

# Dutch agricultural development and its importance to China'

Mission report: Shanghai, Wujiang and Chongming

Jan Buurma

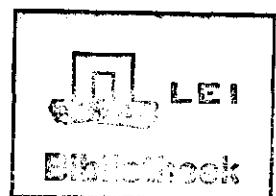
Peter van Horne

Xiaoyong Zhang

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## Preface

'The Experience of Holland Agricultural Development and Its Importance to China' is a joint research project of the Agricultural Economics Research Institute of the Chinese Agricultural Academy of Sciences (IAE-CAAS) in Beijing and the Agricultural Economics Research Institute (LEI) of Wageningen University and Research Centre in the Hague. The Chinese Ministry of Agriculture, the Dutch Ministry of Foreign Affairs (Asian-facility) and the Dutch Ministry of Agriculture, Nature Management and Fisheries finance the project. The objectives of the project are:

1. To reveal the causes of the large difference between agricultural productivity in China and the Netherlands, and to find ways to improve the efficiency of Chinese agriculture.
2. To analyse the developments in Chinese agriculture with special reference to market opportunities for Dutch agribusiness.
3. To train the Chinese partners through training-on-the-job, so that they will get acquainted with research approaches and methodologies used by LEI.

A number of studies will be carried out in the framework of this project. Among these are two case studies in the Yangtze-delta: 'Chongming', an island in the Yangtze estuary and 'Wujiang' located in the province Jiangsu. Both studies will be directed to animal and horticultural production.

A mission of three Dutch researchers has taken place for the preparation of these case studies. The members of team were Dr. Xiaoyong Zhang, Peter van Horne and Jan Buurma. This report contains the results of their mission.

The managing director,

Prof. Dr. L.C. Zachariasse

# 1 Chongming Island

## 1.1 Animal production

### *Poultry farm (10-5-2000)*

Visit to a parent stock layer farm. On this farm there were two rearing houses (0-6 weeks and 7-18 weeks) and a layer house (18-64 weeks of age). A part of the hatching eggs was sold and another part was hatched in a hatchery on the farm (which we didn't visit). The rearing house was made of brick and had a very simple inventory with manual feeding and watering. For litter fine woodshavings was used. After every flock the manure was taken out and the house was cleaned with water.

In the layer house was a three-tier step battery cage with brown and white female layers (6,000 hens per house). Commercial farms use white layers and small backyard flocks are mostly brown. On one side of the house 250 males were kept. Artificial insemination was practised every 6 days. This is not common practice in Europe and the USA because of high labour costs. The breed was Lohman (Germany).

Feed was produced on the farm and based on corn (60%), soybeanmeal (17%) and some premix. It was unclear if the feed was balanced to meet the requirements of the birds. The price was 1,3 yuan per kg (f 0,39). The manager took care of the feed calculations. At the moment of our visit prices were low as a result of an increase in production.

The cost of one worker was 10,000 yuan per year (f 3.000). Hygiene on this farm could be improved. As a result of low labour cost the mechanisation level was very low and artificial insemination level was practised. Production results can be improved by better housing and probably also by improved feed. The people we spoke, saw possibilities to improve the watersupply (nipples, already installed) and the ventilation.

### *Poultry processor (11-5-2000)*

We visited a small local processor, which wasn't slaughtering birds at the moment of our visit. Annually 1,2 million birds were slaughtered. The processor had contracts with 5 townships that have contracts with the local farmers and collect the birds. The processor supplied feed and chicks. In average 15 days a months the processor was killing birds. The average birdweight was 2,1 kg. The plant was a collective ownership of governments of different level (province, town, and state). We saw a simple transport belt at which the birds were cleaned by hand. Cooling was done in a big tank with ice blocks in which the carcasses were slowly moved forward. Finally the carcasses were disinfected.

All birds (white broilers) were further processed by hand into 40 different products. The products did go to Shanghai, the island and also for export. In total 220 persons worked at the plant. The manager knows there is modern processing equipment used in the Shanghai region but it's too expensive.

At the moment the capacity of the plant was only used for 50%. Hygiene was very poor and can easily be improved with small adjustments. Automatization and mechanisation level is very low. Product quality (e.g. through air-cooling) should be improved to meet the need for the Shanghai City and export market.

#### *Poultry specialist (10-5-2000)*

Broiler processing is done on a small scale and a part of the market is still based on selling live birds (the ultimate guarantee of fresh). Many farms produce broilers in small flocks (e.g. 500 birds) and often on a mixed farm with other activities. This specialist gives the following technical data: 50 days growing period, 2,2 kg liveweight, and mortality 2% and feedconversion 2.1. The feedprice is 1,4 yuan per kg (*f* 0,42; for comparison the Netherlands *f* 0,50). In general imported white or yellow breeds are used like Arbro acres (AA) and Avian. The type of housing varies a lot from concrete or brick houses to simple plastic tunnels.

The egg production is more concentrated on bigger farms. The size varies from 3,000 up to 100,000 hens per farm. The eggs go to wholesalers. The feedprice is 1,3 yuan/kg (*f* 0,39. For comparison the Netherlands *f* 0,40) and the eggprice is 4 yuan per kg.

#### *Pig state farm (10-5-2000)*

The state farm has 700 sows and additional fattening capacity. Local sows were bred with foreign male breeds from Germany and the UK. The hybrid improves the number of piglets and the meat quality (which is leanness). The fattening department grows the pigs from 60 days (20 kg of weight) to 160-170 days (80-90 kg of weight). The growth of 65 kg was reached with 175 kg of feed and as a result the feedconversion is 2,70. The pigs were kept in concrete buildings with natural ventilation through open windows. The pigs had a small outdoor area with a concrete floor. Water was provided through a nipple and feed was brought by hand. The pigs were sold locally and to a central processing plant. The price of meat is at the moment 6,8 yuan per kg (*f* 2,04).

The breeding department had buildings for sows with farrowing crates and 'waiting in pig sows'. After giving birth the piglets are weaned at an age of 35 days. Removing the sows and the piglets staying in the farrowing-rearing compartment till 60 days did weaning. The technical results as given by the manager were good. This can be explained by the use of fertile local breeds. Breeding was both done natural and artificial insemination (AI). Feed was made at the farm based on corn (50%), soybeanmeal (15%) and wheat (local and other Chinese provinces). The price of feed was 1,4 yuan per kg (*f* 0,42).

The education of the manager was middle level agricultural school. In general the farm gave a good impression, had a reasonable hygiene standard, made use of foreign breeds, however quality of housing was moderate.

#### *Dairy state farm (10-5-2000)*

We visited a state farm close to the national forest. 80 Friesian dairy cows produced an average of 5,000 litre per cow. Compared to other statefarms this was low. In total 12 people

were working on this farm: mainly for manual milking three times per 24 hours and for bringing the feed to the animals. The cows were kept most of the time inside. Feed came from 3 ha of land and grass out of the forest. Also a mixture of corn and other grains was fed (amount according to milkproduction).

The farm was converting to automatic milking as one of the last farms producing milk for the Shanghai Dairy Company. Although it's not economic to change to automatic milking this was done because of hygienic reasons (reduce bacteria count). The main task for this farm was to improve the quality of the milk to meet the high standards of the Shanghai Dairy Company.

#### *Dairy specialist (10-5-2000)*

In total there are 10,000 dairy cows on the island. The number of farms is reduced in the last 10 years but the exact figure at the moment is not available. The average number per farm varies from 10 to the biggest one with 300 cows. All cows are hybrids from the local yellow cow and the Dutch Friesian. In average the yield is 7,000 litres per cow per year. The 8 state owned farms use 800 to 1,000 ha of land. Automatic milking is common practice on almost all (state and private) farms. Private farms have to rent land from the community (long term).

The milk is produced for the Shanghai Dairy Company who has 5 collecting stations on the island. The farmers bring the milk after every milking period directly to the cooling tanks at the collecting station. The milkprice is based on fat, protein, antibacterial count and bacteria count. The milkprice is about 2 yuan per litre. The products made of the milk are: fresh milk, milk powder and ice-cream. Processing is done both on the island and in Shanghai.

According to the specialist the island is very suitable for dairy because of fertile land, enough rain. There is no grassland and the production is based on 'in house feeding'. With low labour costs and hot summers this sounds very feasible. The Shanghai Dairy Company brings in new technology for example through their breeding centre.

**FUTURE:** a faster development is needed. Automatic milking is already implemented (quality improvement) and the target for milk production is 10,000 litres per cow. This can be achieved with improved breeding, better feeding (according to science), better housing conditions and high level management. There is a management service station on the island that organises courses for farmers and provides otherwise information.

**MARKET:** as income in the region is increasing there will be more demand for milk and milkproducts especially from the young generation. The city people want high quality products (read low bacteria count) and the farmers should increase there quality standards.

**CONSTRAINTS:** there is enough land and credit. On the island the bottleneck is processing capacity. Also the dominant position of the Shanghai Dairy Company is sometimes a problem.

## 1.2 Horticulture

*Vegetable specialist Agriculture Committee of Chongming (10/5-00)*

*Evolution of vegetable areas at Chongming Island (ha)*

	1990	2000
Open air	4,000	7,000
Greenhouse	10	100

Greenhouse production took off in 1992 through government initiative.

The major factors behind the strong expansion between 1990 and 2000 were:

- rising demand (increasing population and changing consumption pattern);
- rising prices for vegetables;
- conversion to market economy.

The production is concentrated (80%) in six towns in the eastern part of the island. Backgrounds for this concentration are:

- natural conditions (good soil and water).
- long tradition (vegetable basket of Shanghai).
- anticipation at comparative advantages.

The production is largely (70%) exported to Shanghai and Beijing

The motive for constructing greenhouses was strengthening the competitive position with regard to both southern China and northern China. In greenhouses the harvesting period is earlier than in open air. Consequently the transport costs from southern China can be 'earned' and consumption centres in northern China can be supplied earlier.

The greenhouse construction was designed at Chongming Island. The greenhouses are for about 90% manufactured in Shanghai (by Changsen Pipe and Tunnel Factory). About 10% of the greenhouses are manufactured by growers themselves (from bamboo).

There is an experimental station for vegetable research in the region. The Agricultural Committee invested 1 million yuan in the station concerned.

*Chongming greenhouse vegetable zone in Hexing (9/5-00)*

The Hexing Greenhouse Vegetable Zone is a Model Unit of Chongming Municipality. The Greenhouse Vegetable Zone was an initiative of three government levels. Under this initiative three tranches of plastic greenhouses were built:

1994	70 ha
1995	70 ha
1996	130 ha

The total of 270 ha counts for 35% of the plastic greenhouses at Chongming.

The land needed for greenhouse construction was rented from the landuse-owners by a co-operative. The governments concerned largely financed the greenhouse construction. The greenhouses are rented-out again by the co-operative to vegetable and flower growers. Maintenance costs of the greenhouses are for the growers' account. The co-operative further provides inputs like plastics, machinery and pesticides, and also market information with regard to the various kinds of vegetables and flowers.

Crop choice is a responsibility of the growers themselves. The same is true for product marketing. The co-operative is not involved in these two functions. Practical production know-how was traditionally available in the area. Most growers had already experience with simple plastic tunnels. There is a waiting list for new members of the co-operative. Nevertheless the co-operative has a policy of enlargement of management scale. The largest grower has 150 tunnels under his management. For the future the co-operative has three development strategies:

- co-operation with biotechnology companies
- co-operation with processing industries
- co-operation with seed companies (new varieties)

The various government levels promised their support for realising these strategies. The natural and economic conditions for further development are considered excellent. Clean soil, clean water and clean air provide favourable conditions for organic production. Investments from the Dutch glasshouse industry are most welcome.

The yield level of tomatoes is about 7 kg/m<sup>2</sup> per growing season. Fruit vegetables are grown in rotation with crops like cabbage in the winter period. Heating has not been considered up to now.

#### *Chongming Vegetable Technical Advice Station (11/5-00)*

Mr. Zhu Zhong Nan, director of the Chongming Vegetable Technical Advice Station showed us round at the garden. The garden was established in 1999 and focuses on both demonstration and production activities. The activities are implemented both in open air as in greenhouses. At the time of our visit the garden was in his first production season, and showed quite nice and smooth crops.

An important task of the garden is variety testing. Especially attention is paid to varieties from abroad. The ultimate criterion is acceptance in the consumer market. As an example Mr. Zhu explained us the technical criteria: (1) thin skin, (2) good taste, (3) shiny colour. There is no formal judgement by a committee of researchers, advisors, farmers, etc.

The results are disseminated through meetings with officials of state-owned companies and technical extension workers. Furthermore dissemination takes place through brochures and articles in agricultural trade journals.

The station focuses at organic production methods. For that purpose contacts with the International Federation of Organic Agriculture Movements (IFOAM) have been made.

Mr. Zhu asked for vegetable seeds from Dutch seed companies to be included in the variety tests at the station. We directed him to the representative of Rijk Zwaan in the Shanghai region.

### *Chongming Green Food Park (11/5-00)*

Mr. Yuan Wei Zhong, vice director of the Chongming Green Food Park Administrative Committee guided us to three new polders along the north East Coast of Chongming. The three polders were diked in 1997 and have a total area of 2,000 ha. Main roads and drainage system have been completed and the land is for the time being in use of the Administrative Committee.

Chongming County is the owner of the new polders. The Administrative Committee is the project developer. The intention is to rent the land to modern agricultural entrepreneurs for organic production of arable and vegetable crops. The Administrative Committee considers export of organic products to Japan and Hongkong as a good opportunity. Next year the committee will start an organic farm of 65 ha as a demonstration project. Contacts with the International Federation of Organic Agriculture Movements (IFOAM) have been made in order to get the certificate of 'organic farm'.

Mr. Yuan Wei Zhong provided us detailed data on soiltype, soil analysis, rainfall, water quality, air quality, etc. They will be translated in English. The conditions for agricultural production seemed to us to be quite convenient, comparable to the circumstances in the polders in the Dutch province of Flevoland.

The Administrative Committee welcomes foreign farmers. They can bring the techniques and the management for successful organic production. There is a gap in the market for high quality products, which cannot be filled with current Chinese know-how.

## 2 Wujiang

### 2.1 Animal production

In Wujiang City we visited different towns. The county government is focusing on specialisation on a certain product per village. In the field we see much rapeseed which will be replaced by paddy rice later this month. The main agricultural sectors are pigs and fisheries (Taihu Lake).

#### *Luxa town (16-5-2000)*

A town with 30,000 inhabitants and concentrating on pigs and fisheries. Many households keep some pigs. More professional production starts at 100 pigs and the biggest farm has 20,000 pigs. The last years the production increased from 50,000 pigs in 1995 up to 160,000 in 1999. Production costs are low in this region as a result of low labour costs. Recently 200 breeding pigs were imported to improve the local pigs to get leaner pork. Feed is mainly coming from Shanghai feedmills (e.g. Hope feedmill). There is a piglet market for trading in piglets, which are coming from the neighbouring province. There is one town government owned processing plant for pigs. The farmers are supported by an animal clinic with an extension service. The chief explains there is no need for foreign technology as the farms are too small.

We visited some small scale household farms with 10 to 15 fattening pigs, the piglet market at the river (without any business at the moment of our visit) and a specialised farm with 350 fattening pigs and 20 sows. At this farm the local Chinese breeds are still in use. The advantages of this breed are: many piglets and large milk production, low feedintake, quiet animal which eats grass. The main disadvantage is the fat meat. The pigs grow from 15 to 75 - 90 kg on 200 kg of feed. The feed is corn (20%), fishpowder (8%), rice husk (30%), oil etc. Man and wife run the farm.

#### *Bache town (18-5-2000)*

A town with 30,000 inhabitants and 4,000 ha of land and water. Duck egg production is important in this town with 150,000 ducks. 320 to 350 million duck eggs are processed (in mud, salted etc.) for the region and exported all over Northeast China. There are 250 specialised duck farms. In this region with many lakes (Taihu Lake) this is very suitable. Chickens and geese are only kept on small-scale farms.

At the moment poultry prices are very low. In duck egg production prices are good and net profits are 15-25 yuan per duck per year. Production starts at 130 days of age and ends after 280 days with a production of 18,5 kg (65 gram per egg). The price is 0,4 to 0,5 yuan per egg (salted). In supermarket the price will be 0,80 yuan per egg vacuum packed. The feed is pellets added with grass, vegetables etc. We visited a duck farm with a simple

bamboo house and 2 times a day the ducks taking a swim in the lake. A local company through a 4-week in water treatment processes the produced duck eggs.

#### *Group discussion (18-5-2000)*

In Wuijang City are a one hundred pig farms. After reform farmers were free to choose their production system. The current problem is that farmers have low skills and take no risk. The town wants to concentrate production of a certain type per village and develop skills of farmers. This has to be done in co-operation between the village, the farmer and the coop bank (which is owned by the government!). In general a farms has 13 to 15 moe (app. 1 ha) in use (by contract or rent) for paddy rice and wheat. In pig production many people raise 10 to 30 pigs. Half of the farms have more than 10 pigs, 1/3 has more than 16 pigs and 1/3 has more than 100 pigs. Over recent years the pork price fell by 50%. Chicken and duck production is of less importance with 18% of the farmers having in average 5 to 6 chickens.

In general there is a tendency towards developing more professional farming. The main problems are:

1. Low technology
2. Traditional farming methods
3. Low quality of the product
4. Lack of good storage and processing.

The government and sector should focus on:

1. New Technology
2. More variety in products
3. Improvement in service

## **2.2 Horticulture**

#### *Tree nursery production and industry in Taoyuan Town (16/5-00)*

We got an explanation from Mr. Jiang Yunxiang in Taoyuan Town. The tree nursery enterprise includes 6,000 farmers' families with in total 500 ha of tree nurseries. The major species is camphor tree. Besides 100 other species are grown. The enterprise comprises both production and marketing. The marketing component of the enterprise includes marketing, garden design, landscape architecture, etc. The enterprise successfully competes in tenders for greening projects of big cities. They have won the tender for greening the outer circular road of Shanghai (96 km).

The enterprise has a second grade certificate of the government. That means, that the enterprise is allowed to export products and services to other provinces. The enterprise has permanently 300 sales representatives underway to sell the nursery products. The total turnover is about 100 million yuan per year.

The knowledge for growing camphor trees is based on 20 years of experience. The trees are mostly sold at an age of seven years. Selling at an age of four years is also possible. Dependent on age the stem diameter ranges between 4 and 8 cm. The bigger the stem

the higher the selling price. It is not very difficult to grow the trees. Production is continuously increasing. Up to now the 300 sales representatives can sell the trees easily.

The strong position of the enterprise finds its origin in the soiltype. The soil sticks with the requirements resulting in high survival rates.

#### *Hua Feng Garden and Greening Engineering Company (16/5-00)*

We got explanation from Mr. Ni Yongxing. He started his tree nursery activities (small scale) in 1970. Now his nursery comprises a production area of 3 ha (13 workers) and a marketplace for bonsai trees.

At present the town counts 33 ha of nurseries with 300 farmers earning a living with it. The nurseries are concentrated in 3 - 4 villages. Most farmers involved have an area of 1,500 - 2,000 m<sup>2</sup> under management. In total 60 - 70 species are grown. On average the individual farmer grows around 30 species. Mr. Ni operates as co-ordinator of the nursery activities in the town.

After the explanation we were guided to a bonsai grower. He had a very nice garden with hundreds of bonsai trees. The bonsai trees are mainly sold to high-income people who use them for decoration purposes. The price of one bonsai tree of 10 years old may amount to 500 - 3,000 Yuan. Considering the size of his house, the bonsai grower had a very good living.

#### *Wujiang City Plant Nursery (17/5-00)*

The Wujiang City Plant Nursery is a state owned company with an area of 65 ha. At the time of our visit more than 100 species were grown at the nursery. The major part of the species can be characterised as park/lane trees. Nowadays many local governments in China are planting trees along roads in order to beautify the landscape and to increase biological diversity.

An important attention-point for the nursery is the introduction of new species (especially evergreen trees). One of the successes is the introduction of the lily tree. This species was imported from Australia in 1980. In 2000 the nursery grows 400,000 - 500,000 seedlings. The seedlings are sold (for 3 yuan per plant) to farmers, who further raise them. A tree of 1 meter high will yield 15 yuan, and a tree of 3 meters high 45 yuan. The nursery is experimenting (adaptation tests) with pines from southern China, and also with various tropical trees.

The nursery does not apply machinery for sowing or harvesting. There is not enough money for investment. The conditions for production of cut flowers are considered as unsuitable in Wujiang. Production of potplants appeared to be unprofitable, owing to lack of demand.

#### *Wujiang Vegetable Engineering (17/5-00)*

The Wujiang Vegetable Engineering has an area of 15 ha, of which a big share of plastic tunnels. The garden was flooded in 1999, and the plastic tunnels had just partly been repaired. At the moment of our visit both vegetables and potplants were grown.

A wilting disease hampered production of watermelon. Researchers from the university advised to try inoculation of the watermelon with a resistant species. Up to now the rate of success is unsatisfactory.

Production of Rhododendron was hampered by fertiliser problems. The planting material has been imported from the Netherlands. Finding the right soiltype (pH 4,5 - 5,4) was rather problematic. After fertiliser application many leaves were burned.

In short: the manager faced many technical problems for which he could not find the solution at short notice. He told us that he had discussed the problems with colleagues, but they also could not provide solutions.

### 3 Shanghai

#### *Impression*

Shanghai is a city with 12 million inhabitants with a very modern down town area with a shopping centre, fast-food restaurants and many people with mobile telephones. On the other hand there are in the same area streets with small shops, resto's and people working and living outside. McDonalds and Kentucky Fried Chicken dominate the fast-food sector.

#### 3.1 Animal production

##### *Supermarket (8-5-00)*

Visit to a medium size supermarket with a food but also with a non-food department with clothes, shoes and electronic equipment.

For buying milk there are two options. First there is a large division with several types of milkpowder in big cans and bags: for adults (70 Y/900 gram), babies (85-120 Y/900 gram) and pregnant women (130 Y/900 gram). On the other hand there is fresh milk in the cooling department. Regular milk is available for 5 yuan per litre (Yunyao group, Wenzhou). There is a wide choice in small bottles (approximately 100 gram) of milk in all different tastes apparently for children. There is imported butter from New Zealand, however, we couldn't find any cheese in this store.

For chicken there is a choice in fresh packed or frozen chicken. In the fresh department there are mostly whole chickens, some chicken parts and organs like gizzard, feet, hearts. We also saw the local black chicken (a slow growing Chinese breed that has a status of 'healthy'). In the freezer were many products from the Dajiang group: legs, filet, wings, hearts, gizzard and feet. In all the supermarkets I visited the frozen chicken came from the Dajiang group. The Shanghai Dajiang group is a joint venture with the CP group from Thailand and a modern large and export-oriented company.

Even in this modern supermarket eggs were sold per piece. One can buy the number of eggs you want and put them in a small paper or plastic bag. Later on we saw in other supermarkets packed eggs similar to the 10 in a box system we are used to.

According to the agricultural counsellor there is in Shanghai City a fast development from wet markets to modern supermarkets. The sector is reacting to slow on those developments. Examples are the need for new products, higher quality products and improved distribution and logistics (think of frozen products, which need shorter distribution lines with proper cooling).

### *Agricultural industry and commerce general group (12-5-2000)*

This group controls 16 state farms and 21 companies (taxis, trading etc.). In the future the group want to concentrate more on agriculture to be their core business and in particular on: seeds, dairy, flowers and vegetables.

DAIRY: In dairy the company has a marketshare of 80% in the milk processed in the bigger Shanghai region. The market will further increase as more of the Shanghai citizen will drink a glass of milk in the morning. Other regions (e.g. Mongolia) can produce at lower cost and especially make milkpowder. The company will concentrate on specialised plants for fresh milk, yoghurt etc.

PORK: The company expects that pork will further replace beef. The company will focus on further processed products like cooked parts. A large portion of the pork (90%) for the Shanghai region is imported from other regions of China. There is severe competition. To improve competitiveness the Shanghai region is focusing on:

1. Enlargement of scale
2. Feeding (low cost) by-products (with support from the city)
3. Higher quality breeds (at the moment in co-operation with the UK)
4. Industrialisation of the production

POULTRY: For poultry was told that the production cost on state farms are higher compared to private farms and the Shanghai area can't compete with other provinces due to higher costs for labour and feed. Recently the prices fell from 3,9 to 1,9 Y per kg. The company lost money on poultry the last two years. Production is reduced (from 16 to 5 more specialised state farms with poultry) and there are more imports from other provinces. Duck production is successful and is produced under an own brand name: 'Daying duck'. At the moment the retail is concentrating on buying poultry from other provinces.

### *Shanghai bright dairy and food company (12-5-2000)*

The Shanghai bright dairy group was established in 1911 and since 1997 working within a joint venture with a Hongkong group which is 'pumping cash money'. The group is working in several regions/provinces and their objective is to become a national company.

In the Shanghai area the milk of 55,000 cows is processed of which 10,000 cows in ownership and an other 10,000 under their management. The company has a strong brand name, 'Bright', that we saw in almost all supermarkets on fresh milk. Another important product is yoghurt. The ice-cream division was sold to Nestle for a good price some years ago. The production costs of milk are estimated to be 2,2 yuan per litre in the Shanghai region.

Within China the production costs vary from 1,0 in Mongolia up to maximum 2,6 yuan per litre in other provinces. In Mongolia the production is based on small scale farming (3 to 4 cows), labour costs are low and all the milk is processed to milkpowder.

In Shanghai the company concentrates on improving the quality of fresh milk. This can be done with automatic milking and a cooling chain. Farming is supported to invest through cheap loan offers. In the market fresh milk and milkpowder are bought by two groups of consumers. Making milk from powder is cheaper and for people without refriger-

erator there is no other choice than powder. In the supermarkets we saw milkpowder from New Zealand and the Netherlands. This is often imported through joint venture companies who have to pay the import levy of 25% + 17% VAT on powder and even double on import cheese. In the next WTO round it's expected that China has to lower these import levies. The company is not exporting as the competition on the world market is too strong. In the processing plant almost all equipment was imported from Europe or USA.

At the moment the market is a buyers market and there is no shortage of fresh milk anymore. The company is focusing on pushing new products. It is difficult for other companies to enter the market, because of the high market share of the company. The director mentioned that retailers are their biggest competitor. At the end of interview was said that there are no joint ventures in dairy who are making money.

### 3.2 Horticulture

#### *Shanghai Agriculture Industry and Commerce Group (12/5-00)*

Mr. Tang Zhi Jian and Mr. Shao Li Ming received us. The Shanghai Agriculture Industry and Commerce Group (SAICG) is involved in a wide range of activities, varying from all kinds of agricultural production, food processing and distribution, to automobile production, taxi exploitation, jewellery and real estate.

The strategy of SAICG is making food production, food processing and food distribution the core-business of the company, with the image of a pioneer in leading modern agriculture. The company has a total area of 52,000 ha in use, of which 23,000 ha are cultivated land (largely polders in the Yangtze delta).

SAICG is experimenting with greenhouses from both the Netherlands and Israel. The greenhouses from the Netherlands give problems in summer when the Shanghai climate is hot and humid. The greenhouses from Israel give problems in winter when Shanghai temperatures fall below freezing point. Insulation of the Israeli greenhouses is insufficient then. Probably the Dutch greenhouses offer better perspectives in more northern parts and the Israeli greenhouses in more southern parts of China.

The Dutch greenhouse technology is far too expensive for the Chinese situation. The high investments cannot be earned back in the present Chinese market for vegetables and flowers. Consequently the technology should be adjusted to the socio-economic and technical circumstances in China. A striking example is the use of CO<sub>2</sub>. For lack of natural gas in Shanghai, coal is used for heating. Therefore CO<sub>2</sub> has to be bought from outside against high costs. Consequently CO<sub>2</sub> application is not profitable in Shanghai. Similar stories apply for artificial substrates and for the Dutch vegetable seeds.

The conclusion of SAICG is, that the development process should start from the existing technology in Shanghai and China in general. Step by step western technology should be included into the existing production system. This requires involvement of foreign investment (both financial and human resources) in the development process. The time of just selling hardware is over. The Netherlands is not the only partner in the process. SAICG does also consider other partners to find the right technology for her situation.

### *Sunqiao Modern Agriculture Developing Zone (14/5-00)*

The Sunqiao Modern Agriculture Developing Zone is a kind of exhibition of modern greenhouse horticulture for the urban public from Shanghai and surroundings. Nice examples of Dutch greenhouse technology are shown. Dutch glasshouses with cherry tomatoes, truss tomatoes, cucumbers and paprika. The crops are grown at rockwool and CO<sub>2</sub> is applied to increase crop production.

Furthermore the developing zone houses a supermarket for flowers and plants. At the time of our visit the supply of flowers was very limited. Just one stall with an assortment of 10 types of flowers. Bunches of 10 roses were sold for 20 - 25 yuan. Expensive kinds like orchids or lilies were absent. The supply of plants was much larger, but with a small assortment (of just 'long life plants') the supermarket made a declining impression.

Our conclusion was, that the public of the development zone was rather reluctant in buying flowers and plants. Discussions with our Chinese counterparts made clear, that the Chinese urban public is not familiar with flowers and plants. They have no idea of how to handle them. That may explain the dominance of 'long life plants' in the assortment. Such plants may give the best quality/price ratio for the visiting public.

### *Wholesalemarket for vegetables in Shanghai (15/5-00)*

The wholesalemarket covers an area of 6,7 ha and employs 600 people. The turnover for vegetables is 460,000 ton/year or 2,300 ton/day. Other important products are cereals with 200 ton/day and pigs with 4,000 heads/day. It is the biggest wholesalemarket in Shanghai (marketshare = 25%). Supplies come from 20 out of the 29 provinces in China. Trucks supply by far the biggest part of the turnover. The market fee amounts to 4 - 5 % of the estimated product value.

The wholesalemarket provides price indications, but does not play any role in the price setting between suppliers and buyers. Supplied amounts and realised prices of the various products are reported at a daily basis to the Ministry of Agriculture in Beijing. The resulting statistical data can be looked up at internet and are available for research.

The vegetable products at the wholesalemarket are not classified in quality classes or grades. Sorting, grading and cleaning is eventually done later in the supply chain. The wholesalemarket focuses at low and medium income consumers. Supermarkets for high-income consumers have their own supply chains. For the time being, the supermarkets concerned are not considered as a threat for the wholesalemarket. The strategy focuses at expanding the existing activities by establishing new branches in new parts of Shanghai.

The government is working on standards for pesticide residues. For that purpose four food safety categories are considered: (1) export, (2) supermarkets, (3) lowest allowed category and (4) not allowed. The facilities for residue analysis were said to be available at the wholesalemarket. At the time of our visit they were not in operation.

### *Sino Dutch Horticultural Training and Development Centre (15/5-00)*

Mr. Jos Stuyt, deputy director of SIDHOC, received us.

The SIDHOC project covers the period 1/1-1997 through 31/12-2001. The objective is training managers/technicians of horticultural firms from all over China, in order to improve the physical and economic performance of the greenhouse sector. Achievements: 100 trainee weeks in 1998, 300 trainee weeks in 1999. Planning for 2000: 600 trainee weeks, which is ambitious for a staff of three persons.

The training centre focuses at (1) glasshouse, (2) plastic tunnels, and (3) open field. Owing to the limited number of staff, the biggest part of the training activities goes to the first target group: managers/technicians of bigger companies with greenhouses. The training staff very much appreciates to pay attention to extension workers and to an email information system, but the present staff situation does not allow for that.

Successively we discussed the following subjects with Mr. Stuyt:

- appropriate Chinese partners for foreign expertise;
- impression of Chinese agricultural knowledge system;
- sustainability of 'importing' foreign entrepreneurs;
- sustainability of training in modern technology;
- decision-making capacity of Chinese growers;
- agricultural education system in China;
- monitoring inputs and outputs at farm level.

#### *Appropriate Chinese partners for foreign expertise*

Mr. Stuyt emphasised the necessity to analyse the existing knowledge system of Chinese horticulture. Starting without having a good common understanding of the weaknesses and strengths of the current knowledge system is asking for difficulties. A good method to analyse the knowledge system is RAAKS (Rapid Appraisal of Agricultural Knowledge Systems) of Paul Engel (Communication and Innovation Studies, Wageningen University).

#### *Impression of Chinese agricultural knowledge system*

Mr. Stuyt described a knowledge system with very deserving scientific research, and an almost completely missing link (of applied and adaptive research) to extension service and practical growers. He attributed the success of Holland agricultural development for a big part to the intensive interchange between research, policy and practice in Holland. In China developments in research seem to go faster than developments in practice.

#### *Sustainability of 'importing' foreign entrepreneurs*

Mr. Stuyt emphasised the differences in history and economy between nations. Foreign technologies do not work without adaptation to the local circumstances. Consequently the intention should be 'how can we work out something together?'. That means take and give things from each other. Decennia of experience in development co-operation have learned, that technology cannot be transplanted. It should be digested.

#### *Sustainability of training in modern technology*

The trainees of SIDHOC come with quite different intentions. Greenhouse constructors may come to copy constructions. Flower producers may have very specific problems and find what they need. Others may be discover, that they were somewhere on the wrong

track and correct it. Again others may come for holidays and apply an idea in the future. So modern technology is not promoted as a package, but as a toolkit.

#### *Decision-making capacity of Chinese growers*

Mr. Stuyt has much respect for the decision-making capacity of Chinese growers. They are smart enough to find their way. The bottleneck is in the information system and in the availability of inputs. So the challenge for (socio-economic) research is improvement of the knowledge system in China. SIDHOC is interested in a study on that subject.

#### *Agricultural education system in China*

In the inland provinces of China expertise is largely transferred from father to son. In the coastal provinces formal education plays a much bigger role. The weakness of the formal education system is lack of relationship with practice. Technical agriculture schools are present in every town, but they mostly have a theoretical strain. The curricula are lacking practical periods like in the Netherlands.

#### *Monitoring inputs and outputs at farm level*

Production monitoring (inputs and outputs) is completely lacking, even at SIDHOC. Mr. Stuyt admits, that production monitoring may result in very interesting information for production and quality improvement by growers.

#### *Flower Production in Shanghai*

Shanghai government less focuses on flower production in Shanghai when compared with the vegetable and dairy sectors. There are special administrative offices for vegetables and dairy under the direct leadership of Shanghai Major. For floriculture such an administrative office is lacking. Consequently the collection of information on floriculture is more difficult. Given the limited time available, we visited one of several (six?) flower wholesale markets in Shanghai. From the interview with one wholesaler, we picked up some points:

1. Flower industry is a high profitable business in Shanghai. There is a strong demand for good quality products. The highest price he realised for a bunch of 10 Tulips was 80 yuan, equivalent to 23 Dutch guilders.
2. Shanghai region does not produce a wide range of flower varieties. He has to import precious varieties from Yuannan province. More than half of his flowers is imported from Yuannan.
3. Shanghai is a flower distribution centre for surrounding areas. This wholesaler does not only supply flower retailers in Shanghai, most important, his customers come from nearby small cities or towns.

## 4 Analysis and conclusions

### 4.1 Stakeholder perceptions

During the mission we tried to understand the statements and matching motives of the various stakeholders we visited. The stakeholder perception model of Buurma (1999) was used to guide the thoughts. A general framework of the stakeholder perception model is given in annex 2, figure 1.

The framework starts with the working circumstances of the stakeholder. These circumstances are determining the stakeholder's perception of the strengths and weaknesses, opportunities and threats of his enterprise. Starting from the perceptions concerned the stakeholder develops a strategic behaviour and a tactic behaviour. Within the strategic behaviour the stakeholder constructs a vision on the future development (structural adjustment) of his enterprise and starts learning and searching for that purpose. As long as the structural adjustments have not been materialised the stakeholder has to suppress the adverse effects of the actual weaknesses and threats through tactic behaviour (symptom combating). The tactic behaviour contains preventive measures and suppressive operations.

The different parts of the model stand in a certain relationship to each other. Strategic behaviour and tactic behaviour represents two completely different approaches to the same (perceived) problem. Consequently 'searching and learning' and 'suppressive operations' are not seldomly contrastive or paradoxical to each other. At the other hand 'searching and learning' and 'working circumstances' are definitely partners to each other. These pre-determined relationships within the model are helpful to compose a 'mental map' from apparently incoherent statements and operations of the stakeholder or stakeholder organisation. Consequently it provides a handy tool to understand and to analyse the way of thinking and acting of the various stakeholders in a given situation.

During our discussions with government or government related officers we were frequently confronted with demands for foreign investments. As foreign investments are a means to an end, we tried to find out what ends were pursued which such investments. After some discussion we found, that Chinese government officers consider the actual low technology level as a constraint. This constraint results in a low quality/hygiene level (weakness). The strategic solution for this weakness is high quality production. The government officers consider foreign know-how and/or expertise as a crucial means to meet the high quality objective (annex 2, figure 2).

The short-term answer of various government levels is government investments, to bring farmers and growers in the position to make use of modern technology. Furthermore incentives and services are held out to persuade farmers and growers to the use of new technology. This type of behaviour probably is a remainder of the centrally planned economy period in which government investments were made to support production targets.

The Chongming green food park is a special case of the high quality production strategy. The clean soil, water and air in the new polders along the north coast of Chong-

ming are considered to represent comparative advantages (strength) which can be utilised for high quality production. The project development agency intends to develop organic agriculture in the new polders. By doing so the strength of clean soil, water and air can be maintained (annex 2, figure 3). The short-term action to get organic agriculture introduced is the establishment of a 65 ha demonstration farm to show the potential for organic farming in the new polders. This approach is exactly the same as the Dutch followed in the province of Flevoland.

Foreign entrepreneurs will not respond to the governments' desire for foreign know-how and/or expertise, when there is nothing to win for them. For that reason we investigated the benefits of involvement of foreigners in high quality production. The following train of thoughts gives a possible answer. China has a fast developing economy resulting in a growing shortage of quality products. This shortage offers opportunities for foreign entrepreneurs to open up the top-segment of the market by supplying high quality products (annex 2, figure 4). At short term there is a drawback to this strategy. A good marketing network to the top-segment of the market is not ready available. Foreign entrepreneurs will therefore need Chinese marketing partners before starting production activities.

Another attention-point was the benefit of high quality production for the consumer. All efforts for high quality production will end in smoke, if the consumer does not buy the product. For that reason we also constructed a perception model for the vegetable consumer (annex 2, figure 5). The low quality/hygiene level implies a threat for the personal health of the consumer. Especially the high-income consumer will have his concerns in this respect. Consequently the high-income consumer will develop a preference for high quality / safe products. To find such products he will go shopping in top-segment supermarkets. In absence of top-segment supermarkets the high-income consumer will try to find least dangerous products. We were told, that vegetables from certain production centres are considered to be better/safer than average.

Next to the need for high quality production, we found two other aspects, which need attention for China's agricultural development. The first attention-point is the dominance of production oriented thinking. This way of thinking probably is a remainder of the centrally planned economy period. The weakness of production oriented thinking is the disregard of product quality and consumer concerns. Consequently opportunities in the market are missed. The long-term solution for this problem is changing to consumer oriented thinking. Collecting market information is an important activity in that respect (annex 2, figure 6). The short-term behaviour of experts with a production-oriented way of thinking is focusing at modern technology and looking for trade opportunities in China. These were more or less the terms of reference for our mission, as discussed in the Steering Committee in March.

Another attention-point is the performance of the knowledge system. We got the impression that the dissemination of formal and informal knowledge is slow. The weakness of a hampering transfer of technology is a low development rate. The strategic solution to this weakness is improvement of the knowledge system. A good start might be intensification of the training of extension workers (annex 2, figure 7). A short term (but less sustainable) solution may be the introduction of modern technology in China by demonstration and training projects under foreign management. This is more or less the approach, which has been propagated up to now, but further dissemination needs additional efforts.

Our stakeholder perception analyses resulted in the following conclusions:

- High quality production offers opportunities for various stakeholders, such as government officers, foreign entrepreneurs and high-income consumers. An important attention-point for improvement of product quality is food safety (hygiene and pesticide residues).
- Foreign know-how and/or expertise may have a catalytic effect on introduction of high quality production. An important condition however is the availability of Chinese marketing partners who can open up the top-segment market.
- Production oriented thinking is still dominant in the agricultural sector around Shanghai. A change to consumer oriented thinking is needed to further develop high quality production. Collecting market information (consumer preferences) is crucial in this respect.
- Knowledge exchange between practice and research is weakly developed. This hampers the agricultural development in the Yangtze delta. A good start for improvement of knowledge exchange may be intensification of the training of field extension workers.

## 4.2 Animal production

### *Chongming Island*

Poultry:

- Three levels of production: large scale production in joint ventures, middle scale private and state farms with professional production and small scale back yard farming. In Chongming there is mainly middle scale poultry farming. Foreign breeds of poultry are used but housing conditions are poor. The equipment is locally made and automation level is very low.
- Looking at the poultry farms as a poultry specialist there are two points of major concern. First the low level of hygiene. Multi age farms are common practice and hygiene standards are low. Secondly there is concern on the feed formulation. Many farms make their own feed based on local grain and mix the feed at farm level. It's unclear if the levels of protein, energy and especially vitamin, minerals and amino acids meet the need of the birds. Use of pesticides in local grain production is also a point of concern for producing safe poultry and pork meat without residues.
- In processing the automation level is very low as a result of cheap labour. In my opinion using modern equipment can be used in combination with higher hygiene standards. The economic feasibility can be a problem together with financing the investment.
- For both poultry and pig farming several specialist mentioned that the Shanghai region couldn't compete on price with other provinces. Both sectors should focus on ways to reduce production cost (e.g. by upscaling the production, feeding by products) and on the other hand improve quality to meet the demand for the upper class in urban Shanghai.

### Dairy:

- In Chongming the dairy farms is mainly concentrated on (former) state farms. The scale of farming is in general big enough to make automatic milking feasible. Automatic milking is also introduced to improve the quality of the milk. Further improvements to control the bacterial count and introduction of a cooling chain should be made in the near future.
- Processing of milk is concentrated in Shanghai. In the processing plant European and American equipment is already in use. Improvement to further improve the quality of the product should come from the dairy farms.

### *Wujiang region*

- For bringing foreign technology it is needed that farms are bigger than we have seen in this area. The answer was that in the future the better farmers will grow in size. Bringing technology can be advised and supported by the government and will also be stimulated by the focus on centralisation and specialisation per village.
- The local government is in our opinion thinking too much in production terms. Although they claim to look at the market (through an agent in Shanghai City) thinking should be more directed on marketing information and the demand from retailers and consumers.
- In this area there seems to be not enough land in relation to the population. A more labour and land intensive production like flowers could be feasible. On the other hand pig production is already causing odour problems for the population and intensive animal production should be situated in more rural areas.

## **4.3 Horticulture**

### *Chongming Island*

- Organic production seems to be the keyword for horticultural research and development in Chongming.
- The missing link is a marketing network for organic products. Exporters and top-segment supermarkets are needed to meet the demand for organic products. Marketing through the conventional trade chains is not a good starting-point.
- Experience with certification and chain management has still to be built up.
- Organic production of flowers seems not very promising owing to lack of association with food safety.

### *Wujiang Region*

- Horticulture in Wujiang has built up comparative advantages in production and marketing of nursery products and implementation of greening projects.

- Production and marketing of flowers requires completely other conditions and customers. Consequently the existing activities seem more lucrative than flower production.

### *Shanghai City*

- Shanghai represents an impressive consumption centre for flowers. Moreover Shanghai functions as a flower distribution centre for surrounding areas.
- This offers perspectives for import or production of high quality flowers.
- Prices of land and labour are relatively high in the Shanghai region. For that reason other conditions must be very favourable to build a flower production sector which can stand the competition with e.g. Yuannan province.

### *Overall conclusions*

- Flower distribution and marketing is a lucrative business in Shanghai.
- Marketing information is badly needed in Shanghai flower industry.
- Marketing chains for high quality products should be further developed.
- Competitive position for flower production in Shanghai needs consideration.
- Foreign investment means participation with financial and human resources.

# Annex 1

## Itinerary

**Sunday 7 May 2000**

Afternoon              Arrival

**Monday 8 May**

Morning              Visit to supermarket  
Afternoon              Dutch Consulate: Hans van der Kooi, consul agricultural affairs and  
                            Hong Yunian, agricultural assistant. And visit to a flowermarket

**Tuesday 9 May**

Morning              travel to Chongming  
Afternoon              greenhouse project  
                            Strawberry farm

**Wednesday 10 May**

Morning              poultry farm and pig state farm  
Afternoon              dairy farm  
                            Chongming museum  
                            Dairy and vegetable specialist at farm bureau

**Thursday 11 May**

Morning              new land development project  
                            (Shanghai Chongming green food park administrative committee)  
Afternoon              Horticulture experimental station  
                            poultry processor  
                            Travel to Shanghai

**Friday 12 May**

Morning              Shanghai agriculture industry & commerce general corp. group  
Afternoon              Shanghai bright dairy and food co.

**Saturday 13 May**

All day              City sightseeing

**Sunday 14 May**

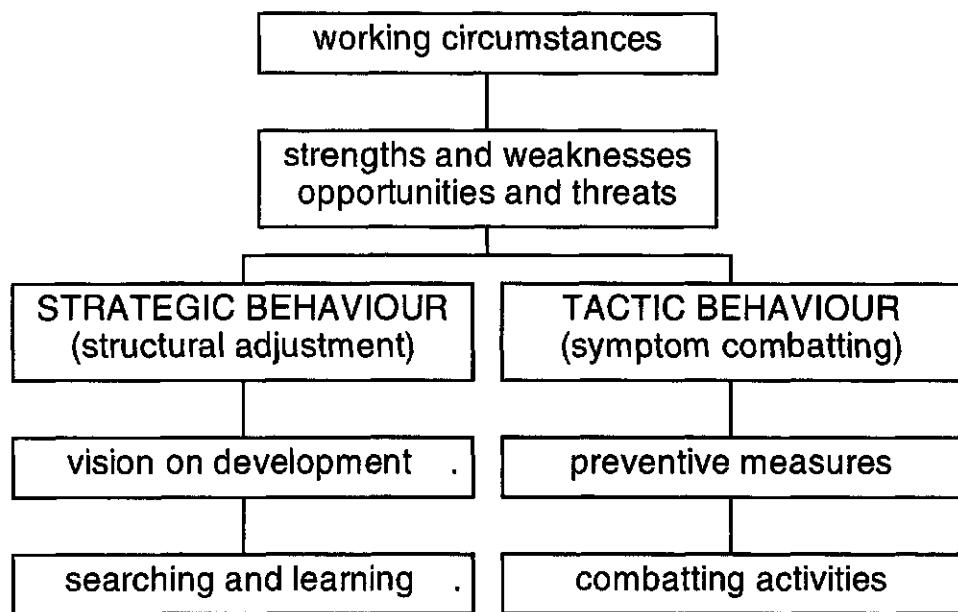
Morning              Sunqiao agricultural developing zone  
Afternoon              Pudong developing zone

<b>Monday 15 May</b>	
Morning	visit to SDHDT, Sino Dutch horticulture demonstration centre
Afternoon	Wholesale market Cao'an road
<b>Tuesday 16 May</b>	
Morning	travel to Wujiang city
Afternoon	visit to pig farms and tree nursery enterprises
<b>Wednesday 17 May</b>	
Morning enterprise	visit to duck farms, plant nursery company and vegetable engineering
Afternoon	discussion with agricultural staff
Evening	travel to Shanghai
<b>Thursday 18 May</b>	
Morning	Shanghai academy of agriculture science
Afternoon	second meeting with Hans van der Kooi
	evaluation with Chinese counterparts
<b>Friday 19 May</b>	
Morning	departure for Amsterdam

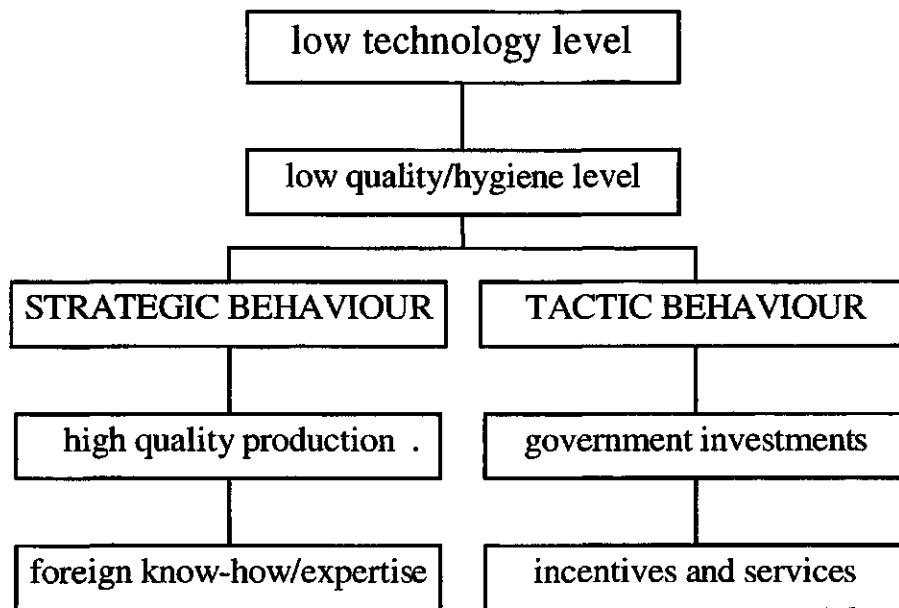
## **STAKEHOLDER PERCEPTIONS**

**for agriculture in the Yangtze  
Delta**

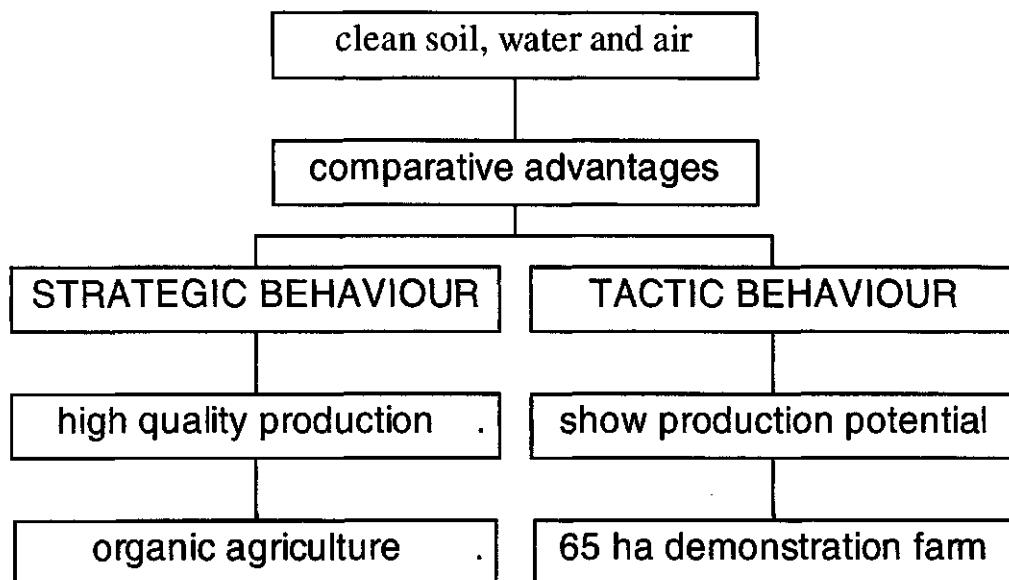
# (1) Perception Model



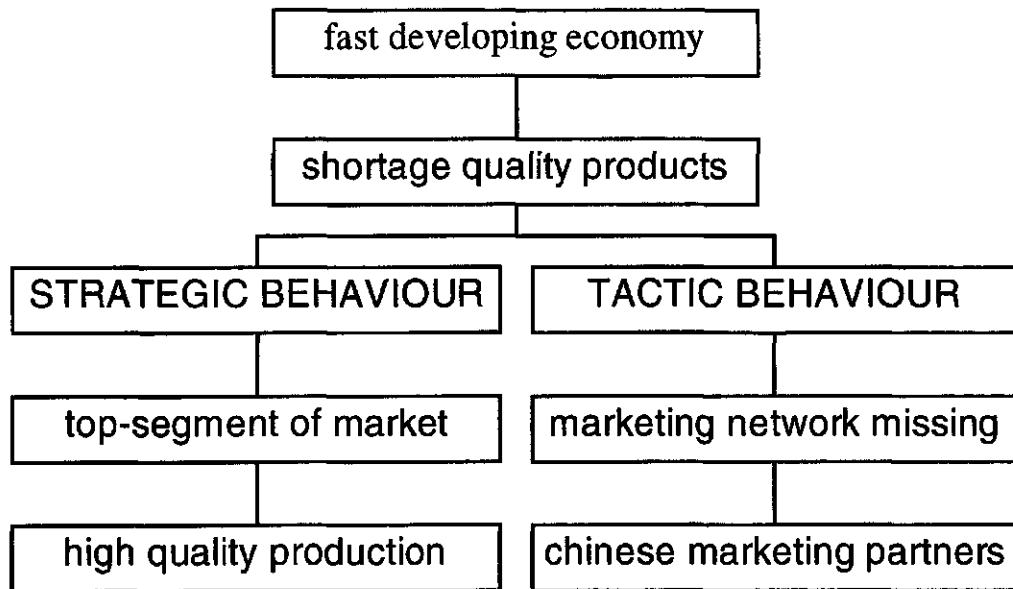
## (2) Chinese GOVT Officers



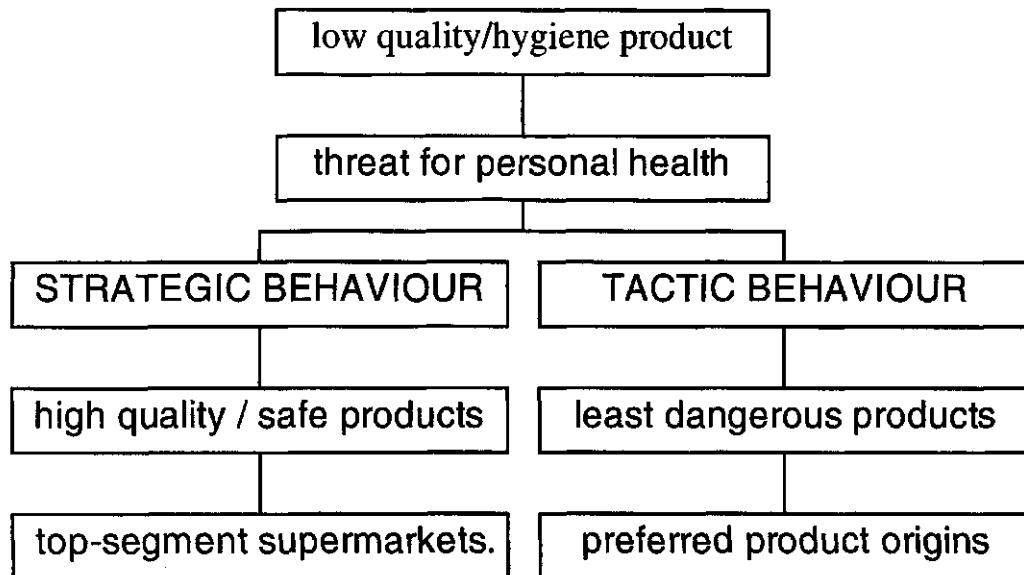
### (3) Chongming Green Food Park



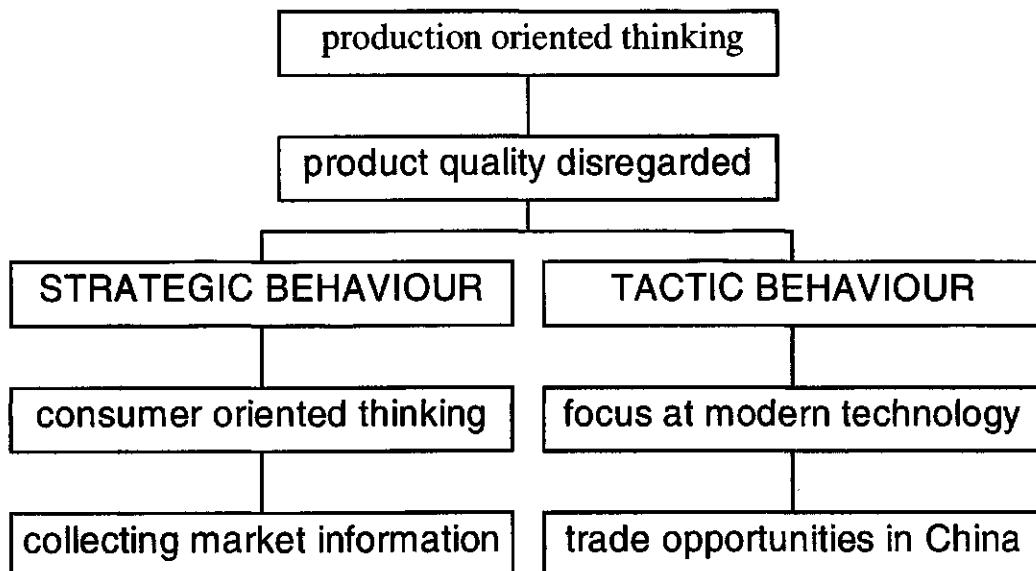
## (4) Foreign Entrepreneurs



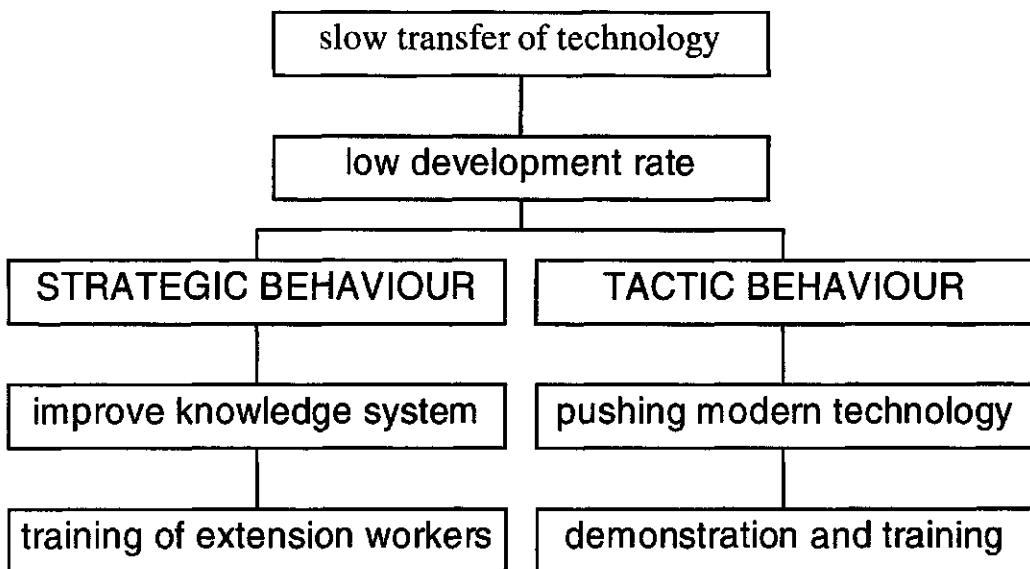
## (5) High Income Vegs Buyers



## (6) Sino Dutch Research Team



## (7) Sino Dutch Research Team



# CONCLUSIONS

- high quality production
- get rid of hygiene problems
- foreign know-how/expertise
- Chinese marketing partners
- consumer oriented thinking
- improve knowledge exchange