



Social and
Environmental
Risk Study on
*Tomato Products
Supply Chain in China*

Made in China:

Social and Environmental Risk Study on Chinese Supply Chain of Tomato Products

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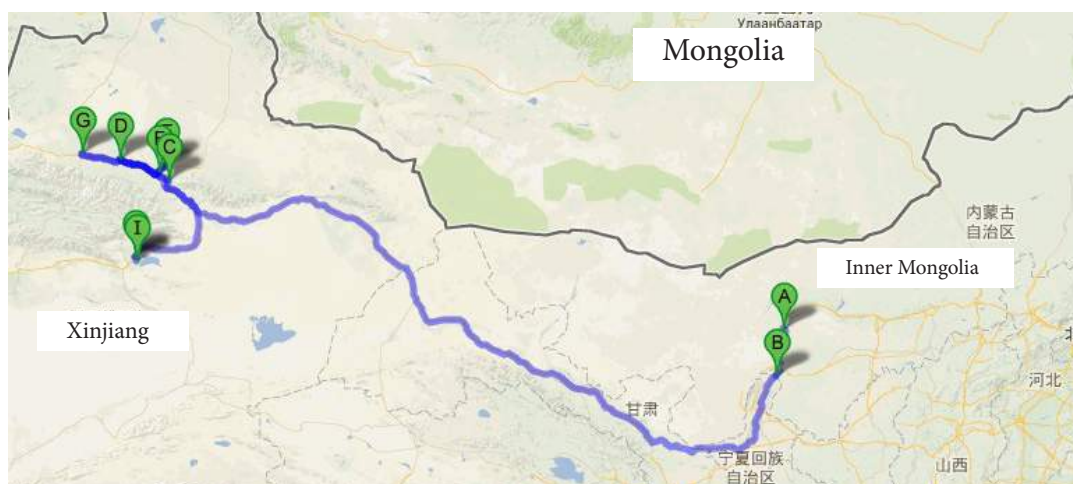
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Research Background

As an independent research center, we expect our work can help push China's agriculture move towards a direction of sustainable development. However, production mode and policy design in realities which go after profits make China's agricultural system become more like a tool for short-term interest in highly risky conditions, even for the shrinking short-term interest, natural resources like arable lands and water are over consumed. It is likely that such trend will threaten food security in the long sun.

China's agricultural OEM¹, represented by particularly farm products with high dependency on overseas market, attracts our attention from angles of food security and economic profits to think about its actual rationality. This report selects supply chain of tomato² products as an entry point to see how this type of farm product influence over Chinese food security, farmers' livelihood and processing enterprises' profits.

In September 2012, four of us drove for thousands of kilometers from Urumqi of Xinjiang Autonomous Region (Xinjiang) around Junggar Basin (Point C-I) to visit local processing tomato farmers and processing enterprises. Before that, we had already visited Dengkou County (Point A) of Inner Mongolia Autonomous Region (Inner Mongolia) for status of tomato planting and processing. We went on to Shizuishan County (Point B) of Ningxia Hui Autonomous Region (Ningxia) for interview with tomato farmers whose tomatoes are rejected by processing plants. Our field investigation covering three provinces/regions in west China lasted around two months.



Map 0.1: Map of Investigation locations.
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1. An original equipment manufacturer, or OEM, manufactures products or components that are purchased by another company and retailed under that purchasing company's brand name.

2. Tomato mentioned in this report without stated only refers to particular specie mainly for industrialized processing.

Research Methods

During this research, we first identifies interest parties in China’s supply chain of processing tomato including farmers, seasonal workers, processing factories, brand companies, production corps, and county-level government officials. Opinions and feedback were collected from each interest party through semi-structural questionnaires and open-ended interviews. Interviewees of this research total 139. See details as below:

Interviewees	Number		Method
Two leading companies	2		Face-to-face/telephone/email interview
Director of Small and medium size processors	6 (Xinjiang and Mongolia)	Inner	Face-to-face/telephone/email interview
Brands	2 (Domestic brand , and international brand)		Face-to-face/telephone/email interview
Farmers	50 (Xinjiang, magnolia,, Ningxia)	Inner	Face to face interview
Agriculture workers employed by farmers	30 (Xinjiang, magnolia, Ningxia)	Inner	Face to face interview
Employers in companies	20 (Xinjiang, magnolia)	Inner	Face to face interview
Seasonal workers	20 (Xinjiang, magnolia, Ningxia)	Inner	Face to face interview
Government staff	5		Face-to-face/telephone/email interview
Scholars	2		Face-to-face/telephone/email interview
associations	2 local associations of tomato		Face-to-face interview

Table 0.1 Interviewees mapping
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Our survey locations cover three major processing tomato producing regions of China: Xinjiang, Inner Mongolia and Ningxia. Each village-level survey location will be categorized as levels of “high, middle, and low” according to their plantation acreage and distribution density of tomato processing factories. We first get in touch with head of the village to get as much support as possible before we start survey in the location. For some administrative village we have no way to survey, other nearby administrative village will be a substitute.

Considering protection of personal information, real names of the locations are only used for the level of district or county, while alternate names for village-level locations and for the interviewees. Names of enterprises are also blurred to protect personal information of interviewees from being exposed.

Purpose of the report

This report taking processing tomato as an example, aim to describe a picture of livelihoods of Chinese farmers, seasonal workers, and contract factories in the upstream of the supply chain. This report is not purposed for academic study nor a product of commercial survey. It is a result of a civil research institute which keeps attention on Chinese agriculture and expects it moving toward a direction of sustainable development so as to benefit all interest parties in supply chain.

European and American brand giants outsource and purchase their materials from all over the world in order to lower cost, which is quite OK speaking of optimal allocation of resources. However, what we keep a watchful eye on is whether Chinese farmers, contract factories, and silent subjects like water resources, natural environment can get reasonably rewarded after they become part of European and American brand giants' supply chain. The related government policies should be reviewed if there is neither continuous economic return nor 100% guarantee of food security.

Those farmers who desperately spill unsold tomato by the side of production line of processing factories or entrances of local office buildings, or even put an end to their own lives drive us to keep on research on sustainable agriculture. Any country, any food enterprise with an outstanding brand is impossible to count on frustrated farmers to produce nice and healthy food or to guarantee "food security" for all citizens.

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Abbreviations and Terms

COFCO	China Oil and Food Import and Export Corporation
Cm	Centimeter
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
ITA	Industrial Tomato Association
M	Million
Mu	A unit of arable land in Chinese scaling, (1 Mu \approx 0.066 hectare)
OEM	Original Equipment Manufacturer
RMB	Renminbi, the official currency of the People's Republic of China
R&D	Research and Development
SOMO	Centre for Research on Multinational Corporations
SRI	Social Resources Institute
USD	US dollars

Executive Summary

This Chinese farm exports are mostly composed of raw materials or semi-finished products which are results of so-called "OEM Agriculture". According to statistics of China Ministry of Commerce, China's total export volume of farm goods ranks the fifth in the world after European Union, the United States, Canada and Brazil.

Different farm products differ in their reliance on overseas environment although they are all results of agricultural OEM. Taking tealeaf as an example, its yearly export amount was close to 0.29m ton, accounting for 30% of total production of China; exported tea product was priced at 1.9 USD per kilogram, which was far lower than domestic market price. It shows tea farmers are comparatively not so sensitive to fluctuation of international market. However, eels, tomato paste, canned mushrooms are highly reliant on overseas market. Taking eel as an example, Chinese annual output of live eel was 0.1m ton accounting for 66% of world's total output; its domestic sales accounted for only 10% of the total production. What's more, China annual production of canned mushrooms was 0.3m to 0.35m ton, only 15-20% of which are sold domestically; for tomato paste, only 5% of total output is sold within China³.

With some comparative advantage, economic farm products have helped farmers in different areas increase income to some extent in the past tens of years by taking part in international market. However, due to increase of Chinese labor cost, change of people's dietary habit, and downsizing of farmlands under pressure of urbanization, farming of some crops which do not agree with diet of Chinese consumers and are highly dependent on international market is faced with the following two challenges:

- **Whether it will affect self-sufficiency of staple food crops**

From 1990 to 2012, self-sufficiency degree of staple food crops saw a tendency of fast dropping, such as wheat and rice, two major staple foods, started to import in a small amount to meet local demands since 2007. However, according to open data issued by FAO (Food Agriculture Organization) and the World Bank, Chinese farmland for grain⁴ accounted only for 21% of total agricultural land in 2010, much lower than that of other Asian countries like South Korea, Japan and India.

In order to enlarge farmland for grain, farm products structure need be adjusted to release more available land for provision grain planting. In this context, rationality of Agricultural OEM needs to be reevaluated. Besides, World Food Summit in 1996 gave a definition to food security which was that "anyone can get sufficient, safe, and nourishing food at any time". China still lives in "food insecurity" in level of self-sufficiency of staple food. How we can guarantee "food security" for Chinese citizens needs to evaluate on OEM Agriculture's dependency on overseas market and farm products planted to satisfy overseas dietary habits.

3. "Analysis Report on Export of Farm Products in 2010", China Ministry of Commerce

4. According to FAO of UN, crops include wheat, rice, corn, barley, oat, rye, millet, sorghum, buckwheat, and side crops.

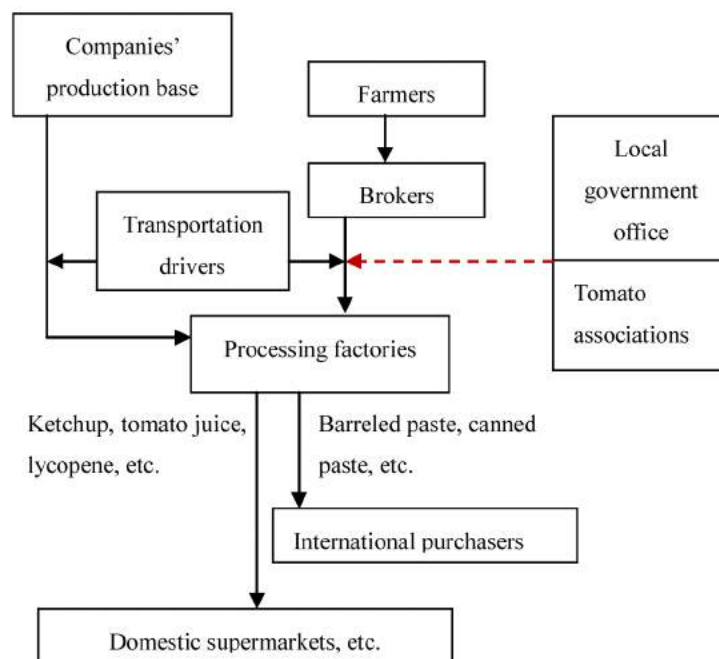
• Whether it can bring profit continuously to farmers and local enterprises?

This report uses Chinese tomato paste export as an entry point to see whether Chinese farmers and local companies can profit from being part of international market and seek reliable basis for economic rationality of "OEM Agriculture".

Most of tomato products produced by China are for export, 98% of which are barreled tomato paste. In this report, the supply chain of tomato products equals that of tomato paste.

Tomato product is divided into three levels: the most initial product is bulk-packaged tomato paste (in tin buckets); then the small-size canned tomato paste; and higher level ketchup products. Currently, China's tomato processing companies produce mainly bulk-sized tomato paste for international buyers.

Different levels of tomato products see no big difference in procedures of plantation and delivery in the upstream of supply chain, but are applied with different processing technologies in the processing procedures of downstream of supply chain. Supply chain of tomato products in China can be demonstrated by the following chart, and the red dotted line represents the local government office and tomato associations work as monitor and coordinator.



Source: SRI

Chinese tomato production industry will be faced with undefined risks brought by fluctuation of European and American economic status in coming years. Besides that, there exist social and environmental risks inside this industry including but not limited to:

Low efficiency of agricultural production

Large-sized processing companies usually need to face thousands of supplying farmers; considering the request of international purchasers on quality traceability system, agriculture food enterprises represented by COFCO (China Oil and Food Import and Export Corporation) utilize a management model covering the whole supply chain: renting arable lands from farmers to plant crops themselves and hiring workforces to monitor daily routine work. The defect of this model is that, farm products with high dependency on overseas market could be easily affected by international market demand; when market price drops below expected, companies will downsize processing workload to cut the cost. Although processing companies could avoid risks by signing short-term contracts of 3-5 years, to decrease the yield of lands when international purchasing price has been low for the past few years, they also would manage their arable land in a relaxing way: they either re-contract their rented arable lands, or they just abandon them. Some leading companies rent a land totaling 0.2m mu⁵ (or 13,400 hectares) in one single place; low-efficiency utilization of arable land could pose a threat to domestic food security.

Due to difficulty in quantizing agricultural work and accordingly lacking in incentive methods to enhance work quality and efficiency, transformation to full mechanic operation would be needed to reduce the ever increasing labor costs. However, the production of some produces, commercial crops such as tomato and tea, cannot be largely replaced by machine. Hence costs spent on managing agricultural labors are not a bit less than purchasing raw materials directly from those "credit-lacking" farmers.

Unreasonable profit distribution in the supply chain

During the last 3 years, Chinese processing tomato farmers and processors are struggling to survive in this industry. No matter when the harvest is good or poor, the farmers enjoy very limited profit, which has caused a series of suicides and conflicts. As far as domestic processors are concerned, sustained appreciation of RMB to USD and Euro directly cuts down their profit margin.

Profit allocation and sharing of risks between farmers, processors and brand companies form the ground for sustainable development of supply chain. When European and American brand companies are making profit all the time, Chinese farmers and processors are nearly broke or losing profit, which is not in line with the ideal of sustainable development held by brand companies such as Heinz and Unilever. If things go on in this way, brand companies will lose raw materials providers with good quality.

Food Safety

As a matter of fact, it is not just the export market that has set up strict requirements on the inspection of bacterial colony that is worrying. Regulatory gaps also exist in a growing domestic market of ketchup consumption, along with rapid development of western-styled restaurants and a growing number of expats living in China. Tomato paste that has failed quality control for export purpose or been held in stock enters domestic consumption channels after being repackaged.

5. 1 mu \approx 0.066 hectares

Pollutant disposal

Major pollutants generated from tomato processing belong to two categories. One is solid waste, including raw and rot tomatoes sorted out and tomato peel and seeds separated during production. The other category is industrial waste water, including water used for conveying raw materials, waste water generated during cleaning processes to eliminate impurities and stains of raw materials, cleaning water generated from regular (weekly) chemical cleaning for pipes and equipment (vessels). Raw materials conveying water and cleaning waste water make up over 90% of total amount of wastewater⁶.

If it can be guaranteed that pesticides used during tomato planting meet up the standard, waste water generated from processing procedures can be classified as nontoxic or low toxic and acid organic waste water. But if waste water is discharged directly, it will pose huge impact on local water environment.

As solid waste and waste water are mixed, they need to be separated before classified processing. However, there are only few tomato processing factories that have invested in building specialized facilities to process wastes. Most processing factories rely on labors to conduct solid and water waste separation and discharge waste water directly. There are some processing factories that adopt open-air cement trench to dispose waste water which emits acidic odor. Excessive disposal can cause waste water flooding into the neighboring arable land which affects the growth of crops.

Contract farming in transition

Since the contract has no actual constraining force on both sides, the role of the contract is to help the companies to know the size of sowing area so as to be able to predict the output of the current year. Contract farming can play certain role when the supplier management costs can be largely reduced for companies. This can happen when farming reaches to certain scale by farmers and the purchase from processing companies is also reasonable. Some companies might prepay a certain amount of production funds during planting season to stabilize partnership with supplier farmers.

During current stage when the trend of centralizing land is accelerating. In the end, a production mode with large-scale farmers who operate on their own and maintain a stable order relationship with processing factories will dominate the market in the future.

6. Qinqin Han, Yuehui Yang, Fengqing Jiang. Tentative analysis on process and use of waste water produced from ketchup companies in Xinjiang. *Arid Environment Monitor*, Volume 20, Issue 2. June, 2006.

Conclusion and Suggestion

To some extent, the issues exposed in Chinese processed tomato supply chain indicate the risks faced by "OEM Agriculture". The problems are attributed to:

1. Domestic plantation of staple crop is affected.

As a material for food which is basically never consumed by local people, the supply chain of tomato processed products has to fight for land, labor and water resources which are currently already limited to plantation of staple crops in China.

Considering of food security issue, a robust traceability system is largely required by the international brands. To cope with such requirements, some Chinese suppliers tend to build autonomous large-scale plantation. However, given the highly dependency of the international market, once the international purchase price is coming down, the domestic suppliers would decrease the productivity by extensive management, or sublease their rented arable lands, or even abandon them, for the purpose of reducing cost. Due to the large-scale of the arable land rented by such companies, for instance, a leading company rent a land totaling 0.2m mu (or 13,400 hectares) in one single place, it is likely that those loss and the risk to food security has not taken into account by the government.

2. Unreasonable profit distribution in the supply chain

During the last 3 years, Chinese tomato farmers and processors are struggling to survive in this industry. No matter when the harvest is good or poor, the farmers enjoy very limited profit, which has caused a series of suicides and conflicts. As far as domestic processors are concerned, sustained appreciation of RMB to USD and Euro directly cuts down their profit margin.

Profit allocation and sharing of risks between farmers, processors and brand companies form the ground for sustainable development of supply chain. When European and American brand companies are making profit all the time, Chinese farmers and processors are nearly broke or losing profit, which is not in line with the ideal of sustainable development held by brand companies such as Heinz and Unilever. If things go on in this way, brand companies will lose raw materials providers with good quality.

Hereby, we believe that, the promotion of highly export dependency agricultural products have threaten the food security of China to some extent; while, it is hardly to find any profit margin for the vulnerable market players like farmers and processing enterprises. Based on this background:

1. The government should evaluate the competitive relationship between highly overseas market dependency agricultural products and staple crops. Besides considering the profit brought to local farmers, consumption of arable land and water resources should also be considered. According to evaluation results, government should consider whether it is necessary to bring out supportive policy to farmers so as to encourage more staple crops plantation.
2. European and American brand companies should consider how they can share risks with farmers and processors to guarantee the stableness and quality of raw materials.
3. Currently in nationwide, arable land is gradually in transfer, which might lead to family centered business model and individual/enterprise-centered model. Processing companies possibly restrain and ensure raw materials purchase through order placing in future. Therefore, processing companies should get ready for coming transition, other than to blindly intervene the plantation phase or to manage the plantation farms at high cost.



Chapter I Understanding “OEM Agriculture”

Speaking of “OEM”, people can easily relate to the forest of manufacturer along Chinese coastal region which provide cheap finished products for European and American brands in electronics, clothing, and toys, etc. When speaking of the supply chain of food, consumers naturally keep close attention on issues related with food security and plantation status like “scattering, small scale, and mismanagement”. However, “OEM Agriculture” has been an important issue much less touched upon in Chinese agricultural system. Connecting with global market, it depends on large-scale plantation model, farmers with small loan, and strict control of chemicals. Its farm products will become industrial materials, or enter into the first level of food supply chain only to become the cheap source for big multinational food brands.

Chinese farm exports are mostly composed of raw materials or semi-finished products which are results of so-called “OEM Agriculture”. According to statistics from China Ministry of Commerce, China’s total export volume of farm goods ranks the fifth in the world after European Union, the United States, Canada and Brazil. Aquatic products and vegetables constitute most of exports as shown in Figure 1.1. The followings are ordered by their export amount in 2010: frozen fish, frozen fillet, apple, apple juice, parva, prawn, canned tomato paste, casing, soybean meal, etc.

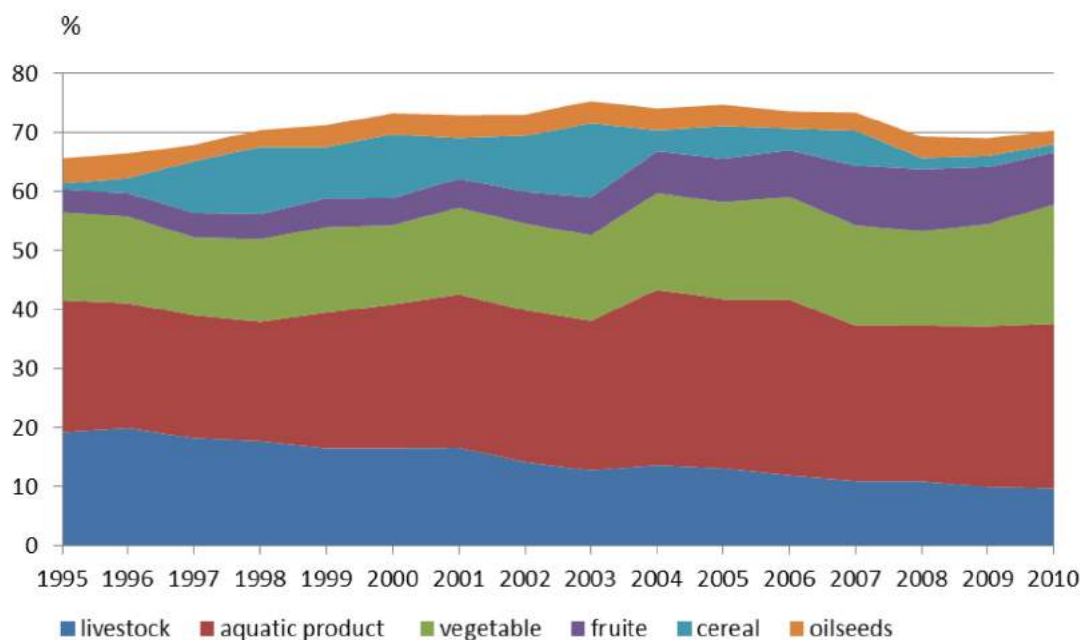


Figure 1.1 China Farm Product Export Constitutes for 2010

Source: statistics of China Ministry of Agriculture

Different farm products of agricultural OEM differ in dependency on overseas market. For example, tea export volume reaches almost 0.29m ton per year which account for 30% of total output of tea in China; average price for export tea is 1.9 USD per kilogram which is far lower than domestic market price; tea farmers are not that sensitive to fluctuation of international market price, while eel, tomato paste, canned mushroom are highly dependent on overseas market. For example, live eel has an annual yield of close to 0.1m ton currently accounting for 66% of world’s total yield, while its domestic sales amount accounts for only 10% of China’s total output. One more example, China has an output of 0.3 to 0.35m ton of canned mushroom per year, and its domestic sales amount accounts for only 15-20% of the total output; that of tomato paste only 5%⁷.

7. “Analysis Report on Farm Product Export in 2010”, by China Ministry of Commerce

With some comparative advantage, economic farm products have helped farmers in different areas increase income to some extent in the past tens of years by taking part in international market. However, due to increase of Chinese labor cost, change of people's dietary habit, and downsizing of farmlands under pressure of urbanization, farming of some crops which do not agree with diet of Chinese consumers and are highly dependent on international market is faced with the following two challenges:

- Whether it affects self-sufficiency of staple food crops?
- Whether it can bring profit continuously to farmer and local enterprises?

Challenge 1: Self-sufficiency of staple food crops VS Food Security

From 1990 to 2012, self-sufficiency degree of staple food crops saw a tendency of fast dropping (as shown in Figure 1.2); wheat and rice, two major staple foods, started to import in a small amount to meet local demands since 2007. To ensure self-sufficiency of staple food crops, China increased heavily import of oil crops, corn, and sugar to ease the pressure of domestic farmlands.

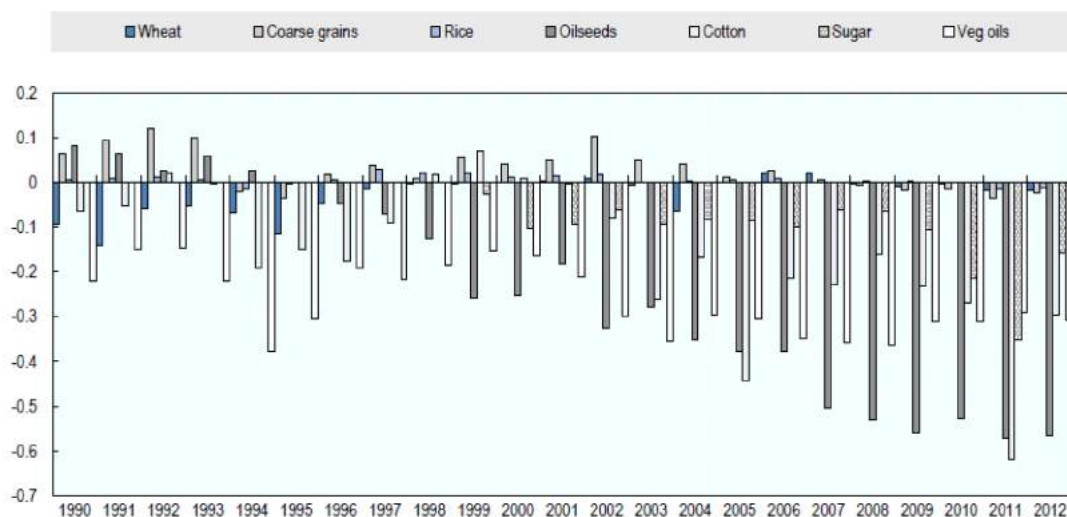


Figure 1.2 Self-sufficiency of Chinese major crops (1990-2012)

Note: net export amount and consumption amount

Source: Food Agriculture Organization of UN(FAO)

However, according to open data issued by FAO and the World Bank (as shown in Figure 1.3), Chinese grain farmland⁸ accounted only for 21% of total agricultural land in 2010, much lower than that of other Asian countries like South Korea, Japan and India, and 20 percentage points less than that of U.S., a country with low level of grain farmland coverage. China is only close to Brazil regarding grain plantation, while its productivity is 4 times that of China.

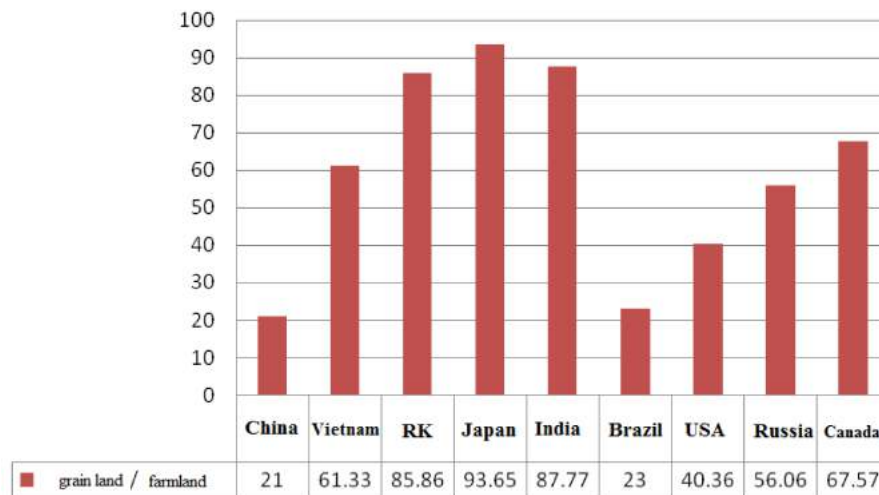


Figure 1.3 each nation's grain farmland coverage ratio in its total agricultural lands (2010)

Source: FAO and the World Bank

According to statistics from China Ministry of Agriculture (Figure 1.4 and 1.5), China has seen a drop in arable land coverage by about 10m hectares since 1996; water resources also show a trend of shock downward.

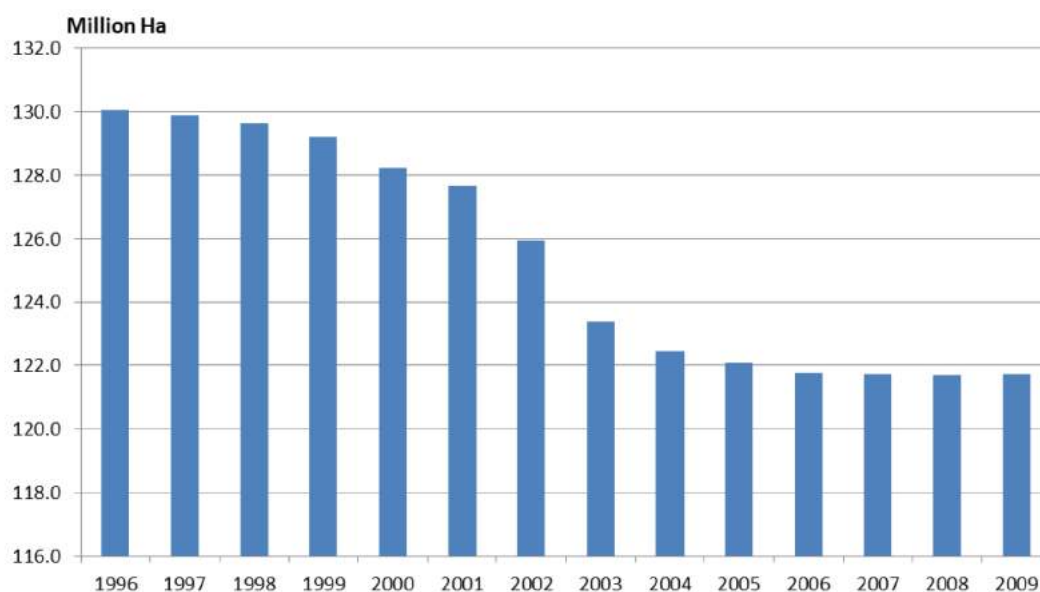


Figure 1.4 Change trend of Chinese arable land coverage (Unit m. hectares)

Source: China Ministry of Agriculture

8. According to FAO, crops include wheat, rice, corn, barley, oat, rye, millet, sorghum, buckwheat, and side crops.

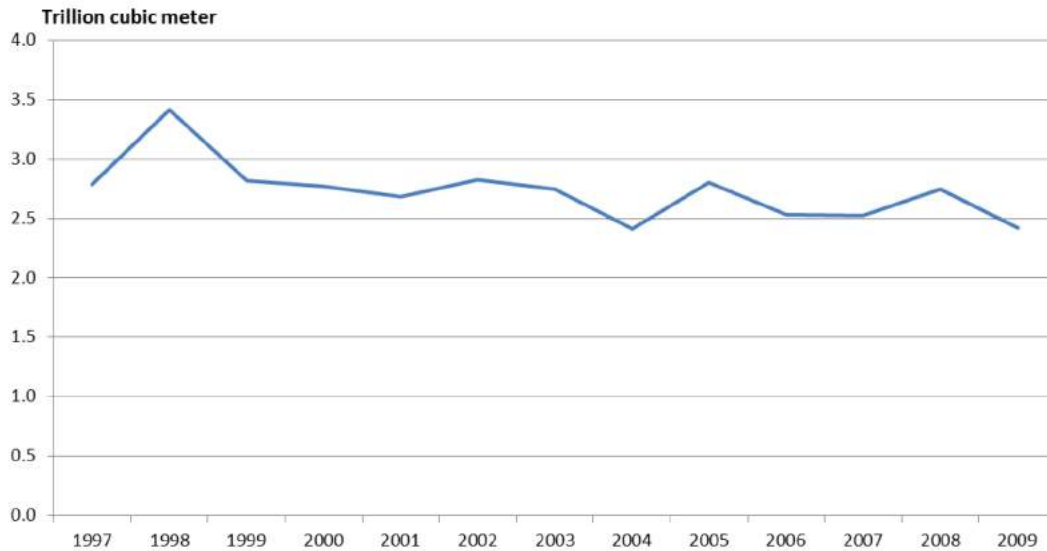


Figure 1.5 Change trend of total amount of water of China (Unit: 10 trillion cube)

Source: China Ministry of Agriculture

Under such resource constraint, China need to improve per-unit yield in order to increase total output of crops since China has no way to increase coverage of grain arable lands, which could cause large-amount and continuous use of chemicals and in turn make agricultural production pose a threat to ecological environment.

In order to enlarge arable land for crops, farm products structure need be adjusted to release more available land for provision crops planting. In this context, rationality of Agricultural OEM needs to be re-evaluated.

Besides, World Food Summit in 1996 gave a definition to food security which was that "anyone can get sufficient, safe, and nourishing food at any time". China still lives in "food insecurity" in level of self-sufficiency of staple food. How we can guarantee "food security" for Chinese citizens needs to evaluate on "OEM Agriculture" s dependency on overseas market and farm products planted to satisfy overseas dietary habits.

Challenge 2: Livelihood of Farmers and sustainable development of local enterprises

If farmers and local processing enterprises can profit continuously from "OEM Agriculture" to keep on living and running, "OEM Agriculture" is still fairly reasonable at least economically.

This report selects supply chain of tomato products as an observational sample, because China's export of tomato paste accounts for 30% of the world's total, and 95% of total output are used for export, which means processing tomato is not a traditional food for Chinese consumers. In the downstream of this supply chain are globally leading food brands and fast-food chains.

Chapter II Supply Chain of Tomato Products

Supply chain of tomato products studied in this report is part of a typical “OEM Agriculture”. It lacks self-owned brand and mainly provides raw materials to European and American food brands. In this chapter, we will introduce market of tomato products at home and abroad and try to identify all stakeholders in this supply chain.

2.1 Global Consumer Market of Tomato Products

Tomato products include tomato paste, ketchup, and tomato juice. Ketchup is the most consumed product and is a paste-looking and enriched product made of ripe fresh tomato. To consumers in European and American countries, ketchup is a necessity just like pepper and salt.

It needs being emphasized that, peel of processing tomato is thicker than ordinary ones and it also has a different taste, which puts a limit on sales channel of processing tomato and makes farmers highly dependent on processing factories. Therefore, it can conclude that Chinese tomato farmers are extremely sensitive towards price change of international market.



Photo: a processing tomato which was found in tomato field.
It has a smaller size than ordinary tomato.

By SRI

According to consumer demand analysis⁹, demand from North America and 15 countries of European Union (such as Italy, France and other developed countries) account for 33% and 26% respectively of the total demand around the world, while Asia only 3%.

Apparently, consumption of tomato products per capita differs substantially across regions. Due to dietary preferences, Asian countries, especially Northeast Asian countries, have a persistently low consumption level. According to statistics provided by the Development Report for the Chinese Ketchup Industry, the average per capita consumption of tomato products per year in the past decade in the US is 34 kilos per; this number is 23 in the EU, but only 2 in China.

9. “Agricultural Product Export Guide -Tomato Paste”, China Ministry of Commerce, 2009.

Countries and Regions	Consumption Per Capita (Kilo/Year)
United States	34
EU	23
Japan, Singapore, Hong Kong	>3
South Korea, Taiwan	1~3
China	2

Table 2.1: Annual Per Capita Consumption of Tomato Products in Major Regions of the World

Source: “Development Report for the Chinese Ketchup Industry”

Processing tomatoes grown in North America are consumed within the region instead of being traded in the global market. The Mediterranean countries, being one of the three major tomato producers, do not produce enough for European market. As European Union reduced subsidy for tomato farming in recent years, area for tomato growing reduced in the region. Europe, as a traditional producer of brand ketchups, fills retail shops all over the world with European brand ketchup after refilling and packaging tomato paste bought from China. Therefore, in the supply chain of tomato products, European ketchup producers have a decisive power on tomato prices in each season.

2.2 Distribution of major tomato plantations

The most suitable areas for processing tomato plantation cluster in between the North Latitudes 34 to 50 degrees. These areas are moderately humid with significant temperature difference in daytime and nighttime. As seen in the map below, these places include the valleys of California, U.S., areas along the Mediterranean, and several places in China including Xinjiang Autonomous Region, Inner Mongolia, and patches in Ningxia and Gansu. In Figure 2.2, darker colors in the map indicate larger plantations.

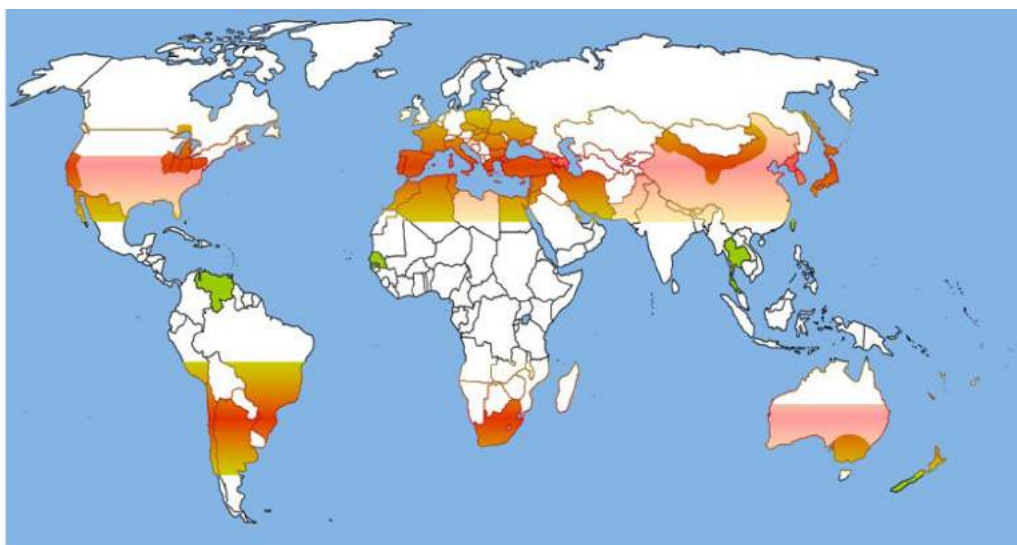


Figure 2.2 World Distribution of Processing Tomato Plantations

Source: Tomato News

Chinese tomato production reached 20% of world's total production in 2009, as shown in Figure 2.3. Xinjiang Autonomous Region alone accounts for 2/3 of the total plantation area nationwide, while Inner Mongolia and other area for 1/3.

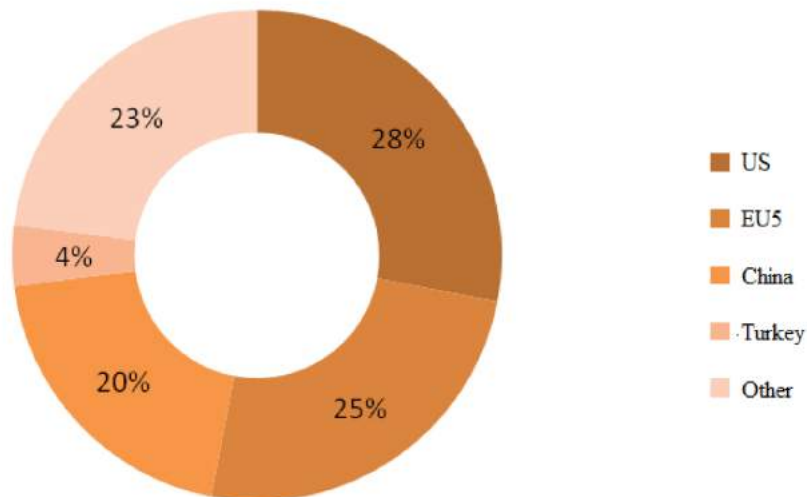


Figure 2.3 Regional Distribution of Global Tomato Production in 2009 ¹⁰

Source from World Tomato Processing Association

Processing tomato production in Xinjiang is mainly located in three areas: the mild semi-arid area in front of the northern ridges of Tianshan Mountain, including Corps No.151, Junhu Farm, and Dongwan of Shawan county; the warm arid area in the middle and south of Ge'er Basin, namely, Changji, Kuitun, Corps Agricultural Division Six, Seven, and Eight; and the warm and humid area of Bosten Lake, namely, Bohu county, Yanqi county, and Heshuo county.¹¹ Even in 2009 when domestic commercial tomato production greatly reduced, the plantation area of commercial tomato in Xinjiang exceeded 1m mu (at 1.0257m mu), averaging 4.504 tons per mu. Average production in autonomous region is 3.689 ton per mu, and 5.524 ton per mu in Corps, making Xinjiang the biggest region of China in terms of processing tomato plantation.

Inner Mongolia plantations, mainly concentrated in its Hetao Plain, were cultivated later than those in Xinjiang but have expanded on a large scale over the past few years. Ningxia Autonomous Region, Shanxi, Gansu and Heilongjiang to its east also produce processing tomatoes, yet with relatively limited area for plantation. In a nutshell, west of China is the main production base for processing tomatoes in China.

2.3 Status Quo of China's Tomato Products Export

China's tomato processing industry started in the 1960s. At that time, to meet needs of export market, the government supported companies in the coast to engage in tomato processing, produce tomato paste using domestic or imported facilities and export to the Middle East and other foreign markets. But unfortunately, coastal regions did not have the best natural conditions for tomato growth, resulting in below average raw material that undermined the quality of tomato paste produced. Chinese tomato products were not competitive in the global market.

Xinjiang's tomato plantation and processing kicked off in 1978. Proper natural conditions there contributed to the increase of tomato processing companies to up to 30 in the 90s all of whose products were export purposed. By 2009, the total production of tomato paste produced in Xinjiang reached 1.01m tons, and the number of producers of tomato paste reached 100, increasing by 44.9%. Tomato paste became the major export in Xinjiang, garnering an annual income of over 400 million US dollars. By then China became the world's No. 1 exporter of tomato products.¹²

10. EU5 stands for France, Greece, Italy, Portugal and Spain.

11. "Analysis into Tomato Industrial Development and Farming in Xinjiang", by Yu, Guoxin, Zhang Jianhong, Northern Horticulture, 2011.

12. "Chinese Farm Products Export Guide-Ketchup", by China Ministry of Commerce, 2011

The tomato products China produces include tomato paste, ketchup, tomato juice and canned tomato paste. Tomato paste is the dominating export, accounting for 98.2% of total export in 2011.¹³

Major destinations for Chinese exported tomato paste are European countries, Japan, Southeast Asia, the Middle East, Russia, Nigeria, Ghana and Togo. Europe is the biggest market for Chinese export. In 2001, Chinese tomato paste exports to the 27-country bloc reached 64,000 tons, valued at 24.47m dollars. Export volume increased to 0.221m tons (a 50% increase on 2001 levels), worth 190 million dollars (a 259% increase over 2001) in 2009.¹⁴

Fluctuating at a consistently high level, price for Chinese exported tomato paste peaked in 2008, at 1,300 dollars/ton, and remained sluggish afterwards. In 2009, supply of tomatoes far exceeded demand and tomato products prices dwindled. This hit China harshly as it was a global major exporter of tomato raw materials.

2.4 Constitutes of Supply Chain of Tomato Products

Tomato product is divided into three levels: the most initial product is bulk-packaged tomato paste (in tin buckets); then the small-size canned tomato paste; and higher level ketchup products. Currently, China's tomato processing companies produce mainly bulk-sized tomato paste for international buyers.



Photo: Barreled tomato paste produced between 2011 and 2012 are ready for export. By SRI



Photo: A small number of processing companies also sell canned tomato paste with self-owned brands to Russia and African countries, as well as ketchup, tomato products with healthy functions such as lycopene capsule and tomato seed oil to the domestic market. By SRI

Tomato products of different levels go through the same planting, delivering and selling procedure in the upstream of supply chain, and differ only in the downstream stages involving different processing and production techniques.

In general, the supply chain of export-oriented tomato products can be illustrated in the graph below. Red dotted line indicates that this stage carries supervisory and coordinating functions.

13. "Monthly Statistical Report on Import and Export of Chinese Farm Products", by China Ministry of Commerce, 2012.

14. The countries in EU which received Chinese tomato products exports over the value of 10 million dollars in 2009 include Italy (86.93 million USD), Poland (17.62 million USD), Germany (20.01 million USD), the UK (14.2 million USD), France (13.58 million USD) and Romania (10.15 million USD).

Supply chain of processing tomato can be divided to three parts: planting, processing and selling. In stage of planting, farmers still make up the majority; however, the proportion of production bases built by enterprises has been expanding since 2008. Because processing tomato does not require fine human labor, and even the most labor-consuming plucking process can be replaced by machines, it can be predicted that the planting of processing tomato will largely shift to large-scale farmers, while companies' production bases may fall into stagnation and shrink due to increase in the costs of agricultural management and labor cost.

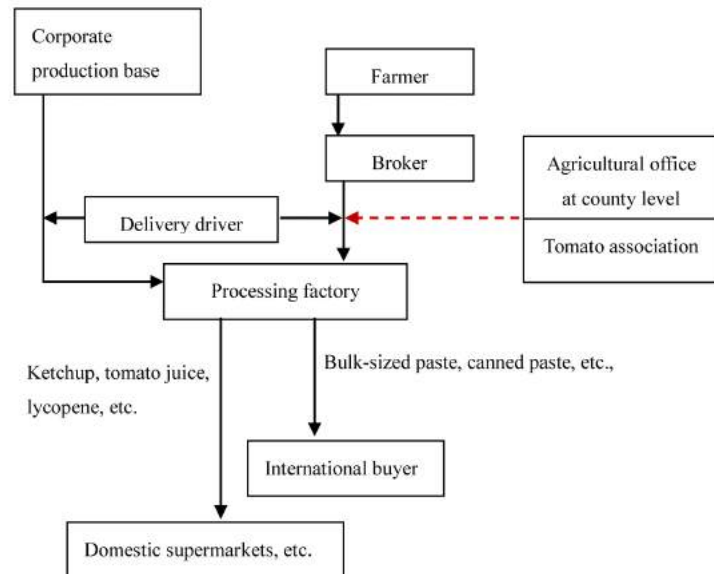


Figure 2.4 the supply chain model of tomato products
Made by SRI

Tomato processing is monopolized by COFCO Tunhe and ChalkiS Tomato (Xin Zhong Ji)¹⁵ who have autonomous production bases and target mainly the export market by selling initial and secondary processing products such as bulk-sized and small-sized tomato paste. Medium-sized tomato processing enterprises represented by Xinjiang Tianya and Guannong Tomato have also started to build self-run production bases and engage in R&D and selling of further processing products apart from exporting. Small-scale tomato processing factories spread all over the major tomato producing areas. Most of them do not have their own planting bases and have to purchase raw materials from farmers according to market trend which is quite random to a large extent.

Tomato products are sold in domestic and international markets. In the international market, China still plays the role as the “world factory” that provides bulk-sized tomato paste for famous international food companies, such as Unilever, Nestle, Heinz, etc. Only ChalkiS Tomato has made attempts to sell its own tomato products brands in the European market.

In the domestic market, apart from those managed by international food companies, brands such as Lee Kum Kee and Maling Aquarius (Meilin Zhengguanghe) also purchase tomato puree to produce and repackage into tomato products with their own labels. Fast food chain restaurants such as KFC and Mc. Donald’s purchase small-sized tomato ketchup directly from companies such as Heinz.

Furthermore, several service providers exist between the stages of planting and processing. They solve problems which occur during supply of raw materials from farmers and production companies and problems on temporary labors. They include brokers who organize supply from farmers and companies, drivers who provide transportation service, temporary labors hired by farmers and companies during busy periods of plucking and planting, and long-term labors who provide field management for large-scale farms and production bases.

Government offices are usually the initiator and actual operator of local tomato association which provides supervisory and socialized services for the development of the tomato industry. The government also has to resolve conflicts and coordinate different interests between companies and farmers during delivery and selling stages, as well as conflicts which arrive along with expanding of corporate-owned bases.

15. The full name of COFCO Tunhe is COFCO Xinjiang Tunhe Company Limited and ChalkiS Tomato is Xinjing ChalkiS Tomato Industrial Company Limited.

2.5 Characteristics of the supply chain of tomato products

Without the support from a domestic market, the supply chain of China's tomato products relies heavily on the international market. Particularly, changes in relation with planting scales and agricultural subsidy policies in Europe can have direct impacts on profitability of Chinese processing companies and livelihood of tomato farmers.

Unlike the edible fresh tomato sold directly to consumers, processing tomato in small size and with thick skin can be only sold to processing companies. Therefore, its supply chain is characterized by distinctive company orientation. If there is a limited number of processing companies in one area or just one leading company, planting, delivery and selling model of upstream supply chain in that area will manifest distinctly the management style of those companies.

Besides, due to differences in agricultural planting conditions, economic development models and governmental management styles, upstream links of the supply chain also differ from place to place. Currently, farms of processing tomato distribute mainly in Xinjiang, Inner Mongolia, Ningxia, Gansu, Heilongjiang, etc. Xinjiang has the largest area of farmland per capita and relatively good conditions in farming infrastructures, as well as a number of corporate-built production bases. In contrast, in Inner Mongolia, planting is mainly order-based and controlled by farmers.

Local government offices also play different roles in development of this industry. In areas where delivery and selling is mainly conducted by medium and small-scale farms themselves, government can have stronger administrative impacts, such as by making protective selling prices, etc. How local government offices understand the role that agricultural companies can play to contribute to the policy of "increasing farmers' income" can also affect planting models. If a local government office acknowledges scale operation, it will actively encourage farmers to transfer land to processing companies who are eager to establish large plantations for tomato.

Chapter III Farmers

Agricultural production has complex patterns in China which has gone from a traditional industry mainly for the domestic market to an export-oriented industry producing an increasing amount of primary and deep processing products. At the same time, the traditional model of small-scale farms that are self-sufficient throughout the production-supply-selling is undergoing a profound transformation.

This chapter will illustrate in details the work of tomato farmers throughout the year, their farmland, labor force, costs and profits, and risk controls during everyday operations.

Due to differences in breed and taste between processing and fresh edible tomatoes, farmers of processing tomato can only sell these raw materials to processing companies and their profits depend on stable and continuous purchase orders.

3.1 From planting to selling

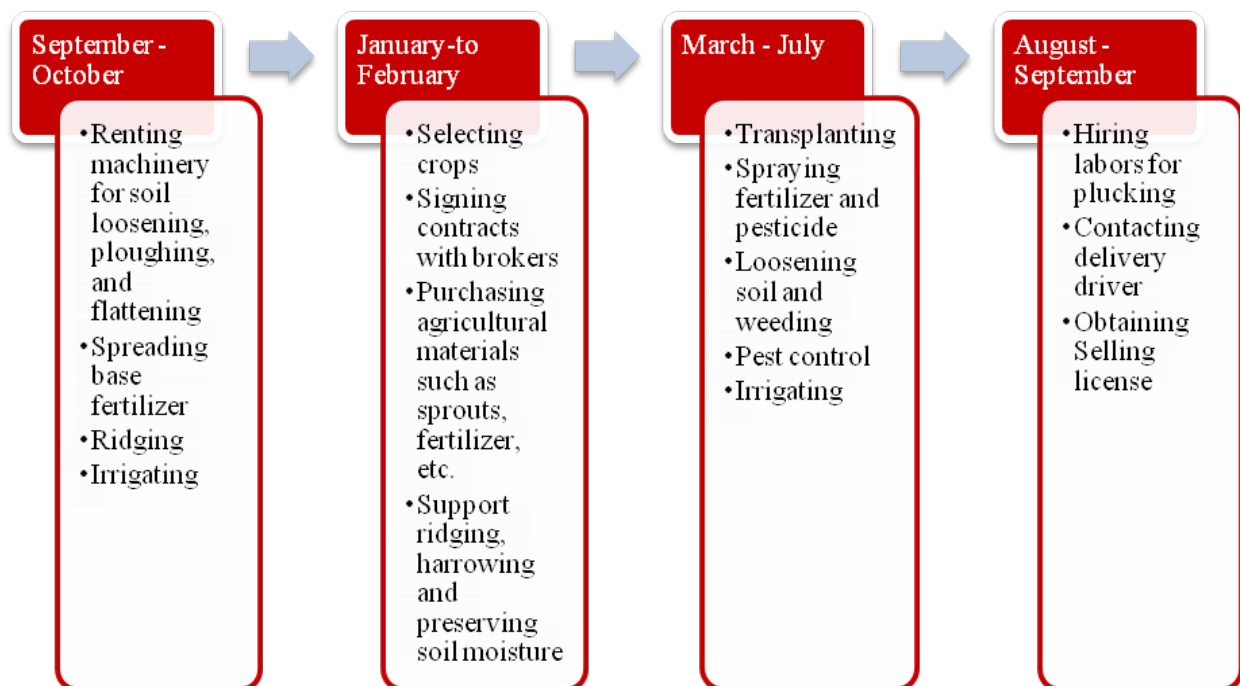


Figure 3.1 the planting calendar for processing tomato
Made by SRI

A complete planting calendar (a 24 solar terms, including “Pure Brightness”, “Grain Rain”, and “Grain Full”, etc.) has been in use for thousands of years in China. However, it no longer applies to principal working procedures throughout the year of export products such as processing tomato. Having to rely on a combination of complicated technological knowledge based on fine breeds, fertilizer and pesticide and technical operation of agricultural machinery that replaced labor force, as well as the purchase timetable and processing techniques of processing companies, today farmers use a planting calendar based on accurate Gregorian calendar date.

Every September and October is a period to upkeep the soil and get ready for farming of the coming year. Regardless whether they have finished selling tomatoes of the previous year or not, farmers have to complete a series of operational processes from loosening soil to ploughing, flattening, fertilizing, ridging and irrigating during this period. This work is considered to help the roots of tomato absorb fertilizer from the soil, decrease humidity of farmland in rainy summer to reduce plant diseases and insect pests.

After October, it starts to snow in northern areas and farmland will stay in rest until early spring. During this period, farmers can take a break from field work, but they have to make final judgments about the crops to plant for next year and signing planting contracts of intention with brokers who are responsible for collecting raw materials for companies. Before the beginning of spring, they also have to purchase all the necessary agricultural materials such as sprouts, fertilizer, mulching films, etc. New planting season starts after the Chinese New Year in lunar calendar and continues until July. Although work such as spraying fertilizer and pesticide can be operated by machines, farmers still insist on certain handwork such as weeding instead of using herbicide in order to maximize conserving soil and avoid weeds from having resistance to herbicide.



Photo: A farmer rented tractor is operating to loosen the soil.

By SRI

The biggest pressure for farmers comes along with the harvest season of every year. Whether the price is good or bad, farmers have to cash their labor of the entire year and their initial investment. Also, tomatoes cannot stay in the field any longer. Farmers have to complete three steps including hiring people to pluck, contacting truck drivers, and obtaining selling permission issued by companies (known as the Ticket). These three steps have to be connected one after another to ensure minimum loss and maximum gains.

3.2 Farmer's identity and their Land

Generally speaking, in China, the main labor force engaged in agricultural planting is citizens who live for generations in rural areas and are registered as agricultural household. However, in Xinjiang Autonomous region, the counterpart is workers employed by the Production and Construction Corp, who are registered as urban household. Since Xinjiang is China's main area of growing and exporting processing tomato, most of the tomato paste is actually provided by "city people" in the sense of household registration.

The Xinjiang Production and Construction Corp is a provincial unit independent from the regular administrative system, under which there are three levels of administrative units – division, regiment, and company. Major purposes of such establishment are land cultivation and defense in frontier areas. Within over 60 years since its establishment, the Corp has cultivated 1.07276m hectares of arable land, 0.91625m hectare of crops sown land. Average size of arable land per capita is 7 mu, almost three times that of average national level. Different from traditional farming model, agricultural production of the Corp is featured by advanced irrigation mode (drip irrigation is commonly used), widely use of agricultural machinery, and continuous planting in large areas.

Differentiation in urban and rural identities could affect arrangements of land property rights, leading to different agricultural production patterns. Land property rights in China can be divided into three levels, namely ownership, the right to contract and the right to operate. Land is owned by the country who arranges it through "household-based contracts" to farmers. Subsequently, farmers acquire the right to contract for at least 30 years. Farmers could gain the right to operate if subleasing the land to others. Tomato farmers generally own the right to contract land and some have the right to operate through contracting land from other people. The workers of the Xinjiang Production and Construction Corp work in the land allocated to them by the Corp who also decides the types of the plants to grow and the sales targets.¹⁶ Such unified planning has led to a relatively high level of infrastructure construction such as its irrigation and water conservancy, mechanical seeding and harvesting. In terms of management model, the workers of the Corp are more comparable to plantation workers working in farms whereby individual grower is allotted with a piece of land to plant and paid based on the output. After Men at 60 and women at 55 retire and return the farmland back to the Corp, they can receive pension ranging from 900 to 3000 RMB every month according to work category and position classes.

16. Some farms under the Corp have carried out land reform and contract land to workers.



Photo: Xinjiang, September. Workers of the Corp are basking corns on the road. A female employee approached us and said, "We front-line workers work very hard. We heard that we would be delayed to retire, but we are too tired. Can you report about this to people of higher levels? We might as well do with the old retirement age of 50 for women and 55 for men!" By SRI

Requiring certain soil and weather, processing tomato is planted mainly in the northwest provinces, such as Xinjiang, western Inner Mongolia, Ningxia, and small parts of northeastern Heilongjiang Province. These are areas of vast territory with sparse populations. Their farmland is large in size and distributed closely. According to data collected in three main producing areas - Dengkou County of Inner Mongolian Autonomous Region, the Junggar Basin of Xinjiang Autonomous Region and Shizuishan City of Ningxia Autonomous Region, individual farming household has 30 mu of farmland in average. The scale of tomato planting varies from 3 to 5 mu in Inner Mongolia, to largely over 8 mu in Xinjiang, and generally over 10 mu for Corp's workers. Large-scale tomato growers in these three areas generally have land between 80 to 200 mu, some even over 500 mu.



Photo: Fields of the Corp (in white labels) are scattered all over Xinjiang. Areas in yellow and with no presence of Corp fields are deserts. By SRI

3.3 Cost and Profits

Fertilizer and seeds are the major costly parts in planting processing tomato. Field management comes next and is both time- and labor-consuming. Once planting is mechanized in large-scale, cost in labor increases dramatically. Detailed cost structure for tomato growers:

Local Farmers		The Corp Workers	
Cost Structure	Amount (Yuan/mu)	Cost Structure	Amount (Yuan/mu)
Seedlings	220	Deposit for Agricultural Materials (based on actual calculation including interest)	1000
Fertilizer & Pesticide	250		
Mulch	50		
Land contract fee ¹⁷	420	Land contract fee ¹⁸	450
Water	80	Water	150
		Depreciation of drip irrigation equipment	50
Plowing	30	Machine Operation	60
Harrowing and Grinding	20		
Plucking (Average yield per mu was 5 tons in 2012)	250	Plucking (Average yield per mu was 6 tons in 2012)	300
Loading	150	Loading	150
Transportation	175	Transportation	180
Total Cost	1645		2340

17. Land contract fee differs from place to place, ranging from 240 Yuan per mu to 600Yuan. 420 Yuan indicated here is the average number.

18. The lowest number that we obtained is 300 Yuan, and the highest is 600 Yuan (2012). 450 Yuan indicated here is the average number.

Production cost of local farmers is calculated based on data of cost in average gathered from farmers of three main tomato producing areas (Xinjiang, Inner Mongolia and Ningxia). Cost of the Corp workers is gathered mainly from farms around the Junggar Basin belonging to the Xinjiang Production and Construction Corp. For average Corp workers, they pay 695 Yuan more than local farmers on each mu of tomato. Even after deposit deduction, production cost of the Corp's workers is still higher than that of local farmers by 155 to 355 Yuan. This calculation does not even include the cost of certain labor work done by tomato growers themselves, such as weeding which would cost 300 Yuan more if done by hired labor. This keeps cost of tomato planting ranging from 2,000 to 2,300 Yuan per mu.

Purchase price of tomato reached its highest level in 2008 at almost 0.5 Yuan per kilo and has been declining all the way since then. Year 2010 and 2011 were the hardest time in sales with price as low as 0.35 to 0.4 Yuan per kilo. Tomato farmers must ensure their yields to achieve at least over 6 tons per mu to make profits. Corp workers, comparing with local farmers, work in farms with better soil fertility, better irrigation facility and seedlings. With tomato yields at 7 tons and above per mu in general, they maintain profits between 400 and 1000 Yuan for each mu.



Photo: Drains constructed in ordinary village.

By SRI

However, all farmers are facing decline in soil fertility caused by continuous cultivation. Ordinary farmers usually have trouble with an increasing degree of land salinization because of using outdated irrigation facilities.



Photo: Drains for irrigation constructed by the Corp. Irrigation facilities of the Corp are larger in scale and more completed. Most Corp farms are already using dripping facilities for irrigation. By SRI

At the moment, every item of planting cost is rising. Only the level of increase in cost and its impact on agricultural production differ. For instance, although fertilizer price has been rising year after year, it does not pose much burden to farmers because of its limited amount of use. However, along with a steady increase in scale farms, land contract fee, labor costs and loans have become the most important factors that affect agricultural production.

Land contract fee has been rising year after year. This is directly related to China's urbanization policy which has led to a vast amount of arable land being expropriated for urban construction and development. Therefore, the closer to the city a piece of land is, the higher the contract fee is. Even though processing tomato growers do not necessarily need to choose land closer to urban consumers, as long as the areas have good road conditions and processing factories, this fee has still been kept climbing up slightly.

Labor costs involved in tomato planting covers field management and plucking, among which weeding is the most labor-consuming work in the field. Although companies usually use herbicide in their own bases, farmers believe that herbicide cannot remove pests completely but only causing weeds to flourish in the coming year. If weeds are left alone, more insects would grow. One type of weed can even entangle the root of tomato and cannot be solved by herbicide. As one person a day can only weed for three-tenth of one mu if working by manual, a large sum of cost will have to be spent on weeding. Farmers who have larger farms usually invite relatives or villagers with good connection to help out to reduce the number of hired labor.

Cost for plucking is divided to packaging and manual loading. One mu of land can usually be harvested twice. The calculation is either based on days of work or bags of tomatoes that has been plucked. In Inner Mongolia, payment is usually cleared on daily basis which is 100 Yuan per day, while in Xinjiang and Ningxia, it is calculated based on one urea bag of 20 kilo which is 2 to 3 Yuan per bag of tomatoes. Loading costs 30 Yuan per ton, more or less around this level in different areas.



Photo: Inner Mongolia, four-wheel vehicle for delivering tomatoes (the one in the front in darker color); and the heavy truck for transporting tomatoes in Xinjiang. Small-scale four-wheel vehicle is now being restricted to be used for selling tomatoes.

By SRI

In Inner Mongolia, average scale of tomato farm is below 10 mu. Farmers use agricultural tricycle (load capacity of 3 – 4 tons) to transport tomato. It usually takes 2 days for a couple to finish plucking and selling tomatoes of one mu, half mu each day. They work together to pluck tomatoes and one person drives to sell tomatoes. In contrast, Xinjiang and Ningxia have large scales of tomato farms. In order to avoid long queues blocking the traffic on national highways, as many tomato factories were built close to the national highways, processing factories and local governments only allow using heavy trucks of few dozens of tons to deliver tomatoes. Farmers therefore have to hire people to pluck 30 to 35 tons of tomatoes each time and contact trucks for transportation in advance.

However, due to shortage in labors, tomato growers can lose half of their already limited profits just for plucking. During a difficult time in 2011, having calculated this part of cost, some tomato farmers had no choice but to plough the land again for new planting or drive their sheep flock into the farm and feed them with ripe tomatoes.

Most farmers have to rely on production loans from local credit cooperatives to buy agricultural materials such as seed, fertilizer. Tomato farmers have to pay for weeding, plucking and loading additionally. Land contract fee constitutes a large part of expenditure for farmers who need to rent land.

Workers of the Corp rely more on the loans than farmers. Though as professional farmers, they own larger land per household, they need to pay for certain land rate, for instances, 600 Yuan for each mu of tomatoes and 1000 Yuan for each mu of pepper. An extra of 1000 Yuan for each mu as deposit¹⁹ of agricultural materials has to be paid for purchasing seedlings, pesticide, fertilizer, etc.

As loans are handled all together by the company, the process of loan application, approval and issuance for the Corp workers are much easier than for individual farmers. However, both have the same problems. Firstly, high interest rates and compulsory insurance - take 100,000 Yuan loaned in the spring of 2012 for example, the annual interest rate is 9.8% with the credit cooperative in Yanqi County, Xinjiang. So 9,980 Yuan is paid for the interest and 700 Yuan for the insurance. As this is deducted from the loan in advance, farmers will only receive no more than 90,000 Yuan in cash. Secondly, loan application requires a “five-household joint guaranty”. Namely, if one family could not pay for the loan, the other four would not be able to apply for new round of loan. In time of bad harvest, this would become a vicious circle.

Interest rates of half-year or one-year micro loans (30,000 to 50,000 Yuan) for agricultural production float within a certain range, with the highest up to 50%. For ordinary farmers, it is not difficult to apply for micro loans, but without certain connection at the bank, they usually could get a high interest rate. Large-scale farmers usually need to loan for over 100,000 Yuan, but farmers usually do not have the collateral that can be accepted by the banking system which is a common problem for them to obtain loans.

19. Some Corps had reform and workers can choose to buy agricultural materials.

A worker of one Production and Construction Corp in Bayinguolen Prefecture, Xinjiang

Once farmers have loss in the first year, they cannot afford to plant for the next year. Think about it: a deposit for a mu of land costs 1000 Yuan. If I rent 60 mu and 120 by my relatives, we need to pay for hundreds of Yuan just for deposit.

We had to seek loans every year. It is impossible to pay for land deposit without credits. We heard that last year (in 2011), there was a couple from inland who contracted 500 mu of land for tomato, but ended up killing themselves by drinking pesticide leaving a kid behind, because of not being able to sell enough tomato to pay for the bank loans.

Though subsidies are issued by the government, they are not given directly to individuals. After being scrapped off by one level to another, not much is left to us. (Comparing with rural people,) the only difference is that we have an urban household registration. But what can we do with an urban household registration as farmers? Subsidies are all issued to farmers with rural household registration. We just received allowance once, like 800 Yuan.

One farmer in Bayinguolen Prefecture, Xinjiang

For a rural household of four people to live on farming, they need to at least earn 40,000 to 50,000 Yuan to sustain life. Otherwise, they will have a deficit. Agricultural materials cost a lot these days, including fertilizer, mulch etc., and so do labour costs. 60 households among 65 in my team have to apply for loans at credit cooperatives, each for 50,000 Yuan, with interest rates at 10% plus compulsory insurance. That is why I loathe watching the CCTV news who always broadcasts about how well farmers earn. This is completely not true.

We have heard about subsidized loans, but only a small number of people are eligible to apply. We only heard about this policy from chats on the street and just left it behind because that is not even closely possible to us. A thing like this is like ghost. Many have heard about it, but few have seen it.

One farmer from Shizuishan City, Ningxia

We have a large area of land and need funds urgently. I have contracted 700 Mu of land which cost me 400,000 Yuan. Plus 200,000 Yuan for fertilizer, it is 600,000 Yuan altogether. So I have to loan from the bank. But it is too hard to do so. I applied for 80,000 Yuan from the bank and it only allowed for 20,000 Yuan, so would you accept it or not?

We have signed a contract with a company, hoping that the company would pay for certain amount of money in advance to release certain burden from us. It is such a bad year for tomato this year (2012). We would never like to grow tomato anymore, carrying such a huge loss.

3.4 Risk Management and Control

Uncertainties in agricultural production, such as market conditions, climate, fulfillment of contract, etc., are problems that need to be taken into consideration in any commercial agricultural activities. But there is no industry as agriculture that has so scattered and small-scaled upstream “suppliers”. Within this structure, farmers do not have power to negotiate with companies, and nor do companies want to spend that much on communication costs. In such a double-blind situation, agricultural production has become something like a bet. Factors that affect profitability can be summarized as follows:

• What to grow?

Farmers need to purchase seeds and fertilizer for the coming year in early spring. But the government usually publicizes a limited amount of market information until the season of spring plough. By that time farmers have already finished early stage of investment. If farmers learn about a bad market prospect of the crops they plant for the current year that late, they could only hope that the bad news would not come true.

Farmers who grow produce for export rely heavily on processing companies. Brokers who are responsible for organizing raw materials for companies are thus the most important sources of market information for farmers to judge from. Once intentional contracts are signed with brokers, farmers will start operating in the farms step by step. However, if there are several processing factories for various produces in the surrounding area, farmers have to make market judgment, such as on whether to grow tomato or cotton, or fine breeds of maize. Yet sources of information for reference are few and unreliable, such as through information exchange with other farmers, information via television and internet, or through acquaintances to learn about facto-

ries’ production plan of the next year. Under the precondition that expected sales can be guaranteed, farmers then have to consider about investment in labor to cover not only field management but also plucking.

Not all the Corp workers have the right to decide about the crops to grow. In some Corp farms, planting is managed centralized. But if workers insist on their own opinions, the company would not force the workers to change the crops to grow. Crop rotation can be inserted among continuous planting. However, because of different land rates for different crops, for instance, 300 Yuan for tomato, 500 Yuan for pepper, farmers have to pay for difference if they change from growing tomato to pepper.

The Production and Construction Corp may also lease arable land, usually in large-scale over hundreds of mu.

However, under most circumstances, growers ultimately go for similar choices. The vast land in the Northwest was planted with miles of tomato in 2011, and after a dismal harvest, miles of cotton and pepper in 2012.

• International Market

95% of the tomato paste produced in the Northwest is for export, mostly to Europe and U.S.A. Normally market demand from export countries should be a reference index for farmers. However, as Chinese companies act only as a semi-finished product supplier among numerous companies in the tomato supply chain, farmers and brokers are not able to reach down to the end of supply chain and take fluctuations in the international market into their own account.

Because of the role Chinese companies plays in the supply chain as an original material producer, profits of tomato growers in

China have to rely directly on the offers of international tomato paste buyers such as Heinz, Unilever. Although the European and U.S economy has suffered from long-term recession since 2008, sales of tomato ketchup as a daily diet has not been much affected. Yet, under the circumstances of appreciation of the Chinese RMB against major European currencies and U.S dollars and drop in consumer spending in Europe, if buyers such as COFCO and CIP keep the previous settlement price in U.S dollar, profit margin for tomato farmers in China would be greatly reduced.

Case: A recollection about tomatoes in 2011 by a Corp worker

Our company grew 2300 mu of tomatoes in 2011 and had a loss. So this year we only grow 900 mu. It rains a lot and there are lots of insects this year. Dripping and spraying pesticide by hand didn't work.

I grew beetroot the year before last and not many tomatoes. I had a loss because the sugar companies didn't collect much amount of tomatoes. Last year, I grew tomato, and because of the economic downturn in foreign countries, processing factories couldn't collect much and I lost again. I had 9 tons of tomatoes per mu and 2 tons went rotten in the field. 17 tons were loaded in a truck to deliver, and 2 tons more of rotten tomatoes were deducted as impurity. There are places where half would be deducted. That's 9 tons out of 18 tons, plus costs for plucking and loading (450yuan)! Why on earth do we deliver it? We may as well leave it rotten in the farm! I've planted one type of pepper for export to Japan this year. But we haven't received a single order from companies because of the tension between China and Japan. We are anxious but unable to do anything. Pepper is at least a bit better than tomato. Tomato will have mildew in 2 days and tomato paste made from that will then contain excessive bacteria.

We started to grow tomato in 1998 and some beetroot, pepper and wheat in between as rotation. As far as I can recall, the price was at the highest in 2008, a bit more than 0.5 Yuan per kilo. Since then the price has gone down every year.

A huge amount of tomatoes went rotten last year. I was so anxious that I could only cry. Once the truck arrives, you have to load immediately, whether it is one o'clock in midnight, or 4 and 5 in the morning. There is a time limit by the permission ticket. If the truck doesn't arrive, the ticket is invalid. Last year, there were people who had contacted trucks and delivered tomatoes, but missed the time limit in the end and the ticket went invalid. Ordinary farmers can still deliver tomatoes to other factories. But the Corp doesn't allow so. No one dares to deliver to other places. Once discovered, we will be fined and even detained under serious circumstances. At the beginning, price offered by processing factories were rather low and the price went up after some people filed petition to the Corp division. These are bold people. We don't have the guts and have only to live with how it is.

• Weather

Agriculture is obviously dependent on the weather. Every government has thus formulated relevant policies related to agricultural insurance. Agricultural insurance policies for crops such as wheat and maize have already been implemented in China. But tomato is not yet included, apart from some areas in Ningxia where a compulsory insurance is carried out by processing companies.

Farmers pay for 6 Yuan as insurance for each mu and can be compensated for 300 Yuan from complete crop failure.

During the stage of sowing and spreading mulch in the farm, strong wind can blow off

mulch and seedlings. If long-lasting drought occurs during growing period, farmers will have to concern about plant diseases and insect pests. What worries them most is heavy rainfall during August when tomatoes start to ripe. Once being soaked in water, tomatoes will soon decompose in soil, and the harvest of the year would fail.

Along with frequent occurrence of extreme weather, spider mites that did not use to grow in tomato field start to appear. In 2009, disastrous hailstone occurred in some tomato producing areas in Xinjiang, leading to ripe tomatoes decomposing in the farm. In 2012, continuous storm in Ningxia also caused heavy

• How to deliver and sell

Tomato growers sell tomatoes directly to processing companies. The more processing factories there are, the more competitive they are with each other for raw materials, and the more profits farmers are able to gain. As big cooperates like COFCO and CIP usually buy in a huge stock of goods, unlike small ones, they do not stop producing when the international market is not in a good situation. Standard companies expect to deal with tomato growers through contracts to make sure a stable and sufficient supply of raw materials.

Scales of tomato farms range from large ones of over hundreds mu to many small ones of few to dozen mu. Companies sign planting contracts either directly with big-scale farmers or with small-scale farmers through brokers. The contractual relation between companies and big-scale farmers are relatively stable. In contrast, contracts signed between brokers and small-scale farmers are not strictly binding to both sides. The contracts mainly function as a way to help companies to figure out the availability of raw materials in one area of the current year.

Small-scale farmers usually do not sign contracts with one company. When raw materials are in short supply, they will go for the company who offers a higher bid. However, farmers will also take companies' capacity to pay loans into their consideration. If the bids of different companies are close, farmers would still prefer to sell to big companies like COFCO even their bids can be a bit lower, because farmers feel "they are more standard". When supply of raw materials exceeds demand, big companies will not refuse to fulfill contracts. They usually reduce their loss through other arrangements.

Tomato processing factories are not equipped with storage for raw and fresh tomatoes. Therefore farmers actually are responsible for storage and pay for it. Once tomatoes loaded on trucks are inspected, they enter immediately into the making of tomato paste. Within half an hour, semi-finished paste will flow out from the pipeline. However, the process for getting tomato inspected from the farm is rather complicated.

Tomato grown in the farm, permission tickets for transport controlled in the hand of brokers, and the means of transportation are three interlocking steps. Any step can go wrong. For instance, if a farmer have already had the permission ticket and hired enough workers to finish plucking 20 tons of tomatoes but could not find heavy trucks to transport, tomatoes piled on the ground would soon grow white pili and discharge fluids in a day or two. Very often, farmers have to worry whether truck drivers who promise to be on time in the telephone will actually arrive at all. Sometimes companies promise on the contract to send trucks to collect tomato within 24 hours after they are plucked. But during harvest season, such promise is usually hard to be fulfilled. Sometimes it takes some bold farmers to file complaints to the local authority until they will send trucks.

Even these three steps are completed, sudden failure of processing machine or tomato collection going too slow can lead to a long queue of trucks outside of the processing factories. Tomatoes will start to stink and discharge fluids. When the truck has finally

its turn to go through floor scale, a ton of tomatoes has probably already gone wrong. Inspectors from the factories will deduct a certain percentage of impurity which generally ranges between 3% -30%, without a quantitative indicator. Once in the hardest selling season, the percentage can be 15-30%, and the highest can be up to 50 – 60%. Therefore, for one mu of land with yields at 7 tons of tomatoes, only 4 tons will be priced after inspection, a breakeven price for a tomato grower. For many more farmers, in a harvest season such as in 2011, they could not even get hold of permission tickets for transportation before tomatoes going rotten in the farm. In Xinjiang, there are at least three cases of suicide committed by tomato growers, related to the difficulties in selling in 2011. The Corp workers also face difficulties in delivering and selling tomatoes. Besides, in Corps which has not been reformed, the Corp company signs contracts with corporations and growers have to sell tomato to assign corporate. During harvest season, checkpoints will be set up at every entries of each regiment headquarters to prevent workers from selling crops to outside privately.



Photo: Trucks are lining up outside of the processing factory waiting for inspection. Tomatoes dropped on the road are scattered around and tomatoes in trucks discharge fluids.

By SRI

Photo: Checkpoints are set up in the name of “defending regional stability”. They usually check vehicles that going outside but not those going inside. Our car, with a Beijing license, drove back and forth for twice. Probably because it was not a sales season, we did not see any outgoing vehicles being stopped and searched during the few minutes we stopped.

By SRI



Case: conflicts between tomato farmers and processing factories

Before going to Shizuishan City, Ningxia Autonomous Region, we found a web post by a tomato grower who pointed out that in 2012, a subsidiary company of a center enterprise in Ningxia refused to purchase tomato according to the contract. We went there to interview local tomato growers and brokers who signed the contracts on behalf of that company. But we could not get in touch with people responsible for this company.

One interviewee is a large-scale grower who contracted 120 mu of land to grow tomato. Normally yields are at 6-7 tons for each mu, but because of the weather, yields were only at 2 tons. This grower first signed a planting contract through a broker with the company. But in the end of July, this company announced it would not operate this year. Tomato growers then went to find brokers and local authority. In farmers' opinion, "officials at central enterprises are not ordinary people who must have high ranks at the level of national vice prime minister," and even general manager of a subsidiary of a central enterprise "cannot be reached easily by ordinary people. They even rejected to meet village officials when they did not have time."

In reality, this year has been bad throughout for tomato growers. Pests and diseases started to occur on June 15, 2012. Between 15th and 20th, heavy rainfall and high humidity in the field caused farmers who did not protect their land well to lose half of their tomatoes. Storm started in July 29th, causing ripe tomatoes to decompose completely. On 30th when the storm stopped, the company sent technicians to farms to test tomato quality. Purchasable tomatoes have to fulfill "four NOs" as stated on the contract signed by farmers and the company. No decomposition is one of the requirements. The technicians picked few tomatoes for initial test and they did not pass the test. That company then did not go on purchasing any tomato.

However, company's explanation was not acceptable for farmers. Before signing the contract, farmers are required to buy insurance by company. The company paid the fee to insurance company in advance and then deducts with the rate of 6 Yuan per mu from farmers' funds when settling accounts. In brokers' opinion, ordinary farmers will not pay a coin for it if not required so. Because they bought insurance this year, they would be compensated for 2000 to 3000 Yuan for each mu this year.

Although farmers would be compensated, they still have loss of more than 1000 Yuan for each mu, compared with how much they initially invested. A farmer from Xinjiang commented on life of countrymen in comparison with urban citizens: "urban citizens can at least earn salary of some 2000 to 3000 Yuan to feed themselves. For growers like us, once we have loss in a year, we would not even have money to put trousers on." The loss caused by weather always becomes the blasting fuse between processing companies and farmers. It is urgent to extend the agriculture insurance to a larger scale and amount.

Chapter IV Brokers

Brokers are middlemen who charge commissions from introducing deals between buyers and sellers. They organize raw materials for companies from farmers, sign planting contracts with farmers and charge commissions from companies. Brokers are referred differently in different areas, such as contractors in most parts of Xinjiang, middlemen in Inner Mongolia

Brokers normally exist in places where planting areas are small and are distributed scattered. In places where individual farms grow over 100 mu of tomatoes in average, tomato processing companies sign planting contracts directly with farmers. For the Corps, a specific company is in charge of signing selling contracts with processing companies. Brokers are also not needed in this case.

This chapter illustrates who brokers are, their income, and specific duties. It also attempts to estimate and explain the impacts that brokers have on processing tomato industry and possible changes of their role in the future.

4.1 Who are brokers?

Tomato brokers are usually local residents from tomato planting areas. They might be the secretary to the Party Committee of the village, head of villagers, or large-scale farmers who do not have official titles. Some brokers have worked for a long time as migrant workers and acquired rich social experience. What they have in common are wide social connections, certain economic base, certain reputation and influence among fellow villagers. Brokers are mainly male.

Normally, anyone can be a broker as long as he is able to connect processing companies and farmers, sign contracts with processing companies and organize sufficient raw materials during production seasons.

A head of Department of Raw Material of a tomato processing company

In villages there're some people who deal a lot with companies or those who have worked elsewhere and have good connections with companies. At the same time they have lived for a long time in rural villages and are very familiar with farmers. Some farmers plant tomato only in small scale and have trouble with selling tomato. They don't know companies and neither do they have time nor manpower to settle bank account or do other things. This is when brokers are needed. Brokers are simply taking advantage of having good connections with both sides.

Brokers help companies contact farmers and negotiate commission with companies for each ton of tomato they supply. A broker may organize 500 mu of land which belong to a dozens of farmers and represent them to sign contracts with companies. But he himself doesn't own any land. For a large-scale farm that alone owns 500 mu of land, factory simply approaches the farmer directly without any broker.

4.2 Brokers' duties

In order to collect an enough amount of processing tomatoes during production seasons, brokers have to start to plan their work for the next year right after the end of processing season. Every November, brokers visit farms door to door to motivate farmers to grow tomato. Some brokers are also agents or salespersons of seedlings who advertise about profits to farmers before they decide about the crops to grow for the coming year.

The new planting season starts in February and March of the coming year. Processing companies set up the quantity of tomatoes to purchase and the purchase prices based on sales of the previous year. Brokers then sign formal contracts with companies. Since brokers have already surveyed among farmers, they are able to estimate the amount of raw materials that they can supply and then go back to villages to communicate with farmers about the purchase of the current year. Farmers who intend to grow tomato then sign contracts individually with the broker and provide the size of land for growing tomato.

Normally, one broker can sign contracts with different companies. But they usually employ principle of proximity whereby they make transactions only in their own villages or production teams, rarely across different regions. Processing companies that are well-managed usually delineate different production areas and assign one broker to represent one area to make sure of stable supply of raw materials. In time of tomato delivery, companies will issue "selling orders" based on the quantity stated on the contracts signed with brokers. However, due to limited capacity of production lines in the processing factories, only a fixed amount of orders can be issued every day. When a massive amount of tomatoes ripen, individual farmers will request the brokers to give out selling orders with the least delay possible. However, which broker can obtain orders in a fastest manner depends on the familiarity with processing companies. Therefore, treating meals and giving out gifts are part of brokers' work, which become a huge amount of expenditure.

In time of oversupply due to a good harvest, for example in 2011, even company staff in charge of issuing "transport license" to brokers, or those in charge of sending out line numbers to transport vehicles and keeping orders in front of factories can benefit from a chaotic market. Some brokers even started to hype the transport license which was normally issued to farmers based on the contracts. Because of the good harvest, one license was hyped to 1000-2000 Yuan. One transport license allows farmers to transport a load of tomatoes about 25 tons, worth 10,000 Yuan. Farmer can expect a net income of 2,500 Yuan, but a hyped transport license could take away 80% of the income at the highest.

A farmer from Bayanggol Autonomous Prefecture, Xinjiang Autonomous Region

Last year, we had too many tomatoes, and prices went up in all aspects. A transport license was hyped to 1000 Yuan. The (processing) factory gave us the license via the broker. The broker first gave out some tickets to their close friends and hyped the rest. I could do nothing but pay 1000 Yuan for one license. Otherwise tomatoes would decompose within 3 days. It's alright to leave tomatoes for one day and one night, but they soon grow white mildew in the second day, and decompose in the third day. Tomatoes are delivered to company who will deduct rate of impurity from tomatoes, 6 to 8 points in last year.

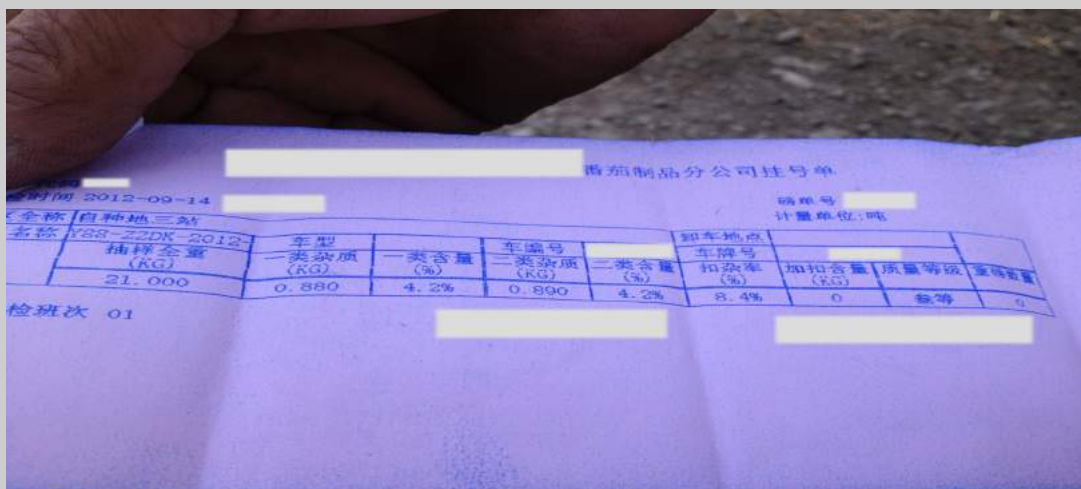


Photo: A sample of "selling order" issued by a processing factory

By SRI

4.3 Income of brokers

When the area for growing tomato is limited, companies will compete for supply and pay higher commission to brokers. For brokers this is where profits and risks can be from. When supply exceeds demand, brokers who control selling for farmers can profit from hyping the "selling license". But worst situations can also happen when a large amount of planting contracts are not fulfilled by companies or there is a massive reduction in output and even complete crop failure.

Brokers normally charge commission from companies. However, in few areas they charge from both sides, some sort of "thank you" reward from farmers at a rate of one cent per kilo.

The amount of commission and its calculation differ in different areas and companies. With no unified standard, commission is generally determined by the status of supply and demand on the local tomato market. The smaller amount of raw materials brokers collect, the smaller percentage of commission rate they would be paid. Besides, they would only receive their commission once they fulfill the amount of raw materials as contracted.

Brokers contracted under ChalkiS Tomato are allowed to organize raw materials of different scales from 300 mu, to 500 mu, 2,000 mu, etc. For each 1,000 mu of raw materials, the company pays 10 Yuan per mu as commission, 20 Yuan for 3,000 mu, and 30 Yuan for 5,000 mu.

In Pingluo County, Shizuishan of Yinchuan city, commission for brokers contracted under COFCO Tunhe is calculated based on the amount of tomatoes sold in tons. For each 1000 to 3000 tons of tomatoes sold, brokers can receive 3 cent per kilo, 3 cent per kilo for over 5,000 tons.

4.4 Impacts of brokers and future trends

Brokers exist as they are supposed to reduce transaction costs for both sides. But in an environment that the binding force of contracts is not respected, whether such middlemen can exert supposedly positive effects depends solely on their “integrity”. If an industry is held onto the “integrity” of brokers, it is hardly convincing that the industry can develop in a healthy way.

Objectively speaking, brokers who are able to reduce huge amounts of purchase costs for companies of dealing with dispersed small-scale farmers and make sure of credits to both sides emerge inevitably in the course of the development of the industry. However when small-scale farms are gradually replaced by large-scale farms with over hundreds mu of farmland, the legal costs for binding companies and farmers through contracts will be largely decreased and the role of brokers will also vanish gradually.

Yet, although the transformation of small-scale farming to large-scale farming has begun, there is still a long way to go. Within 5 to 10 years, small-scale farms (with land of less than 10 mu) and medium-scaled ones (with land of less than 100 mu) will still exist, especially the medium-scale farms that will constitute a large proportion among farms of all categories in a longer period. Therefore, establishments such as association for tomato growers that internalize the role of brokers are needed rather urgently to represent interest of medium-scale farms.

Case: A senior broker

I have been working in this business for almost 10 years as a broker for several different tomato processing companies. In 2003, I worked for a small-scale tomato processing factory in a town, but it went bankrupt due to insolvency. In 2005, when ChalkiS Tomato set up a processing factory, I started to work for it. There was a year when farmers suffered a huge loss as ChalkiS Tomato had limited capacity with its production line to process the amount of tomatoes agreed on the purchase contracts. The problem was finally solved by the government. Nevertheless, this factory still failed to make it to the end. After that, I became a broker for a processing factory until 2009. In 2010, I worked for a central enterprise (The Company).

Brokers are needed because the farms in this county are all small in size and distributed scattered. The Company pays commission based on the amount of tomato purchased. There is no fixed requirement about the amount of tomato each broker must collect. Being a broker depends largely on how much influence that person has inside the village.

In 2012, I signed contracts of over 2,000 mu with farmers. Since November of the previous year, I started to advertise and build connections all around. However, we had a rather bad year this year with weather, lots of rain and then outbreak of insects. In August, farmers sent their tomatoes to the Company for quality test, and their quality failed the preliminary test. However, some farmers insisted on plucking all the tomatoes and delivering them to the front gate of the Company's processing factory. The factory refused to open the gate for farmers, and farmers then poured all the tomatoes on the road in front of the factory. According to the nearby farmers, it smelled badly during those days. Later, the rotten tomatoes were eaten by a flock of sheep.

The Company did not send any one to explain about this thing to farmers. Farmers kept calling me, but there was nothing I could do. I wanted to turn off my mobile. But I was also feared to do so because they would accuse me of running away with money. So I didn't collect enough tomato to get my commission paid. I had a big loss, as I had spent a lot on advertising since previous November. The Company didn't reward me for doing anything.

Chapter V Agricultural Workers

It is hard to give an accurate definition for works in the agricultural industry. In small-scale agricultural production, intensive cultivation has been adopted to take in as many labors within the family as possible. But under today's circumstances that labors at home are becoming redundant, workers are only referred to those who work for processing companies, rather than those who plant.

As a huge amount of rural labors migrate out of rural China while the agricultural industry is transforming toward mass-production, there is an increasingly urgent demand for workers in field management and plucking. Workers in the supply chain of tomato products are those who are involved in planting and production. In some policy documents, workers involved in planting are referred as "professional farmers".

This chapter will first analyze the classification of workers in the supply chain of tomato products to reveal complicated labor relations in planting and production. It then goes to explain job duties of different types of workers, as well as their workload and working conditions. Lastly it will describe income status of workers.

5.1 Classification of workers

Based on different employers, workers can be classified as company-employed and farmer-employed.

The so-called company-employed workers are regular and temporary workers employed by companies. The former usually sign labor contracts with companies and work in positions that require certain levels of technical skills such as raw materials purchase, sales, quality control, etc. The latter are hired temporarily. Because of the seasonal characteristics of processing tomato, processing companies hire a large number of temporary workers between July and October every year to process tomato raw materials on production lines. In small-scale processing factories, apart from factory heads, most workers are temporary including quality control personnel who finish their work and are paid at the end of the grinding season. In processing companies that are relatively well-managed, temporary workers also sign labor contracts with the companies and are able to enjoy full social security.

Workers employed by companies are mostly very young between 20 and 40 in age and are mainly locals or from the same province. Besides, between every July and October when production lines start to operate, students from local or neighboring professional and technical schools also join to work in the factories as interns. Processing factories pay these workers with tiny wages but do not purchase social security for them. The social security can only enjoyed by the employees who has official labour contract, although they doing the same job.

Farmer-employed workers are informal labors hired by individual farmers. They are not protected by existing labor contract laws. These workers can be divided into long-term field management workers hired by large-scale farms and temporary plucking workers during the plucking seasons. The latter are mostly women in their 40s originally from traditional farming regions, such as Henan, Gansu, Shanxi, Sichuan Provinces, etc. They usually grow grains such as wheat and rice at home. After harvesting, they leave home to work as migrant labors. As seasonal labors they usually enter the commercial crops regions in the northwest in July to pluck tomato, pepper, cotton, etc., and return home in early November.

In recent years, a number of farmers of ethnic minorities from remote areas have also joined the migrant labor force. Because of language barriers, they are usually led by headmen who understand Mandarin. They work as a group in one place for temporary jobs, typically plucking. According to farmers in major tomato producing areas in Inner Mongolia and Ningxia, there are ethnic workers from Sichuan working in the production bases of a large tomato processing company.



Photo: Pluckers are resting outside the long-distance bus station in Changji City, Xinjiang. Originally from Henan, they just arrived in Urumqi after over 30 hours' train journey and are waiting for transferring bus to Changji. They are still waiting to hear from their organizer who looks for local farmers to employ them.

By SRI

Farmers from Changji Prefecture, Xinjiang

Pluckers are mainly elder people. For those who grow grains at home, they do not have much to do now (in August) after selling the grains. So they come here to make money by plucking. The longest working period is four months. Some people have even moved their entire family to here (Xinjiang) and live on short-term jobs.

Plucking is immediately cashed. Men who just arrived and have difficulties in finding work in factories can always start from plucking tomato and cotton. After they have made some money and are familiar with local conditions, they will end up in factories.

Long-term labors from Zhoukou, Henan

We are introduced by our fellow countrymen. Six and seven of us came together from Henan. In spring we work on weeding and seeding, in summer plucking tomato and autumn plucking cotton. We leave in the end of October. Every morning around 7 we wait at the labor market in front the village government compound for people who are looking for workers. We start to work immediately after we're transported to the farm and work for ten hours every day.

Farmers from Dengkou County, Inner Mongolia

These temporary workers are mostly from the area of Dingxi, Gansu Province. A sporadic number of migrant workers introduced by the local started first to work here and now the whole village is out here working. Having plucked tomato for and lived with local families, they are becoming familiar among local villagers. They usually confirm about the vacancies via mobile phones before leaving home. There are shuttle buses from Gansu to here which costs 30 Yuan. Places like Linhe and Dengkou all have direct shuttle buses to their hometowns. They work as seasonal labors since they have to go back to grow and harvest wheat. Apart from plucking tomato, they also help out growing wheat. The wage has been on the rise year after year. Right now it's 120 Yuan for ten hours and 100 Yuan for eight hours.

There're also workers from Sichuan who are short and look like just in 15 or 16. We don't understand their language, not like mandarin. They're usually brought by headmen who pay them 20 to 30 Yuan for each day and also provide them with meals and accommodation.

5.2 Job duties and working conditions

Jobs of workers in the tomato supply chain can be divided into field management, plucking, loading, production-line operation, cleaning, security, canteen, etc.

Field management involves several stages of planting such as weeding, applying fertilizer, pulling seedlings²⁰, irrigation, etc. Small-scale farms usually do not have to hire extra labors to work in the field. However, with the emergence of large-scale farms and processing companies who plant tomato on farmland rented from farmers, hired workers are a common phenomenon now.

In general, farmland is partitioned into pieces of "responsibility land" of same size. One labor manages one piece of "responsibility land". A relatively higher level of mechanization and well-maintained irrigation equipment has left only weeding as the most laborious work.

Plucking is done both by hand and machine. Workers usually live in a single room rented in the village. At around 6 o'clock in the morning, at a place where traffic is convenient, such as in front of the county government compound, they form a small labor market to wait for employers who will pick up labors. Plucking starts from 8 o'clock in the morning and lasts until 9 o'clock in the evening. Employers usually provide steamed buns and pickles as lunch. Workers eat their lunch in the field, and after a short break, they continue to work. Plucking season falls in the middle of summer when weather is burning hot and mosquitoes gather. So workers have to wear long trousers and long-sleeve shirts, headscarves and caps to avoid sunburn and mosquito bites.

20. Pulling tomato seedlings which do not grow well.



Photo: Hired labors are plucking cotton in the field, most of whom are middle-aged or senior women.
By SRI

Plucking machines are only used in production bases built by large-scale processing companies. In the farm where plucking is done by machinery, a unified ripening time of processing tomato and fixed distance between each tomato plants are required. Besides, because of the gasoline costs and the machine's recognition rate for qualified tomatoes needs to be enhanced, costs in mechanical plucking could be too high if planting does not reach certain scale.

After mechanical plucking, seasonal labors are needed to select by hand qualified tomatoes that fail to be selected by machines. Usually two seasonal labors are equipped to follow one machine. This work is not very well paid, so most labors are women from the village where the production base is located.



Photo: Labors are following the machine to pick qualified tomatoes that is missed by the machine.
By SRI

Loaders help farmers to load plucked tomatoes onto trucks. In places such as Inner Mongolia, since there is no special restriction on the load capacity for trucks, there is no need to pluck and transport dozens of tons of tomatoes one at a time. Hence, handling manpower is not very much needed. In Xinjiang, however, farmers themselves who are not able to load and unload dozens of tons of tomatoes have to thus hire loaders. Some loaders are men from local villages while most of them are middle-aged or older men working as long-time migrant labors in Xinjiang.

Production-line workers are plant workers. Since their job requires certain level of technical skills, most of them are formally employed. The rest are interns from professional schools.

Taking tomato paste for instance, its entire production process is controlled by machines while each technical procedure still needs human assistance. Production lines of different scales require different manpower. A line that produces 3700 tons of tomato paste on a daily basis requires at least one hundred workers.

The plant where evaporation and sterilization techniques are used during the final stages of tomato paste production remains in a relatively high temperature. According to workers, they can leave their lunchbox which are prepared beforehand inside the plant to keep its warmth.

Working hours for plant workers are normally eight hours. There are about two hour time difference between Xinjiang and inland. So they work between 9:30 – 13:30 in the morning and 16:00 – 20:00 in the afternoon. In busy seasons, work in shifts is needed. When there are enough labors, they work on three shifts, which are 2:00-10:00, 10:00-18:00, 18:00-2:00. If the factory is understaffed, they have to work on two shifts. Period involves shiftwork can last for 30 to 40 days.

Cleaners and canteen staff are usually local middle-aged and older women hired during production season to take care of cleaning the factories and providing meals for workers of the processing companies. Security guards are usually middle-aged and older men who are hired during non-production seasons by the processing companies to look after the plants, finished products, equipment, etc.

A male worker from Henan

I'm from Xihua County, Zhoukou, Henan Province and was introduced to here through my fellow countryman. There're about 20 to 30 people working here from my county, most of who are in their 40s and 50s. We come here every year in April and go back home in November. So we stay here for six months in total including 20 spare days. I don't have much land at home, so only one person is needed for farming. We are too old to compete with young men in their 20s and 30s to find work in the south and the area of the Yangtze River Delta. We can only come here. The economy is bad this year, so there's even not much money to make from working for construction sites.

5.3 Income status

Income of agricultural workers is associated with their job duties.

Farmers usually outsource the field management jobs which are labor-consuming such as weeding and pulling seedlings to seasonal labors. One person can pull seedlings for one mu each day and get paid for about 100 Yuan. Weeding is paid based on the amount of weeds cleaned up. Each mu of land needs to be weeded for three to four times and average price for weeding is around 150 Yuan for one mu.

Companies that rent farmland usually partition the land into several allotments and allocate one person to be in charge of each allotment. These people usually work at the companies' raw material department. Most of them have obtained education level higher than high school. They sign formal labor contracts with companies and are paid for about over 3000 Yuan on a monthly basis and are able to enjoy full social security.

People in charge of the allotments hire long-term or short-term temporary workers to manage the field. Short-term labors who work on weeding, spraying pesticide and picking tomatoes are paid on a daily basis for between 70 to 150 Yuan. Some companies outsource the entire field management work to contractors who contract tomato farmland of different scales depending on their capacity. They can gain 150 to 185 Yuan for each mu of land every year. In average, individual contractor rents 100 to 150 mu of land. Another way of paying them is a monthly salary around 1600 Yuan/month.

Due to shortage in labors, wages for workers and loaders are cleared on a daily basis, rarely in arrears. Wages for long-term employees can also be cleared once several days or on a weekly basis. In all those tomato producing areas, rates for plucking are calculated based on the numbers of sacks of tomatoes. Sacks used for packing tomatoes are ordinary urea bags. Each sack of tomatoes is 20 to 30 kilos in weight and worth 1.6 to 2.4 Yuan²¹. In average, individual worker can earn over 100 Yuan each day. Some hard-working female workers are able to earn more. Rate for loading is 4 cents/kilo. In Xinjiang, loaders can earn 1200 Yuan from loading one truck of tomatoes, around 30 tons in weight.

Major expenditure for seasonal labors is room rental which costs around 60 to 150 Yuan in average. They also need to pay for their own meals. They live in rooms rented from villagers. The cheapest type of accommodation is simple adobe room built inside the courtyard of the landlord. Each single room is between 10 to 15 m² in size and can accommodate at least two persons. A piece of wood laid on the ground is used as bed. There is almost no furniture in the room.

Although workers may complain about the hard conditions of their work, they are in general content as there is no delay with their wages and the amount is solely based on individual's own input.

21. Prices range differently in different areas.

A seasonal labor from Bohu County, Xinjiang

I'm from Bohu, very close to here. My sister has contracted land here and I'm mainly working on picking tomato missed by machine-selection. I've been here for 12 days and will be heading back home after finishing picking tomato. I have Naan for lunch and cook my own dinner after work. The wage here is 80 Yuan per day and paid upon completion of plucking. I've 15 mu of farmland at home and my son takes care of the planting. Temporary workers here are all paid after all the plucking is done. We usually arrive at 8 in the morning and leave sometimes at 9:30 in the evening, sometimes at 8:30.

Production-line workers hired by companies are paid on a monthly basis at around 2000 Yuan. Student interns receive monthly stipends around 1000 Yuan. During busy seasons, it is common to work overtime for several more hours every day. Companies rarely pay overtime wages according to labor laws, and workers get compensated in the form of cash bonuses sometime in the month. During off seasons such as between November and March, some well-managed processing companies still pay salaries to workers but without bonuses. Most companies only pay standard living allowances or simply terminate contracts with workers.

A temporary worker of a large tomato processing company

The companies have regular workers and temporary workers. I'm not really sure about the difference. I drive forklift and earn about 3000 Yuan each month. I've worked for 12 hours each day for one month and a half without any break. I haven't signed labor contract. The regular workers are deployed from branch factories of the company.

A regular worker of a large tomato processing company

This company owns processing plant and sugar plant. Their workshops are separated but workers can be deployed from one to another. When the sugar plant is not busy and the processing plant is busy, a group of workers will then be deployed to the processing plant. Since the wage is too low to retain workers, the plants are very much understaffed.

Work in the processing plant is easier than in the sugar plant. There are around forty days of shiftwork. When there are enough labors, we work on three shifts, and otherwise we have to work on two shifts. During off seasons in the old days, we were only paid with living allowances. Now it's better, as we're also paid with salaries. For the entire year, we can earn about 23,000 Yuan after deduction of social insurance and house fund. There're also bonuses during production seasons, a small sum paid every ten days, and a large sum of several hundred Yuan paid in cash each month. This can be regarded as some sort of overtime pay.

This company doesn't pay well but the welfare it offers is not bad. It gives out things like flour, oil and sugar on festivals and New Year. Accommodation in dormitory is free but we have to pay for water and electric bills.

Labors hired by the processing companies for cleaning, security and canteen jobs are mostly aged local women. Most of them work on temporary basis. Few well-managed companies may sign labor contracts with them. Cleaning and canteen workers are only hired during busy seasons. One cleaner works for 12 hours each day for around 40 days all together and gets paid for 1200 – 1500 Yuan each month. The work of security that guards the front door is not much affected by busy or off seasons and they are paid for over 1000 Yuan each month.



Photo: MR.L and his fellows care mostly is whether the rate of 150 Yuan/mu is worth the money. It is their first time to work in Xinjiang and they are not sure whether there are better working opportunities out there.

By SRI

Case: a temporary labor working in the company's production base

L is 20 year old, from Gansu. He contracted 150 mu of land in a production base of a large company and is responsible for the field management. He was introduced by friends from Gansu. Since this is his first time to work in Xinjiang, he is not clear about what to do and ended up without much thinking working in this company's production base. He is also not clear about what needs to be done to manage the field.

L's work includes everything from weeding to spraying fertilizer, plucking seedlings, irrigating, managing and plucking. Agricultural materials such as tomato seeds, mulch, fertilizer and pesticide are provided all together by the company. Besides, the company sends its regular employees who are responsible for raw materials to supervise and advise his work. Agricultural technicians of the company also come to provide technical support.

Tomatoes grown in the production base are plucked by machines. Labors are also needed to follow the machines and pick tomatoes missed by the machines. During plucking season, L needs to work from 8 am until 9 pm.

According to L, the company just started to allow individuals to contract land from its production base. In the past, he worked as short-term labor and was paid on a daily basis. Now he is paid for 150 Yuan for each mu of land. He is not sure whether this sum covers the costs. He has to wait until plucking is finished around November to get paid. L stays in a rented place in a neighboring village which is paid by the company. He needs to pay for his meals.

Case: a regular employee of a processing company

26 year old W is from Qinghai, a regular employee of one tomato processing company in Xinjiang. After graduating from college in 2009, he signed a three-year labor contract with this company. His wife is his college classmate from the local. They got married this year and settled in the city 40 kilometers away from the company.

There are 150 regular employees in the company, over 50 in the department of raw materials where W works, about 10 in charge of 5000 mu of company's production base, and over 30 in charge of purchasing raw materials from elsewhere. The rest are management personnel and technicians, etc. Every year starting from the grinding season, the company hires a batch of temporary seasonal labors to work between the beginning of August and the end of September. They are around 100 people, most of whom are locals.

Each one is responsible for purchasing raw materials from one area. Every year at the beginning of the spring, they sign contracts with village heads and the villages then arrange raw materials all together. The company sets up the production plan based on the market and adjust contracts accordingly. Each staff in the department of raw materials is responsible for certain amount of contracts. Since there are no brokers in this county, the company deals with farmers directly and sign contracts with them individually. The numbers of contracts signed is a lot less comparing with last few years because of sluggish market conditions.

W is responsible for raw materials produced by the company itself, managing everything from planting to plucking of a 500 mu of land. The land of production base has been rented from neighboring farmers on a three-year lease contract. In order to stay closer to work, W stays in a house close to the tomato farmland rented from a farmer. Rental is paid by the company. The company also hires a group of temporary labors for work in the field. W is responsible for managing and supervising the temporary labors. In the production base, tomatoes are plucked by machines, but labors are also hired to pick tomatoes missed by the plucking machines. During plucking season, he has to keep a close watch in the field. When the supply of raw materials is sufficient, he is able to leave work earlier. Otherwise, he has to work overtime.

W gets paid with monthly salary for 4000 Yuan and receives a bit over 3000 Yuan after deducting the social insurance. The company also provides accommodation and meals, plus living allowances and bonuses for grinding season. After the grinding season, there is not much to do apart from some occasional meetings and making preparations to receive inspectors from the head office. Most employees do not work then and are thus not paid with any bonuses. Their monthly salary between December and January is 1000 Yuan less. During this period, W stays at home and only goes to the company when needed.

According to W, employees of the raw materials department are more likely to rise to the management level compared with employees of other departments. Meanwhile, his work has gone smoothly, not being much troubled. Normally employees work on sideline jobs such as planting their own land, or using a tractor to get some work. He has not done so yet, and has only worked for the production base.

Chapter VI Transport Drivers

Transport drivers are responsible for and charge fees from delivering tomato produced by farmers to processing factories. Since all the tomato processing companies do not set up storage system for raw materials, farmers have to rely on effective means of transport so that tomatoes right after being plucked can be delivered to processing companies for mass production in time. In those large-scale planting areas, small-scale transport vehicles owned by farmers have only limited transport capacity. At the same time, government in some places set restrictions on using small-scale vehicles for tomato delivery. Transport drivers therefore have developed into an independent part of the tomato supply chain.

In the harvest season of 2011, output volume of processing tomato in China reached 6.79 million tons. If we use medium-size tractor that can carry 20 tons, 380,000 times of delivery would be needed. In Yanqi County, Xinjiang, the entire county had 39,500 mu of tomato farmland generating an output volume of 88,500 tons. Even though the output volume decreased for 73.6% compared with the previous years, the county still deployed 320 drivers to participate in the delivery. Each driver delivered more than 270 tons of tomatoes in average.

This chapter is to introduce where drivers are from, their job duties and income status. In the end, a narration about the work and life of a transport driver in a day will be used to illustrate the roles and functions of transport drivers in the supply chain of tomato products.

6.1 Where are drivers from?

Tomato transport drivers are predominantly male. Compared with labors who plant tomato, drivers are younger between 20 to 45 years old. Some of them are hired by local trading companies to drive large trucks. Some are “self-employed transport drivers” who are mostly local farmers. They bought high-powered tractors and provide various transportation and agricultural mechanical services to companies and farmers. For instance, a tractor loaded with plough in the back can help farmers plough and plow the farmland.



Photo: A motorcade including cargo trucks and vehicles towed by tractor head is waiting to sell tomatoes.

Source: Internet-Yaxin Community



Photo: A variety of agricultural machinery can be loaded onto tractor head to do work such as ploughing, seeding, harvesting, etc.
By SRI

Therefore, “self-employed transport drivers” have been actually providing a variety of mechanical services throughout the planting process instead of simply delivering agricultural produce. Apart from transporting tomato between companies and farmland, they are involved in any kind of profitable transport business. They usually do not own much land at home or they may have leased all the land to companies. Thus they are able to free themselves from daily agricultural work. Furthermore, the government has been providing subsidies for purchasing agricultural machinery. For instance, the market price of tractor model JD650, a type commonly seen in Xinjiang, is 74,000 Yuan, and the central and provincial governments subsidize altogether 30,000 Yuan, which immediately reduces purchasing costs for farmers.

Drivers employed by trading companies consists both local and migrant workers. Companies arrange work for them. In general, trading companies provide a variety of transport services instead of just delivering agricultural produce such as tomato.

6.2 Job duties

In simple terms, transportation of tomato is about delivering tomatoes from farms or corporate production bases to tomato production lines in processing factories. The workflow can be subdivided into the following steps.

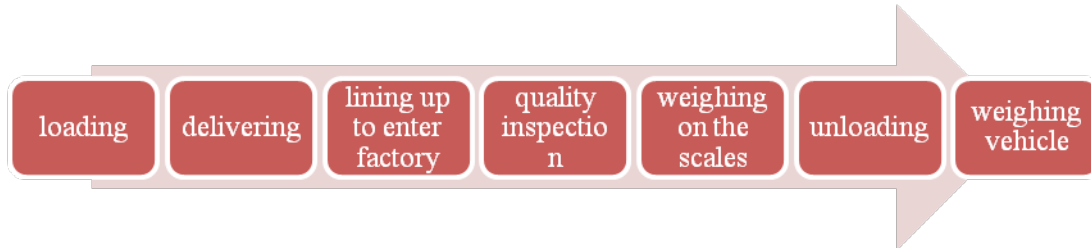


Figure 6.1 Workflow of tomato transportation
Made by SRI

Processing factories are normally located in major tomato producing areas. If everything goes smoothly, it takes only about 60 minutes to deliver and process tomatoes to initial tomato products such as tomato paste. However most of the time, it takes hours and even more than 10 hours for vehicles to line up and just get into factories. The main reason is that most processing companies do not set up storage facilities and process raw materials in a real-time manner. They therefore use transport trucks as storage, taking in raw materials only after finishing processing the previous batch. When machine failure or a good harvest occur, drivers may even have to wait at least over 10 hours to deliver one truck of tomatoes.

Although processing companies require that tomatoes should be unloaded within 24 hours after being plucked, in harvest seasons such as in 2010 and 2011, such requirement is simply not possible to be fulfilled. Tomatoes decompose and perish soon, which affects the quality of tomato paste. Besides, bad tomatoes will be deducted as impurity by the inspector, which affects drivers' earnings directly.



Photo: Trucks with tomatoes are lining up, waiting for selling.
By SRI

While production lines keep taking in raw materials, vehicles that are lining up move forward every once in a while. Drivers have to estimate the interval time to have meals and get rest. They usually have meals in the nearby diners. During rush time, there are vendors selling lunch box on the spot. In Northwest China, temperature difference between day and night can be large. During the day when it is hot, drivers are not able to rest inside the cab but to find a cool place nearby and nap on the ground, or gather together chatting and playing pokers to kill time. At night when it is cold, they sleep with their quilt and frock on the driver's seat inside the truck cab.



Photo: A driver is taking a nap on the ground at noon.

By SRI



Photo: A quilt for keeping warm at night is stuffed in the back of driver's seat.

By SRI

6.3 Income status

Drivers employed either by trading companies or themselves deliver tomatoes only between August and October – the season of plucking and processing tomatoes every year. Their wages can be affected by the supply and demand relation of the tomato market in that year. But since arrears rarely happen, they can secure a basic level of income. They therefore have a relatively stable source of income compared with other labor groups in the supply chain of tomato products.

Wages from tomato delivery are directly linked to the times of delivery. Ordinary truck has a load capacity of 20 to 35 tons. Processing company deducts the impurity and calculates transport wages based on the tonnage of tomatoes that are examined and accepted in the end. As the rate of each delivery is fixed, the more deliveries drivers can complete, the more they earn. Delivery work is both physically challenging and highly risky.

Taking regional differences into account, rate of delivering tomato ranges from 20 to 30 Yuan/ton in average. In some extreme cases, the rate can reach 60 Yuan/ton when there is a good harvest with tomatoes being intensively ripe, processing companies have limited capacity to take in raw materials or the transport market has limited transport capacity. In the peak time of demand, some drivers can receive phone calls requesting delivery from about 20 to 30 farmers in a day. Delivery process can become painful as drivers need to spend more time lining up to have tomatoes examined and accepted by the processing companies. Consequently the rate for each delivery will increase. Some drivers may even require farmers to pay for their meals or extra “thank-you” awards at about 100 for each delivery.

Expenditure of drivers includes their daily meals, gasoline, taxes and maintenance for vehicles. Followed is the expenditure structure of a typical self-employed driver from Yanqi County, Xinjiang.

Income (Yuan)	Expenditure (Yuan)		Net Income (Yuan)
520 Note: for each truck that can load 20 tons, the rate is 26 Yuan/ton.	Three meals	30	345
	Refueling	70	
	Taxes	25	
	Miscellaneous deductions (gross tonnage * 10% freight charges)	52	

Supposing at least the driver can at least deliver one truck of tomatoes, his net income is 345 Yuan, without vehicle maintenance costs. It takes normally 2 days, 4 days the longest to deliver one truck of tomatoes. So, for a 40 day tomato production season, one driver can earn a net income of almost 7000 Yuan by delivering tomatoes.

Case: A day of a “self-employed transport driver”

The 37 year old Mr. Hu has four family members. His wife stays at home to take of their own farmland. His older daughter is 12, attending the 6th grade and younger son 6, attending the 1st year.

Mr. Hu left home to work as driver at 17, starting from driving hand tractor to more updated vehicles. In 2009, Mr. Hu spent 137,000 Yuan including loans and 30,000 Yuan of government subsidies for agricultural machinery on a high-power tractor.

In order to join the tomato transport business, Mr. Hu who already has several years of driving experience obtained the driving license required by relevant regulations and the police inspection²². When we met Mr. Hu, he told us that he had been outside working for over 20 days and delivered 17 times without any break. If he continued to work through day and night, he would be able to earn around 50,000 Yuan.

• 3:00 Lining up to load tomatoes in the tomato farm

At 3 o'clock in the morning, Mr. Hu drives to the tomato farm about 6 kilometers away from the county and lines up to load tomatoes. This farm has about 5,000 mu, belonging to a large-scale tomato processing company as its own production base which employs mechanical plucking. Trucks line up according to the sequence of their arrival. As trucks keep moving, Mr. Hu is not able go back home to rest but can only wait on the spot or take rest inside the truck cab during the night.

• 8:30 Plucking machines start to operate in the tomato farm

Around 8:30 A.M., plucking machines started to operate. While two plucking machines are working at the same time, about 6 and 7 drivers start to load. For how long plucking machines will operate is not fixed but depends on how much raw materials the processing company will consume for the day. Mr. Hu has to be on standby in the tomato farm, as he may have his turn anytime.

• 13:40 Starting to load in the tomato farm

The sun is burning in the mid of the day and the weather hot and dry. Drivers in waiting all have found some places to take a rest or have a chat while keeping their eyes closely on the progress of plucking machines. As there are several machines on operation today, drivers are all looking for any chance to load as fast as possible, although orders are kept according to the sequence of arrival. One plucking has just finished loading and drivers are called to catch up. Mr. Hu drives his truck over there but he is stopped by the field manager to ask him to wait in order. Mr. Hu drives his empty truck between several plucking machines for few times but in vain.

At that time, one field manager from another tomato field calls asking for one driver to load over there. The driver who is asked to go there refuses to do so, claiming that he was once refused of loading after being sent to another field. So instead of wasting time, he would rather stay put.

At 1:40 in the afternoon, Mr. Hu finally has his turn to load. During that time, drivers gather together and have some Naans as their lunch.

• 14:30 Finishing loading and leaving

In an hour, Mr. Hu finishes loading his truck with tomatoes. Field manager and Mr. Hu verify the transport sheets. The sheets state in details the serial number of the tomato field, the breed of tomato, the serial number of vehicle and its time of departure which will be used as proof for entering the factory and quality inspection.

22. The drivers must have diver licenses, driving licenses and transportation contract.

- **15:00 Lining up at the place where tomatoes are sold at the tomato factory**

It takes about half an hour for Mr. Hu to drive from the tomato field to the processing company. He skips the quality inspection as required and drives his truck directly into the factory at where the tomatoes are sold. At that time, there are about 35 vehicles waiting at the selling office and some four to five vehicles are lining up outside the quality inspection booth. He tells us there is no need to line up. But then an inspector comes over to Mr. Hu and says, "You can't do this every time. You have to go through the quality inspection first." Mr. Hu asks him to make an exception with a smile. The inspector does not respond. Mr. Hu then follows the inspector into the quality inspection booth and walks out with a quality inspection certificate shortly after. The tomatoes on his truck do not go through the inspection procedure.

As a matter of fact, the inspection machine is not turned on while vehicles with tomatoes are going through the quality inspection booth and there is no sample-taking as well. But everyone obtains a certificate in the end. Mr. Hu says the rate of impurity deduction and ranking are randomly chosen. Before him, the impurity rate was set as 8.4% and 10% starting from him.

- **17:20 Weighing on the scales at the tomato factory**

Lining-up has been fast today. In over two hours, Mr. Hu has his turn to weigh the truck on the scales. After handing in the selling and quality inspection sheets, Mr. Hu receives a list with the amount of weight on it – 32.4 tons. Mr. Hu says happily, "two more tons at least." What happened was that when his truck was going through the scales, the truck after him moved forward and placed the front wheels on the scales to help his truck gain some weight. Mr. Hu says those in charge of weighing are interns from schools elsewhere. "These kids just sit inside the booth and don't go out to check that. They don't have much experience."

- **17:50 Finishing unloading at the tomato factory**

After weighing on the scales, the truck drives to the nearby cleaning pool to unload tomatoes. Tomatoes plucked by machines carry some mud and need to be washed before being delivered to the production line on a long conveyor belt. Mud washed from tomatoes remains in the cleaning pool. Unloading takes another half an hour.

- **17:54 Truck weighing on the scales at the tomato factory**

The vehicle has to be weighed on the scales after finishing handing in tomatoes. Weight of the vehicle and the impurity of tomatoes will be deducted from the amount of weight measured at the beginning when the vehicle enters the factory to have the net weight. Rate for delivering tomatoes for corporate production base is fixed at 26 Yuan/ton. Mr. Hu receives a sheet of settlement from the selling office. Drivers will use this sheet to close wages of this season with the company. At this time, it has been 15 hours since Mr. Hu drove his truck to the farm to line up. "It's an easy one this time," says Mr. Hu.



Photo: A plucking machine is working and a transport vehicle is following it to collect tomatoes
By SRI



Photo: Because of the hot weather and there is not shelter in the farm, drivers who are waiting for loading usually rest against the truck wheel in the shadow.
By SRI

Chapter VII China's Processing Enterprise

In the supply chain of tomato products, the main role that Chinese companies play is to be contracted to provide half-made and barreled tomato paste for international brands. The two biggest production companies of tomato paste in the world are COFCO Tunhe under the COFCO Group Corporation and Xinjiang ChalkiS Tomato Industrial Company whose gross production quantity maintains around 0.3 million tons annually, taking part 90% of China's export share.

This chapter introduces firstly the processing industry of China's tomato products, and then the characteristics of two biggest tomato producers, the "COFCO model" emphasizing upstream and the "ChalkiS model" downstream.

7.1 General Status of Tomato Processing Business

The growth of tomato processing companies in numbers in China was the result of thrive of international tomato paste market in 2007 -2008. Statistics indicate that the number of Chinese tomato companies was only 68 in 2008, then reaching 100 in 2009, 112 in 2010 and 116 in 2011²³. Without a domestic consumption market to rely on, these processing companies who lack the bargaining power to confront international buyers have to therefore gain market share through low-price strategy.

At present, China's processing companies of tomato products are distributed mainly in the following three areas, representing different forms (indicated in Fig 7.1).

The red color – production bases of tomato products in the Southwest region represented by Xinjiang Province producing tin-canned tomato paste weighing over 198g; The representing companies are COFCO Tunhe and ChalkiS Tomato.

The green color – production bases of tomato products in the Southeast coastal area represented by Guangdong Province distributing mainly in Shanghai, Guangdong (Canton) and Dongguan; The representing company is Lee Kum Kee of Guangdong.

The yellow color – production bases of small-packaged tomato products in the Bohai Sea Rim represented by Tianjin; The representing companies include Limin Group of Tianjin, etc.

23. Source: Finance Channel of Sina.com.

URL: <http://finance.sina.com.cn/nongye/nygszx/20121017/012913387682.shtml>, Oct. 17, 2012

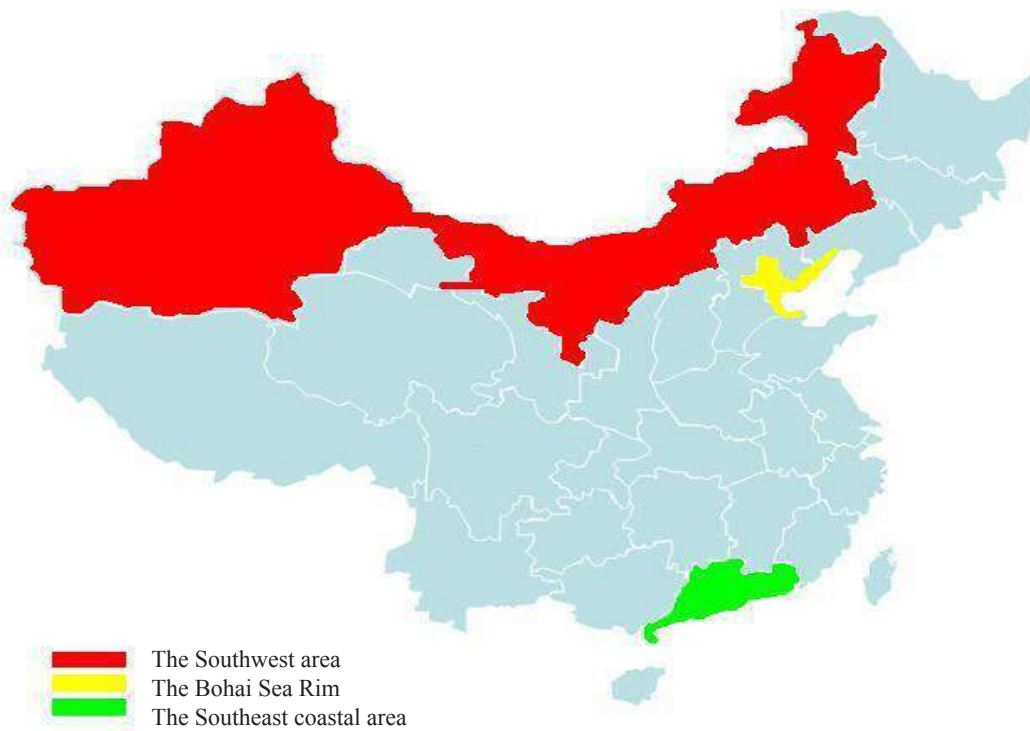


Figure 7.1 Geographic distributions of tomato processing companies
Made by SRI

In short, the Chinese tomato processing business supplies raw materials for the international tomato paste market but they do not generally own brands. In the domestic market, ketchup and small-sized sauce are available in small quantity. They exist either as products sold to customers directly from retail supermarkets or various small-sized products supplied to western-styled restaurants. Those companies that own their own registered brands mainly buy barreled tomato paste in wholesale from production companies and sell the ketchup after sub-packaging and re-labeling it in target market places.

7.2 The COFCO Model

COFCO Tunhe is a sub-company of the COFCO Group. COFCO have mainly four business areas – tomato processing and trade, sugar-making and trade, fruit processing and trade, agricultural planting. Basing its headquarter in Urumqi, COFCO owns 23 tomato processing factories, 9 beetroot processing factories, one sugarcane processing factory, 5 fruit processing factories and 4 agricultural planting companies, employing more than 6000 staff and generating a revenue of 3 billion RMB in 2009. Up to June of 2010, sales volume of tomato products of COFCO Tunhe takes up 55% of its total revenue and 50% of its profits.

In 2009, the COFCO Group came up with a whole industrial chain production model, running its quality management and control throughout the whole industry chain from planting to production and processing, terminal sale.

Starting from 2008, COFCO Tunhe has obtained the right to operate of over 0.4 million mu of arable land through land rental in places such as Xinjiang, Inner Mongolia, Ningxia, etc. Length of the contract is at least 3 years. About 0.1 million people would have to leave agriculture as a consequence of land rental, based on the calculation that average arable land per labor in agriculture is 4 mu in China.

Based on our field research and analysis on open information COFCO publicized, the supply chain model of COFCO Tunhe can be subdivided into four levels as shown in the graph below. The red arrow and square indicate respectively transportation means deployed from land to processing factory and major players of transportation providers in the market.

In the tomato supply chain of COFCO Tunhe, raw materials are obtained through orders signed with farmers and self-owned bases. The proportion supplied by the two

is 2:1 and is very likely to achieve 1:1 in the coming 2 to 3 years according to COFCO's development plan.

In the link of raw material production, tomatoes produced by farmers and bases are supplied to different types of customers. Tomatoes produced by corporate

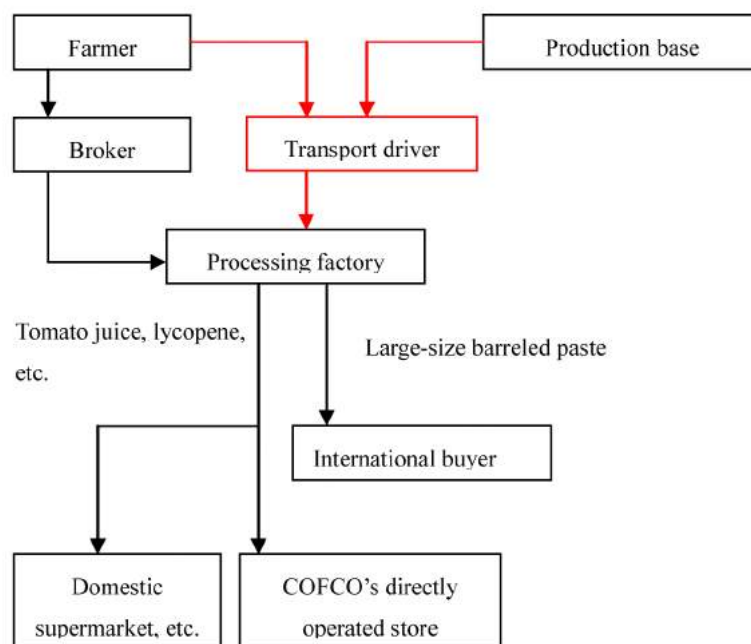


Figure 7.2 COFCO's supply chain model

production bases are used as raw paste for initial processing for renowned multinational corporations such as Heinz, Unilever, Nestle, Kraft, etc. A "working station – district" model of management is adopted by the production bases where each district is assigned with a COFCO staff member to monitor and manage. Field work is outsourced in different forms to migrant labors or local farmers.

Self-built bases usually adopt drip irrigation as means of planting. Seeds and pesticides' list are approved by clients. Average yield per mu remains at around 7 tons. During harvest season, mechanical plucking is adopted along with labor picking. That is, plucking machine and transport vehicle work on the first-round of plucking, followed by collecting tomatoes by hand to enhance the identification rate during the second-round mechanic plucking.

Tomatoes sold by farmers are purchased by brokers who sign pre-order contract with farmers before planting so that the tonnage to deal during harvest season is fixed. During the time of selling, COFCO Tunhe will estimate level of maturity of tomatoes and processing capacity of its production lines, and then issue purchase sheet to farmers through brokers. One sheet is allowed for a cartful of tomatoes. COFCO Tunhe usually pays brokers after November. After that, brokers will pay individual farmers according to contract.

COFCO Tunhe insists a traditional "made in China" way to provide non-branded large barreled paste for buyers. 95% of its tomato paste is produced for export, among which almost 50% is produced for big clients such as Heinz, Unilever, etc. After being sub-packaged, the large-barreled tomato paste is available with brands such as Heinz, Knorr, etc. at major end consumption places in and outside China. Tunhe has developed its own deep processing tomato products, such as tomato juice to sell at domestic supermarkets or COFCO's own stores.



Photo: A machine is plucking tomatoes during the last few days of the harvest season at a production base of COFCO Tunhe in Yanqi County, Xinjiang (Sep 2012).

By SRI

7.3 The ChalkiS Model

ChalkiS Tomato is actually controlled by the Xinjiang Production and Construction Corp²⁴ who holds about 31% of the company share. The company's accumulative investment in the tomato industry has reached as much as more than 3 billion RMB. It has established 0.5m mu of order-based tomato planting bases in Xinjiang, Inner Mongolia, Gansu, Tianjin, etc., and 20 tomato paste processing factories (15 in Xinjiang, 4 in Inner Mongolia, and one in Gansu), 4 end terminal tomato products factories (3 in Tianjin, 1 in France), and one supporting barrel-making factory.

Currently 98.3% of the tomato products of ChalkiS Tomato are produced for export, mainly to

Europe, North America and Asia. Its large-sized tomato paste has taken up 20% of the share of the European market, and small-sized tomato paste 45% of Africa's market share.

The distinctions of the ChalkiS model are firstly its raw material suppliers. Secondly it has developed its own brand in the downstream of the supply chain, hence operating in both domestic and international end markets.

During the tomato planting link, ChalkiS Tomato has established a relatively stable

source of raw materials. One of its biggest shareholders is the biggest state-owned agricultural production enterprise – the Xinjiang Production and Construction Corp which provides around 80% of the raw materials to ChalkiS. Under the same price, every production unit of the Corp prioritizes its raw material supply to ChalkiS. Therefore cost in planting raw materials and dealing with individual farmers can be effectively reduced and controlled. Its model of supply

chain is shown in the fig 7.3.

The Xinjiang Production and Construction Corp can be found all over the Autonomous region in every agricultural planting district which is equipped with complete farmland infrastructure, drip irrigation, with an

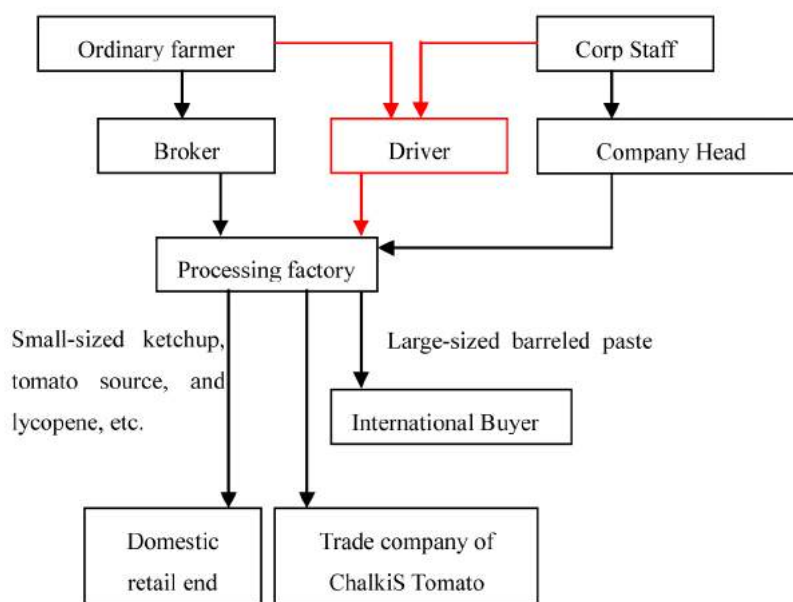


Figure 7.3 Supply chain model of ChalkiS Tomato
Designed by SRI

average yield per mu of 5.5 tons tomatoes²⁵. As a collective production unit, its annual production target is agreed by the heads of each regiment and farm, and then assigned through administrative means to each company. Therefore, the upstream growers of ChalkiS Tomato are a highly organizational production unit instead of a number of scattered farm households.

Local tomato growers are usually organized by each of their village party head who works as broker for ChalkiS Tomato. The specific jobs of the broker are not that different from broker in the COFCO model.

24. The Xinjiang Production and Construction Corp is a special party – political – military – corporate organization under the State Council.

25. Average yield of individual farmer is 3.69 tons in comparison.



Photo: A tomato processing factory of ChalkiS Tomato located in the Corp.
By SRI

Different from the COFCO model which emphasizes upstream raw material production, the ChalkiS model emphasizes on developing the downstream markets of ketchup and deep processing products such as tomato seed oil. It establishes its own brand – ChalkiS, and expands its selling network through joint venture or merger with enterprises in the target markets, including,

Time	Location	Event
Year 2004	France	Acquired 55% of the shares of the French food company Provencal Food
Year 2006	U.S	Joint venture with Hunts, an American company and established HuntsChalkiS Co.
Year 2010	China	Yihai Kerry, a Singaporean food company became ChalkiS' shareholding company, acquiring certain shares through cash offers

Table 7.1 Joint venture and acquisition events over the years

Made by SRI

Taking advantage of brands and selling networks of the French Provencal Food and American Hunts, 90% of the tomato products of ChalkiS Tomato are exported to Europe, Africa, Southeast Asia, etc. Cooperation with international food company Yihai Kerry has also made ChalkiS Tomato possible to take advantage of its established domestic small-sized grain and oil products distribution channels

7.4 Sustainable Development Risks

Tomato industry will face some uncertain risks caused by change of European and American economic status. Besides that, there exist social-ecological risks which include:

- **Low efficiency of agricultural productivity caused by enclosure.**

Large-sized processing companies usually need to face thousands of supplying farmers; considering the request of international purchasers on quality traceability system, agriculture food enterprises represented by COFCO (China Oil and Food Import and Export Corporation) utilize a management model covering the whole supply chain: renting farmlands from farmers to plant crops themselves and hiring workforces to monitor daily routine work. The defect of this model is that, farm products with high dependency on overseas market could be easily affected by international market demand; when market price drops below expected, companies will downsize processing workload to cut the cost. Although processing companies could avoid risks by signing short-term contracts of 3-5 years, to decrease the yield of lands when international purchasing price has been low for the past few years, they also would manage their farmland in a relaxing way: they either re-contract their rented farmlands, or they just abandon them. Some leading companies rent a land totaling 0.2m mu (or 13,400 hectares) in one single place; low-efficiency utilization of farmland could pose a threat to domestic food security.

Due to difficulty in quantizing agricultural work and accordingly lacking in incentive methods to enhance work quality and efficiency, transformation to full mechanic operation would be needed to reduce the ever increasing labor costs. However, the production of some produces, commercial crops such as tomato and tea, cannot be largely replaced by machine. Hence costs spent on managing agricultural labors are not a bit less than purchasing raw materials directly from those “credit-lacking” farmers.



Photo: Since 2008, COFCO Tunhe Huinong Tomato Product Co., Ltd has rented lands from farmers of Huinong District of Shizuishan county, Ningxia for tomato plantation. According to interviewed farmers, COFCO Tunhe stopped planting tomato from 2011 and subleased the rented land. Weeds have grown on some of the farmlands. The photographed land is part of lands farmers leased to COFCO Tunhe. There is a land with a large area of weeds right after the “Boundary Marker of Fundamental Farmland Protection”.

By SRI

• Food safety

As a matter of fact, it is not just the export market that has set up strict requirements on the inspection of bacterial colony that is worrying. Regulatory gaps also exist in a growing domestic market of ketchup consumption, along with rapid development of western-styled restaurants and a growing number of expats living in China. Ketchup that has failed quality control for export purpose or been held in stock enters domestic consumption channels after being repackaged.

A worker from a processing company in Xinjiang

The ketchup piled on the open space was produced in August 2011. Once the dirty upper layer is removed and the underneath ketchup goes through high-temperature processing, it will be sold in domestic market. It is impossible to export such ketchup as foreigners have strict requirements on color and bacteria.



Photo: These tomato paste are labeled as being produced in August, 2011 and the photo was taken in September, 2012.
By SRI

• Pollutant Disposal

Major pollutants generated from tomato processing production belong to two categories. One is solid waste, including raw and rot tomatoes sorted out and tomato peel and seeds separated during production. The other category is industrial waste water, including water used for conveying raw materials, waste water generated during cleaning processes to eliminate impurities and stains of raw materials, cleaning water generated from regular (weekly) chemical cleaning for pipes and equipment (vessels). Raw materials conveying water and cleaning waste water make up over 90% of total amount of wastewater.²⁶

If it can be guaranteed that pesticides used during tomato planting meet up the standard, waste water generated from processing procedures can be classified as nontoxic or low toxic and acid organic waste water. But if waste water is discharged directly, it will pose huge impact on local water environment.

As solid waste and waste water are mixed, they need to be separated before classified processing. However, there are only few tomato paste factories that have invested in building specialized facilities to process wastes. Most processing factories rely on labors to conduct solid and water waste separation and discharge waste water directly. As shown below, workers in a waste pool shovel rot tomatoes and sludge together for later processing. Waste water is discharged directly from the water pool which goes through drainage pipe to somewhere outside the factory. There are some processing factories that adopt open-air cement trench to dispose waste water which emits acidic odor. Excessive disposal can cause waste water flooding into the neighboring arable land which affects the growth of crops.



Photo: Waste water generated from the processing step is being separated from solid waste in a processing pool.
By SRI

26. Qinqin Han, Yuehui Yang, Fengqing Jiang. Tentative analysis on process and use of waste water produced from ketchup companies in Xinjiang. *Arid environment monitor*, Volume 20, Issue 2. June, 2006.



Photo: Waste water disposal pipeline built by a tomato processing factory.
By SRI



Photo: Waste water and few rot tomatoes in a man-dug hole near a processing factory.
By SRI

• Order-based Farm Model to be transformed

During the crop planting stage which is dominated by processing, different transaction models between farmers and processing factories, either random trading pattern which is flexible or contract farming which has been welcomed over the years, have little impacts on building trustworthy, sustainable and stable supply and selling relationship between farmers and production companies.

What is the function of purchase order?

Source: a farmer from Changji City, Xinjiang

I planted 30 mu of tomatoes which was sold at 0.38 Yuan/kg. I was the second one who sold tomatoes in my Corp. I was able to do so because I started early enough. But the factory deducted off a very high rate of impurities, about 20 percent, claiming that our tomatoes had impurities and were not red enough. How is that possible? Our tomatoes are all hand-picked, much cleaner than those picked by machines, without any pebble or dust. Impurity rate deducted from tomatoes picked by machine is just few percent. When it turns to farmers, the deduction rate is just high!

It is agreed in the contract signed with companies that tomatoes will be received within 24 hours of them being picked up. The reality is not like that. We lined up for 2 and 3 days to deliver tomatoes. I was able to deliver all my tomatoes. But many people in my Corp delivered only a crop of tomatoes, because labor rate increased to 3 Yuan each bag (25 kg) when they wanted to pick the second crop and the tomato purchasing price was just a little bit more than 0.4 Yuan/kg. It was not profitable so that people just left tomatoes to rot in the field.

Some people in my village who signed contracts

with a ketchup factory in Dongtan Village were not even able to deliver first crop because the company (a Hong Kong owned enterprise) broke the contract. The factory offered a high purchasing price when it signed contract with farmers. At that time the plant was not built but the company claimed the plant would be built by the time when tomatoes are picked. Many therefore signed contracts with the company. But the plant was not finished until tomatoes were picked. I don't know if it was because of not having enough capital or the equipment was not ready. So they could not receive tomatoes.

There were thousands mu of tomatoes planted in our Dongtan Village last year and we couldn't just see loss happen like that. Everyone owns over dozens or even hundred mu of land. In the end some villagers indict the company to the Changji municipal government. What is the role that the village committee plays? They would stop people from filing lawsuit and send police to intercept. But how could the village stop that? The municipal government came to mediate and settled the compensation at 1200 Yuan/Mu.



Photo: The Hong Kong-owned company signed purchase orders with farmers in 2011 when their plant was not yet built which was not finished even until September 2012.
By SRI

Since the contract has no actual constraining force on both sides, the role of the contract is to help the companies to know the size of sowing area so as to be able to predict the output of the current year. Contract farming can play certain role when the supplier management costs can be largely reduced for companies. This can happen when farming reaches to certain scale by farmers and the purchase from processing companies is also reasonable. Some companies might prepay a certain amount of production funds during planting season to stabilize partnership with supplier farmers.

During current stage when the trend of centralizing land is accelerating, we conclude that the mode of self-build production bases do not fit agricultural products that are highly labor consuming. In the end, a production mode with large-scale farmers who operate on their own and maintain a stable order relationship with processing factories will dominate the market in the future.

Chapter VIII International Brand Owners

China has plenty of tomato paste suppliers, however, considering food safety, big multinational brands often select medium- or large-sized supplier to sign supplying contracts.

This chapter is to introduce two top brand owners who purchase a large quantity of tomato products in China, Heinz and Unilever. Tomato paste purchasing behaviors will be then used as examples to analyze impacts of multi-national corporations on Chinese farmers and local enterprises. As a western proverb puts it, one coin has two sides. On one hand, multinational corporations have a strict food safety regulatory system that is worthy of reference for Chinese local enterprises. On the other hand, if aggressive buyers cannot respond effectively to cost pressure of suppliers or even shift their costs, it is unlikely for the China's OEM that cannot profit and the upstream Chinese farmers that cannot make a living to form the basis of a sustainable tomato products supply chain. This principle applies to other produces supply chain.

8.1 Ketchup Tycoons

As to the two tycoons of China's tomato products business, ChalkiS have decided to establish its own brand while COFCO Tunhe posits itself as raw materials supplier for high-end brands, among almost half of whose purchase orders are from renowned international brands such as Heinz, Unilever, Nestle, Kraft, Japan's Kagome, etc.

China supplies raw materials of high quality and low price to European and American markets thanks to suitable weather and soil conditions in Northwest China, and cheap labor and land costs. These brand owners do not invest in the Chinese consumers which is a huge population to accept ketchup. Nevertheless, through supplying small-size packaged ketchup to western-styled fast food chain restaurants such as KFC, McDonald's and Pizza Hut operated in Chinese cities, these brand owners have gradually affect the eating habits of young Chinese.

Heinz's Heinz Ketchup and Unilever's Knorr Ketchup occupy a leading position in the international ketchup market. Heinz Ketchup, in particular, is almost the equivalence to ketchup in the U.S where the company's headquarter is.

Introduction: Heinz Ketchup

H.J. Heinz, headquartered in Pittsburgh, Pennsylvania, is one of the biggest food kingdoms today. Heinz owns over 150 brands, mainly of two categories, condiments (ketchup, seasonings and various sauces), and meals and fast food (frozen food, baby food, appetizers, soup and spaghetti). Among them, annual sales volume of the Heinz Ketchup reaches 650 million jars. Small-size packaged ketchup and other condiments produced by Heinz reach more than 11 billion packets, equivalent to two packets per person all over the world.²⁷

27. Heinz China official website <http://www.heinz.com.cn>.

Introduction: Unilever's Knorr Ketchup

The Unilever Group was established in 1929 after the merger between the Dutch margarine company Margrine Unie and the British soap company Lever Brothers. Its headquarters in Rotterdam, the Netherlands and London, UK are responsible for business in food and detergent products respectively. Having business networks in 75 countries all over the world, 500 sub-companies and almost 0.3 million staff, it is the second largest producers of consumers' goods and one of the most profitable companies around the world, generating an annual revenue of over 40 billion U.S dollars.

Currently, Unilever purchases 12,000 tons of tomato paste each year all over the world. Almost 20% of the raw materials for its Knorr Ketchup are purchased from COFCO Tunhe.

8.2 To change suppliers behaviors through purchasing orders

Under the pressure of consumers' movement, European food brands have established a thorough supply chain sustainable development plan. Its standard is even higher than regular expectation on food safety from Chinese consumers. To take the 2011's sustainable action plan of Unilever for example, it includes three responsibility targets, which are helping over one billion people to improve health conditions, reducing half of the negative impacts of unit product on environment, 100% sustainable purchasing of agricultural raw materials. Meanwhile, the company has made seven commitments to support the realization of targets, which are,

- Health and hygiene - up until 2020, the company will help over one billion people to change their health habits and bring safe drinking water to 0.5 billion people.
- Enhancing nutrition - the company will consistently work on improving the taste and nutrition values of its food products. Up until 2020, the company will double the production of product portfolio according to the best nutrition standards, globally recognized dietary guidelines.
- Greenhouse gas - up until 2020, to reduce half of the greenhouse gas emission within the life circle of products.
- Water – up until 2020, to reduce half of the water consumption of unit product.
- Waste – up until 2020, to reduce half of the waste of unit product.
- Sustainable purchasing – up until 2020, the company will realize 100% sustainable purchasing of agricultural raw materials.
- Improving livelihood – up until 2020, the company will include at least 0.5 million petty farmers and 75000 small-scale dealers to its supply chain.

From a short-term perspective, such a thorough sustainable development plan will increase costs for brand owners and suppliers. In order for suppliers to accept such improvement plan on the premise of increased costs and unpredictable profits, brand owners must offer orders that have considerable influence on suppliers.

As one of suppliers of Unilever, COFCO Tunhe, 30% of its total 60 mu of tomato fields are part of its own bases, planting tomato for major clients such as Unilever, Heinz, etc. These brand owners not only have requirements on pesticide control, but also on full traceability. Besides, each brand owner has its own specific requirements. In consequence, self-owned production bases are dependent on special purchasers.

Keep Unilever!

Source: the Economic Observer, Aug 12, 2011

Tomato processing is the major business of COFCO Tunhe. According to its 2010 Earnings, profits in 2010 declined for 124.96%, claiming the reason as decreasing profitability of its tomato business. Under such bad conditions for tomato business, being able to keep key purchasing accounts is extremely important for COFCO Tunhe.

95% of TOFOCO Tunhe's tomato products are exported and the amount for domestic consumption is rather small. Among its international key accounts, Unilever is a very important client whose annual purchasing volume reaches 20,000 tons. As Unilever has posed higher requirements on Tunhe's tomato planting

in its sustainable agriculture collaborative project, COFCO Tunhe has to carry out a new round of upgrade of its tomato planting mode.

According to a chief of COFCO Tunhe, preliminary planting is carried out by Unilever's technicians with them together. A purchasing team from headquarter is responsible for purchasing pesticides and fertilizers. Land selected by Unilever has to go through inspection and water resource must be made sure of having no pollution. As a result, self-planted land becomes dependent to certain degree on the key accounts.



Photo: Self-planted field by COFCO Tunhe supplies tomato raw materials to Heinz, adopting a planting mode required by Heinz and tomato sprout bred by Heinz itself.
By SRI

8.3 Unsustainable Risks

Firstly, it is difficult to have a sustainable developing supply chain with consistently unprofitable suppliers on one side and profitable buyers on the other side.

To calculate according to the sell price of bagged tomato ketchup (in 320g) sold in China which is 9.8 Yuan²⁹, sell price for ketchup in 500g would be 15.3 Yuan. Chinese processing companies exported their large-barreled tomato paste at 5.94 Yuan per 500g in 2012. Therefore the brand value that international brand owners acquired from outsourcing production of and enhancing quality inspection on tomato ketchup was worth 9.35 Yuan per 500 g. In order to understand the implication behind this figure, one can compare the 2012 annual Earnings and stock prices of Heinz³⁰ with those of its Chinese supplier COFCO Tunhe.

In its June 29, 2012 quarterly Earnings, Heinz profited 0.258 billion US dollars, equivalent to 87 cents per share compared with 0.2261 billion US dollars, equivalent to 70 cents per share of the same time last year.³¹

According to an announcement publicized by COFCO Tunhe in January, 2013, its loss was predicted at 0.7 – 0.77 billion Yuan. Over the years, for COFCO Tunhe's major business - tomato tomato paste, its selling prices have continuously dropped away from its cost prices.

Secondly, more farmers are losing land. In Northwest China where main producing areas of processing tomato are located, farmers own relatively larger planting field comparing with highly-populated southern region. In addition, as it is far away from developed cities and town in the east, the cost to profit from non-agricultural business is higher for individuals. As a result family livelihood relies mostly on agriculture.

29. Price listed on Amazon without discounts on June 18, 2013.

30. According to open data of Heinz, its tomato ketchup business contributed 45% for its total operation income for 2012.

31. Source: quarterly Earnings of Heinz.

The Chinese government has been advocating transferring surplus agricultural labors through urbanization to achieve arable field concentration and modern scale agriculture. Yet such transfer cannot be realized overnight. Cities and towns ought to provide sufficient work opportunities to attract parts of the outflow of agricultural labors. However, building their own bases by production companies, however, has artificially accelerated the scale and speed of agricultural labor transfer. Although it is stated in Unilever's sustainable action plan that more petty farmers would be attracted to the purchasing chain, when it turns to purchasing behaviors in China, this target is running toward the opposite direction at the moment. According to publicized figures by COFCO Tunhe, the size of its self-built bases reached 0.18 million mu in 2011. As a result, almost 30,000 agricultural labors would be transferred.

For COFCO Tunhe, the purpose to build its own bases is to guarantee quality control required by buyers. The quality tracking system required by brand owners have as well been regarded as an effective path to solve food safety issues by China's food industry and policy makers. However, under current technical conditions, it only applies to farm products which can be produced in scale by farmers in the upstream of supply chain. Yet in processing tomato industry, no farmers in the upstream of the supply chain can meet such requirements. COFCO Tunhe therefore had no choice but to contract land and plant by itself. Despite that such business model pushes out petty farmers, the company has to spend more on raw materials than those who purchase directly from farmers. If brand owners such as Heinz keep their purchasing prices unchanged, the earnings outlook for COFCO Tunhe is rather grim.

Tomato farmers and processing companies are indispensable parts of the supply chain. If they cannot profit from the supply chain, there is nowhere to start the so-called sustainable development advocated by brand owners. The terminal of ketchup produced by brand owners such as Heinz and Unilever is European and American consumers. But the costs that China, as the original place of raw materials, has paid to make sure of the food safety of European and American consumers, including limited arable land in competition with grain crops, squeezing out petty farmers, difficult livelihood of tomato farmers as a result of low sell prices, etc., seem not to be taken into account by brand owners.

Chapter IX Government bodies and social organizations

Government bodies shoulder the responsibility of regulation and supervision, while trade associations speak for enterprises; farmers' association and cooperatives protect farmers' interest; and some other non-government organization are striving for ways to stand up for vulnerable groups. There exists a chance to construct a sustainable supply chain if they do just what they need to do and fulfill their own responsibilities.

Based on tomato products, in this chapter we will first explain government bodies who undertake regulatory and supervising functions and what role they are playing. Second, we will explain social groups with different roles and functions and the most important part is to unveil their relations with administrative bodies and what services they provide to their members.

9.1 Function and role of government bodies

Due to limited domestic market for tomato products and the early introduction of processing tomato into China in the 1970s and '80s, China has become the largest tomato paste exporter of the world. To make this happen, Chinese government has played a huge role in industrial planning and guidance. Xinjiang Production and Construction Corps, the early bird of growing processing tomato and a deputy provincial unit, has powers of administration, production and judiciary as well. This made processing tomato industry extremely closely connected with governmental power.

Incentive policies and regulatory function of government bodies often concentrate on the downstream stage of the whole supply chain of tomato products. Ministry of Agriculture, Food and Drug Administration and Ministry of Commerce are responsible for tomato raw materials process, food safety and export of tomato products respectively.

Agricultural supervisory body of county level like agro-technical station is responsible for planting section. Agro-technical station together with science-technology bureau will provide sprout, technical support like cultivation method and market information to farmers. In addition, different from agro-products directly facing end market, processing tomato must be processed by processing enterprises; in this sense, the government has to ensure smooth transaction between farmers and enterprises.

Before seed sowing every year, government bodies of province (or autonomous region) and prefecture-level cities in major producing areas will make an overall planning together with their agro-supervisors on growing cultivation acreage of the coming year based on last year's tomato production results. Before entering press season every year, government bodies of prefecture-level cities, together with their function units of agriculture, transportation, quality inspection, finance, environment protection, water affairs, industry and commerce and electricity power, will make deploying arrangement on production of processing tomato, purchasing price, processing capability of processors, transporting vehicles and pollution risk in course of transportation, power guarantee during processing, dispute settlement for contracts signed between farmers and processing enterprises.



Photo: Pilot project of Science and Technology Agency of Xinjiang Autonomous Region. Responsible officer is in direct charge of one piece of tomato field to trial implement some new cultivating method.

By SRI

Take tomato transportation as an example. The average distance between farmers' field to processing line is within 30 km. However, due to restriction on self-owning a transportation vehicle, transportation driver has become a particular type of work. Agricultural machinery bureau, as a supervisor over transportation section, will organize the drivers for driving technique training and warning education of safe driving at the beginning of production season. Moreover, offices of public security, traffic police, transportation, and toll collecting and management are all mobilized to ensure safe transportation of tomato.



Photo: Driver is taking a field driving test.

Source: website of Xinjiang Agricultural Machinery

9.2 Social Organizations

Non-profit or non-government organization in processing tomato industry, mainly composing of tomato industry association set up in counties, or county-level cities, and prefectures or prefecture-level cities, are local-level social groups. In terms of national level, there is a China Canned Industry Association. These social groups are one kind of existing social organizations in China. As of the end of 2012, there are 268,000 social organizations in China³². According to Registration Regulations for Social Organizations, to set up a social organization, application documents must be submitted to related supervisory organs which are units either belonging to or authorized by people's government of county-level or above. Therefore, social organizations, actually attached to supervisory bodies, are semi-official.

Social organizations in processing tomato industry are usually staffed with civil servants working under government units who will take different assignments. In 2012, Industrial Tomato Association (ITA) was set up in some major tomato producing county of Xinjiang³³. Each function unit has attended its founding conference presided by county government. In the elected leadership team, director of Agriculture Bureau of this county was elected to be the president of ITA, and head of Rural Renovation Office, director of Economic and Information Commission, director of Bureau of Agricultural Economics as vice president, while leaders of each village or town or major farms as members of ITA.

As in-charge person are part-timely working in associations like ITA, some of them are semi-disfunctioning after setup. Associations of different areas are active in varying degrees. In Inner Mongolia Autonomous Region, a considerably large number of enterprises and farmers know about such association, since the protective purchasing price of tomato is made by local association each year. However, as the associations are not independent from the government, governmental power is believed to get involved in industrial development, and it is more like a tool to be used to negotiate with enterprises.

Owing to necessary support to supply chain of processing tomato and supervision involving more than one unit, the government expects existence of such non-government organization who can be coordinator of cross-functional relations and interests to push forward with related comprehensive policies, without making it look like intervening market economy. Local tomato industry association registered as social organization emerged at this right moment. It has become a coordinator between different functions of government rather than a self-governed agent who should represent its industrial interests and negotiate with government on diverse issues.

32. This figure comes from explanation and introduction on social groups in column of Xinhua information of Xinhua.net.

33. Tomato only used to be made into tomato paste is commonly known as industrial tomato in Xinjiang, just to differentiate them from tomatoes directly consumable by humans.

Conclusion and suggestions

Tomato products are processed food; therefore, there exist some general problem in their supply chain dominated by enterprises (processors or brand enterprises), which is that raw materials supplying farmers and enterprises are lack of stable business relations and mutual trust between each other; it can also be affected by some specific factors, such as, Chinese farmers and processors rely heavily on single market and are lack of multiple sales channel due to extremely unbalanced demand in domestic and international markets.

With this background, supply chain of tomato products in China sees the following problems including but not limited to:

1. Domestic plantation of staple crop is affected

As a material for food which is basically never consumed by local people, the supply chain of tomato processed products has to fight for land, labor and water resources which are currently already limited to plantation of staple crops in China.

Considering of food security issue, a robust traceability system is largely required by the international brands. To cope with such requirements, some Chinese suppliers tend to build autonomous large-scale plantation. However, given the highly dependency of the international market, once the international purchase price is coming down, the domestic suppliers would decrease the productivity by extensive management, or sublease their rented arable lands, or even abandon them, for the purpose of reducing cost. Due to the large-scale of the arable land rented by such companies, for instance, a leading company rent a land totaling 0.2m mu (or 13,400 hectares) in one single place, it is likely that those loss and the risk to food security has not taken into account by the government.

2. Unreasonable profit distribution in the supply chain

During the last 3 years, Chinese tomato farmers and processors are struggling to survive in this industry. No matter when the harvest is good or poor, the farmers enjoy very limited profit, which has caused a series of suicides and conflicts. As far as domestic processors are concerned, sustained appreciation of RMB to USD and Euro directly cuts down their profit margin.

Profit allocation and sharing of risks between farmers, processors and brand companies form the ground for sustainable development of supply chain. When European and American brand companies are making profit all the time, Chinese farmers and processors are nearly broke or losing profit, which is not in line with the ideal of sustainable development held by brand companies such as Heinz and Unilever. If things go on in this way, brand companies will lose raw materials providers with good quality.

Hereby, we believe that, the promotion of highly export dependency agricultural products have threaten the food security of China to some extent; while, it is hardly to find any profit margin for the vulnerable market players like farmers and processing enterprises. Based on this background :

1. The government should evaluate the competitive relationship between highly overseas market dependency agricultural products and staple crops. Besides considering the profit brought to local farmers, consumption of arable land and water resources should also be considered. According to evaluation results, government should consider whether it is necessary to bring out supportive policy to farmers so as to encourage more staple crops plantation.
2. European and American brand companies should consider how they can share risks with farmers and processors to guarantee the stableness and quality of raw materials.
3. Currently in nationwide, arable land is gradually in transfer, which might lead to family centered business model and individual/enterprise-centered model. Processing companies possibly restrain and ensure raw materials purchase through order placing in future. Therefore, processing companies should get ready for coming transition, other than to blindly intervene the plantation phase or to manage the plantation farms at high cost.



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