areas in 1999.

The aim of this paper is to compare farm management conditions in Japan and the Netherlands and to examine the comparative features of production costs of tulip bulbs. De Klein and Haybroek (1992) provide a comprehensive report of the comparative cost of flower bulbs world-wide.

TULIP BULB FARMS IN JAPAN AND THE NETHERLANDS

The farms

Table 1 shows the characteristics of the farms visited in 2009. Japanese farm A had two main workers, a farmer and his son. The farmer was 58 years old and he employed four full-time workers and part-time (and seasonal) workers of 500 man days per year. Farm B had three main workers, a farmer and his parents. The farmer was 30 years old and he employed hour full-time and no part-time workers.

Dutch farm C had two main workers. The farmer was 44 years old and he employed one full-time workers and provided part-time employment of 625 man-days per year. Farm D had one main worker. The farmer was 40 years old and he employed two full-time workers and provided part-time employment of 1500 man-days. Farm E had one main worker. The farmer was 41 years old and he employed 5 full-time workers and provided part-time employment of 1250 man-days per year.

Japanese farm A and farm B had 15.2 ha and 21 ha, respectively, of cultivated acreage, while Dutch farm C had 20.6 ha, farm D had 22.6 ha and farm E had 68.8 ha of cultivated acreage. Japanese farms A and B were very small. The ratio of own land to cultivated acreage was 8% for farm A and 4.9% for farm B. Dutch farms C, D and E had relatively large lands; 19.4% for C, 25.7% for D and 58% for E.

The main corps of the farms investigated were tulip bulbs. Japanese farm A plants tulip bulbs over 3.8 ha and farm B over 5 ha. Dutch farm C plants them over 11ha, farm D over 16 ha, and farm E over 33 ha. The scale of the farming of tulip bulbs in the Netherlands is more than four times that of Japan.

Japanese farms grow several crops; tulip bulbs, tulip cut-flowers and rice production. In addition farm B grows onions. The Dutch farms produced tulip bulbs and cut-flowers. In addition, farm C is used to grow peonies, while farm D and E are used for

harvesting grass.

Machines and equipment used in Dutch farms are of higher quality than those used of in Japanese farms. In Japan, the highest horse-power of tractors is 80 ps, while in Dutch farms it is 180 ps. The production system in the Netherlands is more mechanized with bigger tractors and machinery. In clay soil, Dutch farmers use planting machines with nets, which are placed under the planted bulbs to allow them to be picked up easily at harvest. A Dutch farmer said he planted tulip bulbs over 3 ha per day, whereas a Japanese farmer planted only 0.3 or 0.4 ha per day. Picture 1 shows farmers planting tulip bulbs using a machine attached to a tractor of 41 ps in Japan. Picture 2 shows a planting machine attached to a tractor of 180 ps in the Netherlands.

Management

Figure 1 shows some economic aspects of tulip bulb production. In my interviews, each farmer reported sales, production volume and production acreage for each year from 2007 till 2009. According to the average rates of foreign exchange from OECD (2009), the exchange rate was 161.4yen/euro in 2007, 151.2 in 2008 and 130.7 in 2009. By calculating the euro value of Dutch sales to Japanese yen, the average (wholesale) price of Dutch tulip bulbs is 7.2, and that of Japanese bulbs is 17.2 yen. The average price of Japanese bulbs is 2.4 times of that of the Dutch bulbs. The average yield or sales value of tulip bulbs per ha is 3948 thousands yen per ha in Japan and 3285 thousands yen per ha in the Netherlands. Japanese yield per ha is approximately 1.2 times of the Dutch. Japanese land productivity is 220 thousands bulbs per ha while that of the Dutch is 483 thousand. The Japanese productivity per ha is around half of that of the Dutch.

Japanese farms sell bulbs only to Tayama Bulb Association (TBA) and store some bulbs for their cut-flower production. TBA sells bulbs to traders and consumers. Dutch farms sell their bulbs to many traders and store some of their bulbs for their own flower production.

Table 2 shows management problems. Japanese farmers face the following problems: the market price is too low, they require more labour in the planting and harvesting seasons, their machines are very old, and the workers are very old. Their mail opinions in the future are to reduce production costs and to attain the best combination of bulb and cut-flower production.

Mail problems faced by Dutch farmers are fungi and viruses affecting the bulbs; how to employ better (trained) workers; how to improve the soil; and how to control disease. Their future strategies would be to develop good varieties, quality and colours of bulbs and flowers, and to secure adequate water supply.

The lower half of Table 2 shows the structures of yields. Japanese bulb farmers get their yields from three resources: tulip bulb production, cut-flowers sales and rice production. The rice yield is estimated from rice cultivated acreage multiplied by the average rice yield per ha in 2007 at the area. One farmer informed he has three income sources and he gets money throughout the year. Dutch farmers get their yield from two resources: tulip bulb and cut-flower production. The yield values are almost equal.

PRODUCTION COSTS IN JAPAN AND THE NETHERLANDS

It is not easy to compare production costs in Japan and the Netherlands because some concepts and components are different in each country. A Japanese cost survey was conducted in 2006–2007 by Toyama Prefectural office to obtain data for the improvement of tulip bulb production management. In the Netherlands, LEI has an official farm accounting system. I will not focus on the absolute level but on the composition and

structure of production costs of tulip bulbs in Japan and the Netherlands.

In the case of Japan, informants are from four farms. Their crops were tulip bulbs, rice and tulip cut-flowers. On average, they have 12 ha of cultivated land per farm, and they use 3.7 ha per farm for tulip bulb production, 8.15 ha for rice and 0.133 ha for greenhouses used for cut-flowers. In 2007, on average, they produced 644 thousand bulbs per farm. The volume of forced bulbs per farm was 149 thousand, which amounted to 23 % of total production. The part-time and seasonal employment per farm was 5075 hours per year.

In the case of the Netherlands, three farms were selected from the LEI data-base of to find the tulip bulb cost. These farms are greatly specialized for tulip bulb production with relatively small cut-flower production. They cultivate tulip bulbs at 13.3 ha per farm. They employed workers for 4300 hours per year per farm.

Yield

Table 3 shows yield structure. In the case of Japan, only tulip bulbs are produced, whereas, in the Netherlands, products include tulip bulbs, cut-flowers and others. The Japanese cost data is concentrated on tulip production, while the Dutch cost data includes cut-flowers as well as bulb production. Therefore, this comparison is only an initial approximation.

Table 3 shows that Japanese farms get their yields or revenue from tulip bulb production and income subsidies. The income subsidies are a compensation for reduced rice production. This income account for 12% of the total yield amounts.

Dutch farms obtain their yields from tulip and flower production. The yield from flower production is around half of the bulb production. The share of income from subsidies is 0.3 %, which is very low.

Cost

Figure 2 shows a summary of the cost structure. In Japan, the total cost share of the yields is 72% and farm income share is 28%. In the Netherlands, the total cost share is 82% and farm income share is 18%. The Japanese wage share of the yields is 23%, and the Dutch share is 17%. The Japanese wage share of the cost is 32.5% and the Dutch share is 20.1%. The Japanese depreciation share in the yields is 6.4%, and the Dutch share is 11.7%. The Japanese depreciation share of the cost is 8.8%, and the Dutch share is 14.3%. The farm income share of the production price in the Netherlands is less than that of Japan. The wage share of the production cost of the Netherlands is less than that of Japan. The capital depreciation share of the production cost in the Netherlands is more than that of Japan.

The details of the cost structure (per ha, % of yield) are shown in Table 4. Some notable features are as follows:(1) payment of contract work has been included in the Netherlands, 3.5%: 0%; (2) land rent and interest in the Netherlands is greater than Japan, 6.4%: 2.5% (3) fertilizer and chemicals cost lesser in the Netherlands than in Japan, 3.4%: 8.5%; (4) electricity and fuel costs more in the Netherlands than in Japan, 5.0%: 3.3%; (5) the taxes on costs in the Netherlands is lesser than that of Japan, 0.2%: 1.5%.

CONCLUSION

Some features of the cost structure in Japan and the Netherlands can be highlighted. The main results are as follows: (1) the average price of tulip bulbs produced in the Netherlands is less than half of those produced in Japan; (2) the production per ha in the Netherlands is more than twice that in Japan; (3) the scale of farming in the Netherlands is more than four times that of Japan; (4) the production system of the

Netherlands is more mechanized with bigger tractors and machinery, allowing Dutch farmers to plant a greater area per day; (5) the wage share of the production cost of the Netherlands is less than that of Japan; (6) the capital depreciation share of the production cost of the Netherlands is more than that of Japan; (7) the farm income share of the production price of the Netherlands is less than that of Japan.

In brief, the Dutch bulb farming is large scaled with big machines, while Japanese bulb farming is small with little machines. This may be because of the small unit size of Japanese fields, but this is only one aspect of the differences in tulip bulb farming. As shown in Table 2, Japanese bulb farmers earn a proportion of their income from rice production and they work throughout the year by planting rice, bulbs and cut flowers production. Without producing rice, they cannot produce tulips. Therefore, the scale of tulip production is dependent upon rice production in Japan.

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Tables

Table1 Characteristics of farms 2009

| Farm | Japan | | The Netherlands | | |
|---------------------------------|-------|------|-----------------|--------|--------|
| | A | B | C | D | E |
| age of farmer | 58 | 30 | 44 | 40 | 41 |
| main workers (man) | 2 | 3 | 2 | 1 | 1 |
| full-time employment (man) | 4 | 4 | 1 | 2 | 5 |
| part-time employment (man days) | 500 | 0 | 625 | 1,500 | 1,250 |
| own land (ha) | 1.2 | 1 | 4 | 5.8 | 34.7 |
| rental land (ha) | 14 | 20 | 16.6 | 16.8 | 34.1 |
| total (ha) | 15.2 | 21 | 20.6 | 22.6 | 68.8 |
| crops | | | | | |
| tulip bulbs (ha) | 3.8 | 5 | 11 | 16 | 33 |
| other bulbs (ha) | 0 | 0 | 0 | 0 | 0 |
| tulip flowers (1000) | 100 | 430 | 2800 | 8300 | 7500 |
| green house for flowers (ha) | 0.1 | 0.08 | 0.27 | 0.58 | 0.48 |
| peony (ha) | 0 | 0 | 0.9 | 0 | 0 |
| rice (ha) | 10 | 14 | 0 | 0 | 0 |
| onions (ha) | 0 | 1 | 0 | 0 | 0 |
| grass for dairy farming (ha) | 0 | 0 | 0 | 6 | 35 |
| others (ha) | 1.3 | 1 | 8 | 0 | 0 |
| machines | | | | | |
| tractors | 4 | 4 | 4 | 4 | 9 |
| planting | 1 | 1 | 1(net) | 1(net) | 1(net) |
| sprayer | 1 | 1 | 1 | 1 | 1 |
| harvesting | 1 | 1 | 1(net) | 1(net) | 1(net) |
| bulb selector | 1 | 1 | 2 | 1 | 1 |

(1) part-time employment includes seasonal labour

(2) man days = yearly hours/8hours

(3) Farm A has four tractors (80 ps, 75 ps, 28 ps, 32 ps)

(4) Farm B has four tractors (75 ps, 50 ps × 2, 30 ps)

(5) Farm C has four tractors (115 ps, 84 ps, 82 ps, 75 ps)

(6) Farm D has four tractors (180 ps, 105 ps, 65 ps, 50 ps)

(7) Farm E has nine tractors (165 ps, 130 ps, 115 ps, 108 ps, 100 ps, 75 ps, 69 ps, 45 ps, 28ps)

Table2. Problems, strategy, and yields

| Japan | | | The Netherlands | | |
|--|---------------------|--------------------------------------|-----------------|-------------------------|------------|
| | A | B | C | D | E |
| problem 1 | low price | deterioration of machines | fungi | efficient workers | good soil |
| problem 2 | additional labour | ageing of workers | virus | fungi | disease |
| future strategy | low cost production | combination of bulbs and cut-flowers | good variety | good quality and colour | good water |
| yields (average 2007–09, per farm, 1000 yen) | | | | | |
| tulip bulbs | | 14,833 | | 73,846 | |
| tulip cut-flowers | | 12,250 | | 84,016 | |
| rice | | 15,960 | | | |

Table3. Yield Structure 2007

| | (per ha, % of yield) | |
|-----------------------|----------------------|-----------------|
| | Japan | The Netherlands |
| tulip bulbs | 88.2 | 61.9 |
| tulip cut flowers | | 32.1 |
| contract work | | 4.0 |
| growth of plant stock | | -3.1 |
| others | | 4.5 |
| income subsidies | 11.8 | 0.3 |
| taxes (VAT) on yields | | 0.3 |

Table4. Cost structure in detail

| Japan | % of yield | The Netherlands | % of yield |
|--------------------------------------|-------------|-----------------------------|-------------|
| Total yields (Y) | 100.0 | Total yields | 100.0 |
| Direct Costs (F) | 64.1 | Direct Costs | 70.0 |
| wages | 23.4 | wages | 16.5 |
| | | contract work | 3.5 |
| land rent and rental machine | 2.5 | land rent | 6.4 |
| interest | 0.4 | interest | 5.0 |
| seed and seedlings | 5.3 | planting material | 12.7 |
| manure and fertilizer | 4.7 | fertilizers | 0.5 |
| chemicals | 3.8 | pesticides | 2.9 |
| other direct cost | 17.4 | other direct cost | 6.0 |
| materials | 1.6 | | |
| tools and equipment | 0.4 | | |
| repairs | 3.3 | | |
| clothing | 0.1 | | |
| packing and shipping charge | 4.2 | | |
| plant fee | 0.4 | | |
| charge for TBA | 7.4 | | |
| electricity, water and fuel | 3.3 | electricity and fuel | 5.0 |
| | | electricity | 2.7 |
| | | fuels (heating) | 2.3 |
| Others | 3.3 | Others | 11.4 |
| mutual aid (fixed capital insurance) | 0.6 | | |
| land improvement | 0.2 | | |
| study and training | 0.6 | | |
| office job and postage | 0.6 | | |
| social expenses | 0.2 | | |
| social welfare service | 0.3 | | |
| others | 0.8 | | |
| Depreciation (G) | 6.4 | Depreciation | 11.7 |
| | | buildings | 4.0 |
| | | machines | 7.3 |
| | | others | 0.5 |
| Other costs (J) | 1.5 | Other costs | 0.2 |
| taxes(fixed asset tax etc.) | 1.5 | taxes (VAT) on costs | 0.2 |
| Total costs (C = F + G + J) | 71.9 | Total costs | 82.0 |
| Farm income (I = Y - C) | 28.1 | Farm income | 18.0 |

Figures

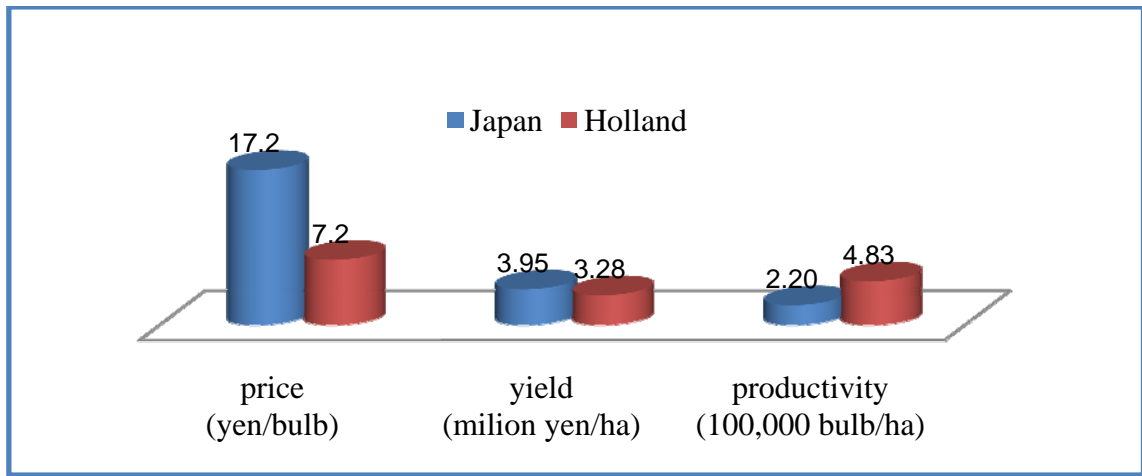


Figure 1. Average values of tulip bulbs 2007–2009

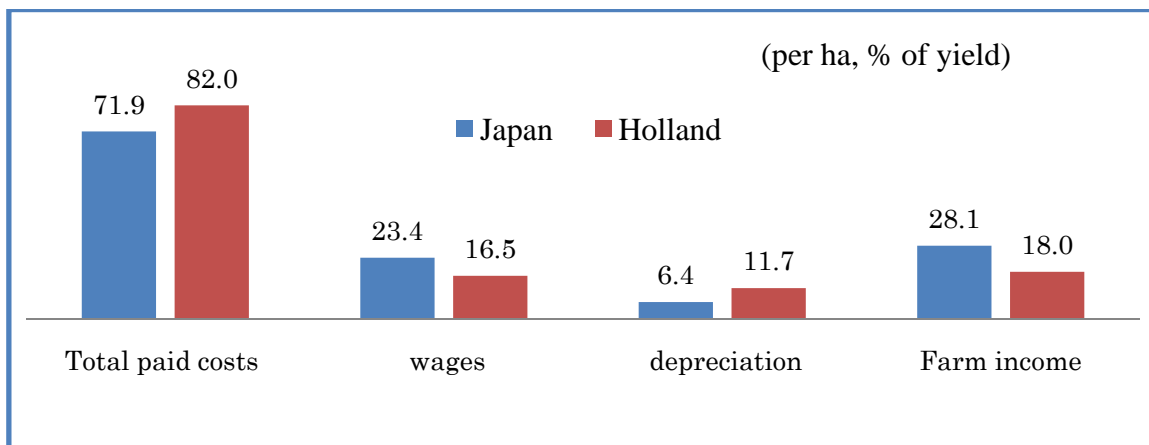


Figure 2. Cost structure 2007



Picture 1. Planting bulbs with a machine in Japan



Picture 2. A Planting machine in the Netherlands