

Development of New Agricultural Production Systems in Asia: Impacts of Globalization and Industrialization on Agricultural Products

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1. Introduction

Since agricultural product has natural restrictions, such as a climate condition, a soil condition, and living thing conditions, it has been made difficult to carry out continuous production, mass production, standardization, and production system automation like an industrial commodity production. However, high technology comes to be introduced into protected horticulture, and a new cultivation form is being established today.

This cultivation form became possible mass-producing even if in the plant which had added value as rare species. And this production system has given a big change to management, distribution, and a market. High technology is the technology of an advancement of aiming at rationalization of agricultural product, such as biotechnology, growth environmental control technology, and facility management by computer use. In this paper, orchid, *phalaenopsis*, production of Taiwan which is raising the track record by high-tech introduction is taken up as an example of new production system. And the actual condition of the production in the case of introducing agricultural high technology, management, and distribution is clarified. And the change of the management of a producer and a manager accompanying it is considered. And since it is the closest to agricultural industrialization, based on the idea of a global value chain (GVC) required as one form of Asia industrial development, the possibility about the industrial production by orchid (*phalaenopsis*) production is analyzed.

2. Trend and feature of the production of Orchid, *Phalaenopsis*, in Taiwan

Phalaenopsis cultivation of Taiwan has tens of years of history from World War II to the present. In the 1950s of the beginning when cultivation started, the grower grew

phalaenopsis as garden plants as a hobby and amusement without considering economical efficiency. And a young farmer began to participate into cultivation from the 1970s or subsequent ones. In that time, the scale of a cultivation institution was small, and there was also little quantity of production, and it had not concentrated a producing area, either. Therefore, there was a market of phalaenopsis only in Taiwan domestically. The situation continued till the 1980s. Taiwan sugar industry incorporated company of a state-owned firm entered into phalaenopsis cultivation as a company the second half of the 1980s. And this situation made expansion of the oversea market of phalaenopsis successful. An agribusiness firm and many individual farmhouses entered after it, and wide range and large-scale phalaenopsis production started. The base as industry was formed. By the time the export volume of phalaenopsis occupied the 1st place in the world until 1998.

The point which should be noted as a feature of phalaenopsis production is that the large-scale commodity production system is developed. Since phalaenopsis belongs to a single stalk plant, there is no corm and propagation of a seedling is more difficult than the ornamental flowering plant of other kinds. Furthermore, the propagating ratio in natural conditions is very low. Moreover, there is no probability of survival of the seedling in the raising seedling period of phalaenopsis at about 75% only. Therefore, since it corresponds to the quantitative seedling demand of a market, the technology which supplies a big amount of seedlings is needed. For this reason, biotechnology was introduced into phalaenopsis production and mass propagation technology was established by the extensive seedling raising production by a seedling from true seeds and a Mericlones (Meristem Clone) seedling, and performing shortening of a seedling raising period. Thereby, year-round shipping was also enabled. Moreover, it became possible to lower the prices of seedlings sharply and to lower the fund of initial investment from before by extensive seedling raising. Therefore, the barrier of fund problems became low for the new participants to production. The "factory seedling raising system" and the "division-of-work cultivation system" were established by high-tech introduction. For this reason, it became possible a new farmer to grow easily. Therefore, the number of the cultivation farmers is increasing greatly in 20 years. The number of cultivation farmhouses will be about 400 houses in 2008. By high-tech introduction, the productivity of phalaenopsis improved remarkably and the quantity of production per tsubo (1.8mx1.8m) increased from 97 shares to 165 shares. The method of being division of work about the same seedling of a growth stage, and producing in large quantities grew as flowering plant industry which employed the profit of the

location of Taiwan efficient from the old production system which was being given from a seedling to merchandised flower at one farmhouse, . Therefore, it can be said that the high technology to agriculture is playing the important role into which the phalaenopsis industry in Taiwan is developed in recent years.

3. Experience of the production in Taiwan

3.1 The labor force of high school education

A common farm management person's academic level group in Taiwan has the highest rate of the graduation from an elementary school, and has reached to 50% or more. The common farm management person was mainly concentrated on the middle-and-old-age-people group, and the rate of the middle-and-old-age-people layer of 45 or more years old occupies 80% or more. This shows that the farm management person of Taiwan has the phenomenon of aging in low school education. However, if a phalaenopsis manager is seen to an academic level, a high school graduate grade is highest share, 43.95% and subsequently more than high school graduate is 35.43%, the junior high school graduate is 13%, and elementary school is 7.62% lowest. If a phalaenopsis manager is seen according to an age group, phalaenopsis managerial age will be concentrated on the youth group of 31-40 years old and manhood group of 41-50 years old. And 68% or more in all of both is reached. From now on, a phalaenopsis manager's academic level is higher than a common farm management person, and this manager's age will be comparatively younger than a common farm management person. In order that this may introduce high technology for phalaenopsis production management, high school education and the comparatively young labor force are needed. Simultaneously, a selling market occupies a big share also not only in the domestic market but in an international market. Therefore, it is thought that the high academic level for an international market is needed.

3.2 A size of production management and production form

The farmer with phalaenopsis production of Taiwan youth began to participate as a high profitability farming from the 1970s. However, the cost of equipment of cultivation facility and the price of seeds-and-seedlings were high, and on the other hand the rate of maturity was low at those days. Moreover, since cultivation techniques were unskilled, production area was limited. Although this situation was continued till the first half of the 1980s, the management form changed by entry of a state-owned firm

from the second half of the 1980s.

3.3 Development of organization and incorporation

Since most farm management is generally the private management by a farmer, supply of funds poses a problem. Furthermore, phalaenopsis production serves as a means with important financing from the fund outside farming, in order to gain funds, since more funds than other agricultural production is needed. Moreover, phalaenopsis is quality articles, high-value added, and a flowering plant with the image of a sizable income. Therefore, the government has recited that it should establish as one of "the biotechnology industrial policies." Therefore, many companies outside farming had positioned entry to phalaenopsis production as diversification of management. As for the type of industry, food business, the steel industry, distributive trade (department store), the construction industry, seeds-and-saplings business, etc. reach far and wide. Thus, organization and incorporation have been the new management feature of phalaenopsis industry.

3.4 Development of specialization according to growth stage

Phalaenopsis cultivation was grown on a small scale by small-scale agriculture at beginning of the cultivation. In that time, the farmer got the small seedlings, sometimes self-preparation and the cultivation was doing a series of work until it blooms by farmer alone. This growing method system can be said vertical production system. On the other hand, a lot of stocks came to be managed by development of farming modernization, and division of work by a growth stage was attained. This cultivation system can be said horizontal production system.

However, the management of the phalaenopsis production in Taiwan has almost adopted mono-culture management, in order to use effectively management elements, such as arable land, the labor force, and farm machines and implements, an institution. This form established the "division-of-work cultivation system", in order to require specialized skills. The "division-of-work cultivation system" made the phalaenopsis industry in Taiwan raise the producer of various sort of jobs. If this is summarized, a producer can be typified in the production form of five job descriptions by the growth stage of phalaenopsis.

(1) Tissue culture seedling contractor -- He is the special contractor who produces the seedling in vitro of phalaenopsis in large quantities. A tissue culture seedling contractor is the clone seedling of phalaenopsis. Not only producing but the true seed seedling is also produced.

(2) Acclimatation contractor -- The contractor who introduces acclimatation of seedling and raises stocks from the seedling taken out from in vitro to a small seedling (in No. 1.5 pot) or an middle seedling (in No. 2.5 pot).

(3) Seedling raising contractor -- The contractor who performs stock training of the bloom stock from an inside seedling (in No. 2.5 pot) to a large seedling (No. 3.5 pot) or a special enlarged seedling (in No. 4 pot).

(4) Flowering regulation contractor -- The contractor who performs promotion of flowering and flowering regulation of the stock from the bloom stock of a large seedling (in No. 3.5 pot) or a special enlarged seedling (in No. 4 pot).

(5) Comprehensive cultivation contractor -- The contractor who produces the stock from in vitro seedling to a bloom stock or flowering stock.

There are most comprehensive cultivation contractors in the occupational description of the above 5 production forms. On the other hand, since it has restriction of the place of air conditioner cost and mountain raising processing, the flowering regulation contractor has decreased most. In addition, the commodity transactions of the phalaenopsis in Taiwan included not only so many bloom stocks which are final products, but also transactions of seedlings which are semi manufactured products.

4. Distribution systems of phalaenopsis

The export of the phalaenopsis in Taiwan is about 90% of total product, and about 10% will be shipped to the domestic market. Dealings are classified into the domestic market and an oversea market. Hereafter, the distribution system of each market is described.

4.1 Domestic distribution system

The phalaenopsis made shipment in the domestic market has little quantity of cutting flower, and is mainly dealt with as potted plants. The potted plants of the phalaenopsis generally produced by the producer who goes over several steps are treached to a retailer or a potted-plants wholesale store via a wholesaler. Furthermore, it is sold to final users from a retailer. Although the central portion of distribution is borne by the wholesale market as for the potted plants of phalaenopsis, as for the rate (about 30 - 40%, not so high) via the wholesale market, compared with whole dealings, the part is sold through distribution market outside. This means that the producer of phalaenopsis sales to local merchant, a retailer, a special agent, and directly sale to florist and a consumer.

4.2 Distribution system in export

Dealings of the phalaenopsis shipped to an oversea market are mainly conducted with seedlings. The distribution channel shipped to the oversea market of the seedlings of the phalaenopsis for export in Taiwan. Since the seedlings of phalaenopsis ordered from overseas have much quantity, shipping is difficult for a small-scale production farmer. Therefore, the big company and a trader are bearing the core of distribution. The big company and a trader collect the seedlings produced by their on farm and the small-scale farms, and ship to an order directly from overseas. Or it ships to an oversea market via an overseas partner. For this reason, the big company and the trader who can introduce high technology will play a role of important for export of phalaenopsis seedlings.

5. Overseas expansion of production areas

Since the cultivation period of phalaenopsis is a long period of time, it can shorten a cultivation period by moving to an area suitable for growth conditions. The relay cultivation took in this method. Relay cultivation is the method of carrying out what is called a relay which grows while moving a plant object to a cultivation proper place according to a growth stage. The purpose of relay cultivation is producing a low price stock taking advantage of production location. It is the cultivation system which aimed at raising the use turnover of a facility and raising a profit by this. Now, in export-oriented for Japanese, Japan already has an experience long to phalaenopsis cultivation, since bloom adjustment is possible in local Japan, relay cultivation is introduced into cultivation in Taiwan, and the production and sales which tied up with

the Japanese company are carried out. In the United States, Europe, and China, flowering stock has been exported. However, since there is little cultivation experience of phalaenopsis these countries in the export for the capability of flowering regulation is low to it and it is difficult for it to carry out bloom adjustment there. For this reason, many exporters utilize the effect of relay cultivation, found a subsidiary in a abroad, and tends to make the cultivation system which was adapted for the oversea market.

6. Conclusion

6.1 GVC analysis and phalaenopsis industry of Taiwan

When the relation of producers of Taiwan and Japan was observed, the early stage was the form of the chain of the hierarchical type by a size of a management. It is because Taiwan imported the seedling produced even to the flask and it was cultivated in Japan. However, since Japan came to have imported after that the seedling cultivated in Taiwan, the situation changed completely. It is changed to the network relation of a semi- class chain to modular production. The phalaenopsis producer of Taiwan came to have the function of Research & Development (R &D) or marketing.

As for the time which was performing relay cultivation with Japan, the form of a product up-grading or a process up-grading had occurred so that the quality of the market in Japan might be suited. This is because the cooperative relation between the companies taken into Global Value Chain is notably seen with vertical relations (they are a buyer company and a seller company especially) rather than horizontal relations. According to the relation between a Japanese producer and the producer of Taiwan having been strong, the producer of Taiwan was able to acquire many knowledge about cultivation from the Japanese producer.

Then, the method of relay cultivation changes and the producer of Taiwan came (achievement of a functional rise grading) to have the function of R&D or marketing. And the contractor who builds a farm to mainland China also came to appear.

Although the phalaenopsis production management of Taiwan where it is raised to the background that such upgrade occurred that the phalaenopsis industry of Taiwan differs from other industries is treated as unique industry, it is the industry which does not belong to agriculture and the manufacturing industry. For example, the reason when moving the background and the process that relay cultivation is built to overseas differs

from the manufacturing industry. The reason the manufacturing industry relocates a factory to overseas is a time of manufacturing a low prices product by producing in cheap labor wages. Probably, it will be difficult in a developing country to expect a good product from there, because the skill which needs manufacture takes runs short, when agricultural product advances to overseas in quest of the cheap labor force. However, in the case of phalaenopsis industry, since quality is influenced by climate, the quality in which it is better to raise in the place of origin like Taiwan will grow up. And the big reason besides cheap labor wages exists.

6.2 Experience of management change of phalaenopsis production

The management of the agricultural field of Asia has lapsed into the difficult situation, while industrialization progresses. In this situation, the management of orchid cultivation, especially phalaenopsis which is origin in Taiwan, introduced new management to flowering plant industry. Orchid cultivation took industrialization management taking advantage of the point which can be grown without using the soil. The feature of this management has been developed internationally and domestically by introducing the new system which took in introduction of the biotechnology as hi-technology, introduction of the automatic management engineering of a cultivation facility and the efficient cultivation management by relay cultivation, a sales strategy, etc. As what goes to industrial production system of agricultural-products production, this direction shows the new management direction.

If it is the agriculture not using land, development of the intensive production system near industrial production is possible. However, the cultivation system based on land needs to develop the sustainable intensive cultivation techniques not only in consideration of mere rationalization but natural environment. Concentration of the further technology should be aimed at and it should be made to contribute to agricultural development of the Mekong area from which development is expected from these intensive cultivation techniques from now on.