

## Feasible options for strengthening the role and competitiveness in the lily bulb supply chain

----- A case study of AgroNew BV Co., Ltd



**A Research Project Submitted to Larenstein University of Applied  
Science in Partial Fulfillment of the Requirements for the Degree of  
Masters in Agricultural Production Chain Management, specialization  
Horticulture Chain Management**

**By**

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**September 2009**

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## **ACKNOWLEDGEMENT**

This thesis report was written from July to September, 2009. Although this research was mainly developed through literature study in a large measure, its accomplishment was not possible without the external support I have been given. I would like to express my gratitude for the supporters.

Mainly, I would like to thank my supervisor Geert Houwers at Van Hall Larenstein in Wageningen. He seriously and patiently contributed critical and relevant comments from formulating the research proposal to the final thesis. I've experienced frequent meetings were hold between us as very valuable for the final outcome of this research. Without his contribution, I cannot improve myself. Besides, I appreciate a lot for the interviewees that bring me into the lily bulb business field and the information they have offered.

Last but not least, I would like to thank my classmates for their positive criticisms that have been very instrumental in the formulation of the thesis report.

I hope that you will find interesting content to read this research. Moreover, the perspective and results will inspire you in relation with your own personal reading objectives.

Yin Hao, September 2009

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## **ABSTRACT**

This dissertation is a case base study for Dutch flower bulb trading company-AgroNew BV Co., Ltd. The company is facing the problem of declining of sales figure in the Chinese market. Therefore, to find the causes that resulted in problems and the suitable business strategies are significant for the further development of AgroNew BV in China. In this research, the major research approaches are: Desk research, Qualitative research and Quantitative research.

The first step is to analyze the situation of lily bulb export chain of AgroNew BV and the business environment for the lily bulb trading between Holland and China. The value chain was also mapped to include all relevant chain actors, supporters and influencers. Information gathered by phone call and sending questionnaires to China; or through interviewing with all related participators in the supplying aspects of AgroNew BV in the Netherlands, which is used to identified their roles, function, behavior and relationship between each other. The business environment is analyzed by Porter's five forces theory. About the analysis of internal and external environment of AgroNew BV, the SWOT analysis is adopted as well.

Through comparing with the successful Dutch lily bulb exporters who have already got great achievement in the Chinese market, the author found two major constrains in the supply chain of AgroNew BV. One is that highly depends on intermediary to purchase the lily bulb from bulb growers, which result in AgroNew BV has less control for their own flower bulbs and is very passive to control the quality of bulbs. Another limitation for the company is that highly depend on three Chinese bulb importers but sold small quantity of lily bulbs in China.

Based on investigating for the supply chain of AgroNew BV and the potential of lily bulb import in China, the author put forward to four feasible options (purchasing lily bulb from bulb growers directly, being pro-active for new lily varieties, establishing representative office in China and establishing sale company in China and sell lily bulb to Chinese cut flower producers directly). And the recommendations will be stated about how AgroNew BV adopts these options to operate business in China. The purpose is to contribute on strengthening the role of AgroNew BV in the lily bulb supply chain to enhance the competitiveness in the Chinese market.

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# CHAPTER 1 INTRODUCTION

## 1.1 The context of research

As a master student majoring horticulture chain management, AgroNew BV expects the author to have a critical view at the current lily bulb supply chain between Holland and China objectively and to find out what the major influence factors are in the chain. Then by analyzing the performance of AgroNew BV in the supply chain, as well as other successful businesses in the same chain, the author could design the feasible strategies for the company.

## 1.2 General information about AgroNew BV

AgroNew BV is a Dutch flower bulb trading (export) company, located in *Noordwijkhout*, the heart of flower bulb production areas in the Netherlands. AgroNew BV was established in 2002 from a managerial group with more than 20 years experience in the flower growing sector and is made up of Spanish and Dutch companies, 60% and 40% respectively. Before started export business to China, the company had already had steady market in Mexico, India and some European countries.

In 2006, the General Manager of AgroNew BV started transforming his attentions to the Chinese market. In order to find potential cooperation in China, the General Manager consulted the working experience how they started in other market and worked on it. For example, the General Manager participated in the Chinese floricultural exhibition in personal and focused on the Chinese flower bulb trading companies; after coming back to the Netherlands, he frequently contacted with these Chinese flower bulb trading companies by email or phone call. However, the Chinese market was totally strange for this company in that time. Meanwhile, comparing with situation what AgroNew BV has in other countries, the situation in China was quite different, especially the interpersonal relationship in China. For example, in Mexico the main customer who was used to work for AgroNew BV. This Mexican importing company is just as the sales agency of AgroNew BV in Mexico; a Spanish importing company, the director is the blood brother of the General Manager of AgroNew BV. Besides, the General Manager has experience for working and living in India.

Through hard work, in 2007 AgroNew BV formally established business relationship with three Chinese flower bulb traders, mainly for lily bulb export. Although the export chain of AgroNew BV is similar as the chain of many other Dutch flower bulb traders (exporters) in the export business between Holland and China, as a fresh man AgroNew BV has very weak name in the Chinese market and doesn't yet have sufficient working experience and knowledge for handling lily bulb export business in China. Besides, the interpersonal relationship is also very weak. Those were resulted from less communication scale in China. Furthermore, like other new organizations in

the Chinese market, AgroNew BV is fighting for surviving under “the hidden rules” of the business. “The hidden rules” means when buyers face different suppliers, although new suppliers offer similar conditions to buyers as old suppliers, even better than the old, the buyer always like to require more from the new suppliers.

In order to create its own position in the Chinese market soon, in guaranteeing the quality of product, AgroNew BV tries to offer competing price to attract the Chinese buyers (the competing price means that when offer same quality products as other suppliers, AgroNew BV’s price is lower than others. of course, the reasonable price for the corresponding quality). Furthermore, if there are quality problems when Chinese importers receive products from AgroNew BV, AgroNew BV always actively investigate causes of quality problem, and give corresponding compensation according to the situation of problems, because how a trading (export) company does after service and resolves problems, which can also display their professional ability.

### **1.3 Research problem**

In the middle of 2007, AgroNew BV started exporting lily bulb to three Chinese flower bulb traders in China. The company highly depends on these three customers with small export quantity. Sales quantity of AgroNew BV decreased in 2008 comparing to 2007.

### **1.4 Research objective**

The objective of this research is to find the causes that resulted in decreased lily bulb sales quantity of AgroNew BV in China and recommend on strengthening the role of AgroNew BV in the lily bulb supply chain to enhance the competitiveness in the Chinese market.

### **1.5 Research questions**

#### **Main question 1**

1. What are the main causes that resulted in decreased lily bulb sale quantity of AgroNew BV in the Chinese market?

#### **Sub-questions**

- 1.1 What was the situation of the Chinese lily industry in recent years?
- 1.2 How is the current value chain by AgroNew BV exports lily bulbs to China? (chain actors and functions)
- 1.3 What are the requirements of the Chinese importers for importing lily bulbs? Does AgroNew BV satisfy the general requirements?
- 1.4 What factors limited the lily bulb sale of AgroNew BV in China?

#### **Main questions 2**

2. What are the feasible options for AgroNew BV to increase the lily bulb sale in the Chinese market?

### **Sub-questions**

2.1 How is the import potential of lily bulb in China?

2.2 What could be the feasible changes of current export chain for AgroNew BV sales lily bulb in China?

2.3 How does AgroNew BV use the feasible change(s) to increase lily bulb sales in China?

### **1.6 Research methodology**

To be able to answer the research questions, it is necessary to investigate on AgroNew BV's lily bulb supply chain and the business environment, as well as the situation of other Dutch bulb exporters in the same chain. The comparative analysis involved use of the value chain analysis tools. The first step of value chain analysis is to formulate the chain. Then value chains were mapped to include all the chain actors, supporters and influences.

The information was gathered from literature study and case study on several successful companies in the lily bulb export chain between Holland and China. The author can compare them with AgroNew BV's position and roles in the current chain and find the discrepancies. Then recommend feasible options based on other successful experiences.

Analytic tool of SWOT is used to analyze the internal and external environment for AgroNew BV. Through analysis, especially after indicate the weaknesses of AgroNew BV in the current export business between Holland and China, the author gives his recommendation on sound alternative strategies for the development of AgroNew BV in the coming years.

#### **1.6.1 Conceptual research framework**

The research framework focuses on the whole lily bulb supply chain by AgroNew BV exports lily bulb from the Netherlands to China. It revolves around the Chinese part of the supply chain, the Dutch part of the supply chain, the decrease in sales quantity in China. These three aspects were used as baseline to address the problem of the decrease in sales quantity by AgroNew BV exports lily bulb in China. Based on this, the research develops recommendations about feasible options or strategies in order to address the problems what AgroNew BV has in China and help to strengthen the role of AgroNew BV in this supply chain for enhancing the competitiveness in the Chinese market.

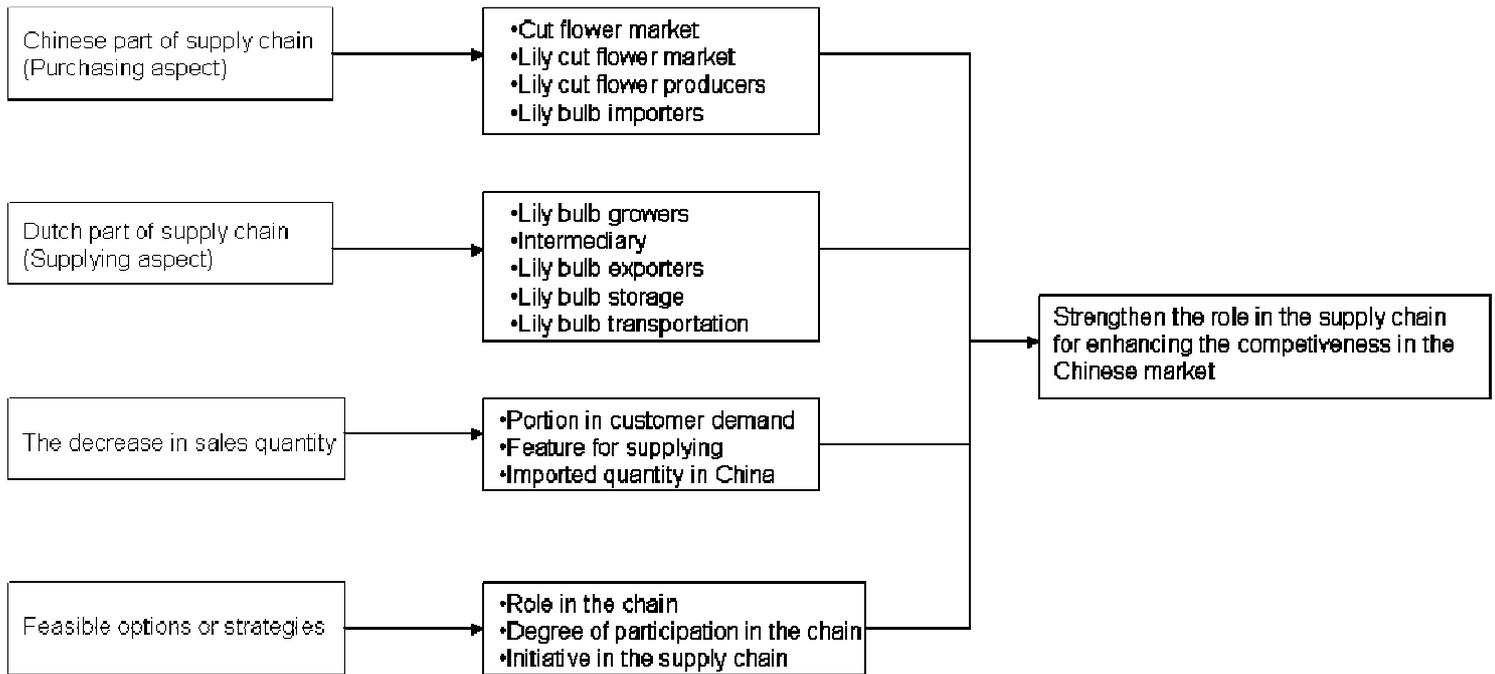


Figure 1 Conceptual research framework

### 1.6.2 Data collection

The study involved both qualitative and quantitative approaches based on empirical data, literature review and documents. In order to analyze AgroNew BV's lily bulb supply chain and recommend on the alternative business strategies, besides desk study, case studies are also carried out.

#### *a. Desk study*

Secondary data was collected by going through relevant documents to get more information by using internet, journals, scientific books, PhD thesis, and companies' profiles. Through reading literatures from Wageningen University library, the author not only reviewed on the concepts/theories on value chain analysis, but also reviewed the analysis tools SWOT analysis. Moreover, to fulfill the research objective, the author paid more attention to each actor in the value chain by Holland exports lily bulb to China. Besides, other relevant information about lily bulb marketing, lily bulb production, lily bulb storage and logistics were necessarily to understand. More important, through communication and interview, the author can always check whether the data is valid.

#### *b. Case study*

For whole lily bulb supply chain, it was necessary to investigate according to two main aspects of the business trade: the Purchasing aspects (condition of Chinese part) and the supplying aspects (condition of Dutch part).

#### ● Chinese part

First, the Case study would focus on the Chinese lily bulb importers (current and potential Chinese customers of AgroNew BV) and lily cut flower producers (final lily

bulb user in the chain). The case study for the Chinese part was achieved through phone call and questionnaire.

- communicate with the general manager (Mr. Qingfeng, Kong) of Beijing Oriental Flower Trading Co., Ltd
- communicate with the general manager (Mrs. Huihan, Liu) of Beijing Huihan Flower Trading Co., Ltd
- communicate with the sale manager (Mr. Yang, Wang) of Beijing Sinoflor Trading Co., Ltd
- communicate with the general manager (Mr. Qiangfa, Cheng) of Zhe Jiang Lily Breeding Co., Ltd
- communicate with the general manager (Mr. Shengde, Jiang) of Zhe Jiang Hong Yue Seed Co., Ltd
- communicate with the Chinese senior floriculture journalist (Mr. Jiliang, Lu)

The first three Chinese company that are the customers of AgroNew BV. Through communicate with them to find out how the performance of AgroNew BV's supply was; and how the performance of their familiar suppliers were; what the differences are between AgroNew BV and other Dutch suppliers for offering lily bulb to China. The next two are the potential customers for AgroNew BV. Through talk with them, the author could understand what the general requirements of most Chinese importers are for importing lily bulb; if want to attract more attentions from potential customers and compete with other Dutch suppliers, what situation AgroNew BV should satisfy. Last one is a Chinese senior floriculture journalist, during the investigation, the author always contacted with him for consulting.

- communicate with the general manager (Mr. Shang, Yu) of Ling Yuan Lan Xing Flower Trading Co., Ltd
- communicate with the general manager (Mr. Xi, Lu) of Ling Yuan Flower Commodity Market

They are lily cut flower production organizers. Each of them controls more than 10 lily cut flower producers respectively. About how they work, 1) both of them are delegate for helping lily cut flower producers purchase lily bulb from Chinese flower bulb importers; 2) after harvest, they are in charge of sales operation. Through talk with them, the information about the situation of the Chinese lily cut flower market, which was gathered by desk research, could be judged whether the data is reliable. And the chain map about the situation of whole Chinese lily industry could also be formulated.

Besides, the role and behaviors of the different stakeholders in the Chinese part of the lily bulb supply chain, relation between each other, constraints within the chain, key performance indication to evaluate the chain performance, government policies, and other sectors related information.

- Dutch part

The situation of export chain (the supplying aspects) would be investigated by another case study. The case study for the Dutch part would be achieved by a number of interviews:

- interview with the general manager (Mr. Ulises Lorenzo) of AgroNew BV
- interview with the Dutch lily expert (Mr. Hank Gude) in Wageningen research center
- interview with 5 different lily bulb growers in Holland
  - (a. J.Flierman, Raalterweg 47A, 7431 PA Diepenveen
  - (b. Fa. H.W. van Saase & Zonen, Zilkerbinnenweg 59, 2191 AD De Zilk
  - (c. Fa. P.Th.J. Langeveld, Delfweg 58, 2211 VN Noordwijkerhout
  - (d. Gebroeders J. En A. Heemskerk, 1e Loosterweg 27, 2182 BL Hillegom
  - (e. Gebr. J. & W. Van der Slot & Zonen BV, 's-Gravendamseweg 65, 2211 WH Noordwijkerhout)
- interview with the responsible person (Mr. Franc) of the storage center
- Sent the questionnaire to the manager (Mr. Rene van Eijk) of Dutch logistic company

First, through interview with Dutch lily expert, the author understands the correct way how to handle and keep the quality of lily bulb during the harvest and post harvest stage. Furthermore, not only the author understand the position and function of each actor in the supplying aspect through interview; what the relationship between each other, but also according to the standard the author can evaluate the performance of each actor.

### **1.6.3 General items for interviews**

- Before the interview, make a time plan. The plan can also be used as a check list.
- Interviews were conducted using questionnaire.
- The questions were guided by the research objective and had to provide answers to the sub-questions of the main research questions in the proposal.
- Carried out during the exploration time, the pre-test was of great importance as it helped to get familiar with the subject and to ensure that the all questions are clear and adapted to the interviewees.
- Be very clear at the introduction of the interview and try to note down all key words during the interview.
- Make short summary after the interview.
- Send back the summary to the informant to ask for additional feedback.

### **1.6.4 Limitation of the research**

One of the limitations for the research is that author could not conduct a large survey personally with limited resources, such as large surveys with a lot of Dutch lily bulb growers in Holland. Therefore, the performance of Dutch lily bulb growers for handling the quality of lily bulb was evaluated by interviewing 5 Dutch lily growers.

Another limitation in the research is communication with other Dutch flower bulb trading companies. During the research, the informant was always very cautious no matter talking by phone or face to face. Especially for answering about how their performance is in the Chinese market, they just answered by few simple words. On the other hand, how to operate the business is belonged to the business secret. Therefore, actually, many data and information about other Dutch flower bulb traders what the author got from literature data or some Chinese flower bulb importers are used to analysis.

Last but also very important is the calculation for analyzing during the research. In the flower bulb export business, in the business invoice besides of the value of goods and the transportation cost, it also includes many other costs, such as the cooling cost of the goods. Normally, the cooling cost is calculated according to the numbers of week the bulbs have already been stored in the cool house. Furthermore, there are also many different costs the importers and exporters should pay for, such as quality inspection fee from quality inspection association, the service fee of sea port and many other necessary cost. If the author wants to show an example by calculation, it is very difficult that how the situation of profit is shown. Therefore, during the research most calculation was about cost price or gross margin.

Although the author tried to obtain and crosscheck information between different informants, there could be a risk that this report may not have an insight understanding for certain issues or some points are missed.

### **1.6.5 Outline of the study**

This study is organized into four main chapters. Chapter 1 provides the general information of AgroNew BV. It further describes the research objectives and links the research problem with the main research questions and sub-questions. It also presents the methodology elaborating research methods, tools used and the data analysis procedure.

In Chapter 2 describes how important lily flower compared to other flowers is in China firstly; and will focuses on the information of lily industry, an overview of lily cut flower production industry in China, the introduction of lily bulb import in China, the situation of lily bulb industry in the Netherlands and the situation of lily bulb industry in the world in recent years according to secondary literature data.

Chapter 3 can be seen as the core of this report, consisted of the findings in this research. Chapter 4 covers the discussion of these findings. The discussion was always surrounding the comparison between AgroNew BV and other Dutch lily bulb suppliers. Chapter 5 expresses the feasible options for helping AgroNew BV go further in the Chinese market. The report ends with Chapter 6 that formulates the conclusion and recommendations of the study.

## **1.7 Significance of the study**

This case study thesis focuses on the AgroNew BV case to recommend the feasible options to strengthen the company's role in lily bulb supply chain so that enhance its competitiveness in the lily bulb supply chain. The research plays a role in how to analysis and clarify problems in the supply chain and makes recommendations for the organization to become more powerful.

This study also indicates the existence of problems within the current lily bulb export chain of AgroNew BV from the Netherlands to China. This report further analyses business environment in lily bulb industry. AgroNew BV hopes that information gathered from the study will benefit the organization in improving the supply chain.

## CHAPTER 2 LITERATURE REVIEW

### 2.1 The situation of Chinese fresh cut flower market

In China there are four main fresh cut flower products in the market because of the consumption quantity. The consumption quantity for these four cut flowers is about 50% of total cut flower consumption in the Chinese market. As **Figure 2** shows below, they are Lily, Carnation, Chinese rose and Chrysanthemum. The Chinese cut flower products are mainly consumed by the domestic market, although China also exports cut flower products every year.

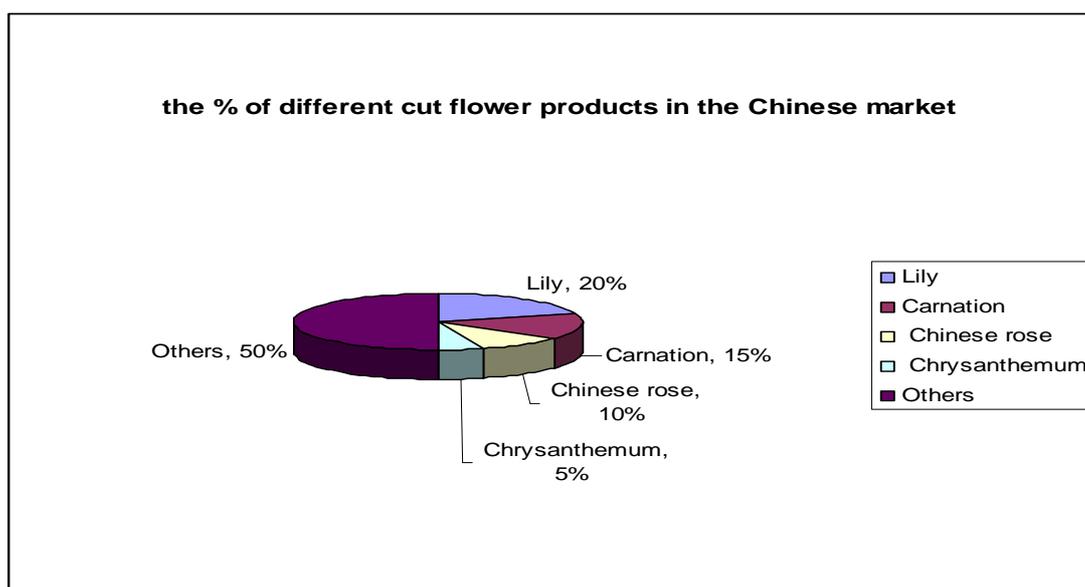


Figure 2 the % of different cut flower products in the Chinese market  
(Source from: <http://jpkc.njau.edu.cn/ncpyx/srt/wr.doc> & personal communication with the general manager of Ling Yuan Flower Commodity Market)

The group consumption and the large-scale celebration activities in the festival were main ways for domestic cut flower consumption in China. Afterwards, the continuous development of Chinese flower industry and the improvement of standard of living in China, promoted the cut flower products as a kind of ornamental product or gift in people's life. Meanwhile, the personal consumption also becomes the main part of the cut flower consumption in the different festival. On the other hand, according to the statistics of the Chinese government in 2006, the consumption quantity of cut flower products in the festival period is the main part of total consumption all year around in China. And during the festival period the selling price of cut flower products is always much higher than other time. For example, more than 80% of lily cut flowers are consumed during different Chinese festival (mainly in February, October and December of the year); the selling price can be increased about 50% to 100% in the market.

(Source from: <http://www.jdagri.gov.cn/info.asp?id=12106> & personal communication with the general manager of Ling Yuan Flower Commodity Market)

However, in China there are still many people believed that cut flower products no matter as ornaments or gifts are unworthy of their payment because of short time for enjoying. After consumption, just few days the flowers start fading. Therefore, comparing with other cut flower products, the longer vase life of the lily cut flower is the main reason to explain why the lily cut flower is the first choice for most Chinese people who want to purchase cut flower products. As **Table 1** show below.

Table 1 vase life of different cut flower

Item Flower	Vase life (days) (Maximum)
<b>Lily</b>	17-20
<b>Carnation</b>	15
<b>Chinese Rose</b>	15
<b>Chrysanthemum</b>	8

(Source from: [http://news.china-flower.com/paper/papernewsinfo.asp?n\\_id=210168](http://news.china-flower.com/paper/papernewsinfo.asp?n_id=210168) & personal communication with the general manager of Ling Yuan Flower Commodity Market)

On the other hand, the Chinese people like lily, because lily is the emblem for motherhood; to dream of lilies in spring foretells marriage, happiness and prosperity. Furthermore, lily flower means everything goes well, succeed, wishes and dignity. Of course, Chinese people like lily because lily is one of the highest valued ornamental plants in the floriculture industry in China. Their usefulness in the internal decorations, traces back to the love of florists for its vibrant colour and striking, and the blooms that make wonderful additions to bouquets. As a food, it is very delicious and nutritional. Meanwhile, lily bulb can be as medicine, which promotes health and well-being. Hereby, lily has more function for Chinese people and it is very popular in China. In a word, lily is more and more important in Chinese daily life.

## 2.2 Fresh lily flower bulb

### 2.2.1 Introduction

Fresh Lily flower bulb, which called Lily bulb for short, is separated into Natural bulb and Hybrid bulb. The Hybrid bulb is mainly used in the commercial transaction.

Of all the bulbous plants, the lily has shown very considerable growth in terms of hectares cultivated in the last few decades. Its increase in cultivation is primarily due to the new groups of lilies that have been developed for cut flower production. The lily has become a very popular cut flower throughout the world. One of the lily groups, known as *the Asiatic Hybrids*, offers lilies in orange, red, yellow, white and pink. Also favored are *the Oriental Hybrids* with their large white, pink or red scented flowers. Lilies in *the Longiflorum Group* (including the white ones sometimes known as Easter Lilies) have been grown for a long time, but recent breeding efforts involving the crossing of these lilies with *Asiatic Hybrids* has produced a new group known as

*the LA Hybrids*. This group is becoming more and more important. In the Netherlands, lily bulb production involves planting the bulbs in the spring and lifting them again before winter. For the production of flowers, the bulbs can be planted throughout the year in many different climate zones, both in the field and in greenhouses.

Through tremendous and continuous development, at present several hybrid varieties are popular in the commercial transaction. As follows:

**Oriental (Or) Hybrid**

**Asiatics (As) Hybrid**

**Longiflorum/Asiatics (L/A) Hybrid**

**Oriental/Trumpet (O/T) Hybrid**

(Source from: <http://www.bulbsonline.org/>)

Hereinto, **Oriental Hybrid**, **L/A Hybrid** and **O/T hybrid** are favorable in the current world market for cut flower production. Especially, the **O/T hybrid** is considered as the development orientation of lily variety in the future. These three varieties have same characteristics: big flower bud, big flower and strong and long stem. These are factors what lily cut flower producers always consider due to the requirement of the market. Whereas **Asiatic Hybrid** is mainly used to produce pot plants. As **Table 2** show, the occupancy rates of different lily hybrid varieties in the world commodity flower bulb market are formulated.

(Source from: <http://www.cloverflora.com/Article/ShowArticle.asp?ArticleID=2>)

Table 2 the % of different lily hybrid varieties in the world commodity lily bulb market

Item Variety	Market share
<b>Oriental</b>	36.7%
<b>Asiatic</b>	32.8%
<b>L/A</b>	19.3%
<b>O/T</b>	2.4%
<b>Others</b>	8.8%

(Source: <http://www.cloverflora.com/Article/ShowArticle.asp?ArticleID=2>)

### 2.2.2 History of lily bulb

Since the 1960s, the lily breeding has been progressing quickly. As the breeding center, Holland has cultivated several thousand new lily varieties. Only in last decade, in the Netherlands approximate 100 new varieties were published per year. For the intellectual property rights of lily varieties, the 90% of new lily varieties' patent in the world belong to the Dutch breeders. The breakthrough of the Dutch lily breeding and the significant improvement of lily bulb production technology, promote the development of the Dutch lily industry enormously. That has made the Dutch lily industry stay in the leading position of world lily industry for a long time.

## 2.3 The lily cut flower industry in China

### 2.3.1 The main areas for lily cut flower production in China

Until the end of 2008, the total lily cut flower production area was about 2900 ha in China. There are two main lily cut flower production areas in China: *Liao Ning* province and *Yun Nan* province, which locate in north and south of China respectively. The lily cut flower production areas are respectively: 1305 ha in *Yun Nan* province, 870 ha in *Liao Ning* Province and 725 ha in other Chinese province. (As **Table 3** shows). According to the demand of respective market, in the north of China the **Oriental Hybrid** lily bulbs are favorable, as **Table 4** shows, “**Siberia**” and “**Sorbonne**” are the most popular varieties. The **O/T Hybrid** lily bulb like “**Manissa**” has high market value in the south of China.



Figure 3 the first seven provinces of Cut flower plant area in China

Table 3 the situation of lily cut flower production in different area of China

Area	Items	% of total production in China	Total production area (ha)
Yun Nan province		45%	1305
Liao Ning province		30%	870
Other provinces		25%	725

(Source from: personal communication with the general manager of Zhe Jiang Lily Breeding Co., Ltd)

Table 4 Brief introduction of lily industry in north and south of China (2008)

<b>Area Item</b>	<i>North of China (Liao Ning province for instance)</i>	<i>South of China (Yun Nan province for instance)</i>
Import quantity of lily bulb (Piece)	30 million (90% of total import are <b><i>Oriental Hybrid</i></b> varieties: <i>Siberia and Sorbonne</i> )	60 million (different varieties). More than 50% of total import are <b><i>Oriental Hybrid</i></b> varieties; Main products are also <i>Siberia</i> and <i>Sorbonne</i>
Cut flower production (Branch)	30 million (total)	65 million (total)

(Source: <http://www.yuanlin168.com/news/content/2007/7/5397.html>)

### 2.3.2 The subsector map of the Chinese lily cut flower production

A good subsector map is a range of activities required to bring a products or service to the final consumer, as well as a supply/value chain. It includes both vertical and horizontal linkages. The Chinese lily cut flower production subsector chain consists of foreign bulb traders (exporters), Chinese bulb traders (importers), local lily cut flower producers, wholesalers, retailers, and consumers. Besides all operators within the value chain, there are also chain supporters and chain influences to form a lily industry subsector map as illustrated in **Figure 4**.

Hereby, it is necessary to indicate that although Chinese lily cut flower producers also use Chinese lily bulbs to producer cut flowers, the quantity of usage is very small comparing with the usage of imported lily bulb. Therefore, the author just mapped the situation for Chinese cut flower producers use imported lily bulb.

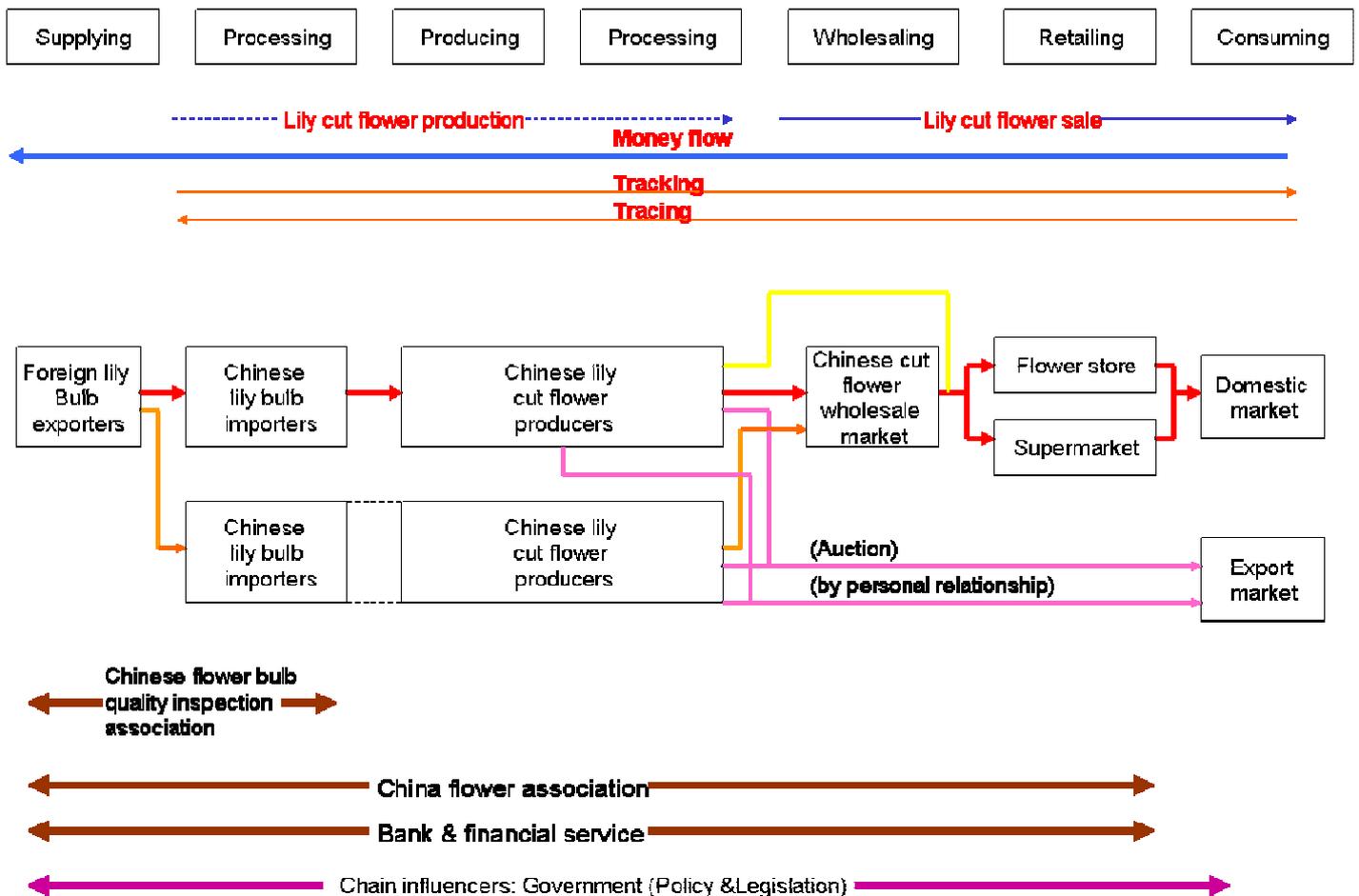


Figure 4: the subsector map of Chinese lily cut flower production  
 (Source from: personal communication with Chinese senior floriculture journalist)

According to **Figure 4**, the Chinese lily cut flower production can be divided into two aspects: *Lily cut flower production* and *Lily cut flower sale*.

- Lily cut flower production

As **Figure 4** shows, Chinese lily cut flower production includes two different formations:

- Follow the red line, which can be seen as the most general production structure in China: when the Chinese bulb importers receive the lily bulb from exporters, they will repack the lily bulbs, such as change the cover of the crates with their own logo. And sell to the Chinese lily cut flower producers; after production, lily cut flower producers will harvest the cut flower and do processing works.
- Follow the orange line, which can be seen another structure for lily cut flower production in China. After importing lily bulbs, the Chinese importers have their own contract cut flower producers to produce, harvest and process the lily cut flowers. Therefore, the importers and cut flower producers could be seen work for same organization.

The *Mode a* is the most common way after lily bulbs are imported in China. But comparing with *Mode a*, through *Mode b* the bulb importers will get more margins from the market. In *Mode a*, the role of importers in the chain is just a bulb trader.

*(Source from: personal communication with Chinese senior floriculture journalist)*

- Lily cut flower sale

In the selling stage, the sale could be divided into three different ways:

- a. Still follow the red line, the lily cut flower will be sold to the Chinese cut flower wholesale market; after better processing, the lily cut flowers are sold to domestic market through retailers.
- b. Some cut flower producers have their own distribution channel. As the yellow line shows, the lily cut flower could be sold to retailers from cut flower producers directly.
- c. If the quality of lily cut flower reaches the export standard, the qualified lily cut flowers will be exported through auction. As map shows, if some cut flower producers have personal relationship in the foreign market, they can also export the cut flowers directly, although this situation is very limited in China.

In China, most lily cut flowers will be sold through wholesale market in northern market; the establishing of flower auction in southern market, such as *KIFA (Kunming International Flower Auction)*, that has already become the new sales platform for local cut flower producers to sell lily cut flower. Actually, the quantity of lily cut flower sold to retailers directly is very limited. Besides, normally the export of lily cut flower will be accomplished through local flower auction.

*(Source from: personal communication with Chinese senior floriculture journalist)*

### **2.3.3 The situation of Chinese lily cut flower market**

Lily cut flower, which is the most favorable cut flower in China, is vital element in the Chinese cut flower industry. In recent years, the increasing consumption of lily cut flower in China stimulated the positivity of Chinese people to produce lily cut flower. Many people threw themselves into this attractive and potential industry. The Chinese lily industry was also promoted by the enthusiasm of the Chinese people for lily cut flowers. However, in last two years the Chinese lily cut flower market was very stagnant.

#### *2.3.3.1 The situation in recent years*

In 2006 and 2007 the stagnant lily cut flower market in China did affect the motivation of the Chinese cut flower producers. Many Chinese cut flower producers suffered big losses, because the selling price of lily cut flower was very low in the cut flower market in most of the time, even lower than the break even price sometimes. The main cause was excessive quantities of lily cut flowers were always offered in the market. That resulted from most cut flower producers could not get valid market information for reasonably planning their own supplying agenda. As a result, the supply exceeds demand made cut flower producers have to decrease the supplying price to sell lily cut flower. (Jiliang, L, 2009)

Here is the data formulation about the average selling price of cut flower of “**Siberia**” in the Chinese wholesale market in 2006 and 2007 as **Table 5** below. According to the

characteristics of the lily cut flower consumption in the Chinese market, the selling price of lily cut flower during Chinese festival period was indeed higher than other time (according to Chapter 2.1). And although the average selling price of lily cut flower was decreased a little bit in 2007 comparing with 2006, more than 80% of lily cut flowers are consumed during Chinese festival (according to Chapter 2.1); due to the break even price of lily cut flower was around €0.45/branch in the Chinese wholesale market (**Figure 9**), it looks like the Chinese cut flower producers could earn money.

Table 5 the average selling price of cut flower for “*Siberia*” in the Chinese wholesale market in 2006 and 2007

Month Year	1	2	3	4	5	6	7	8	9	10	11	12
2006	€0.36/ branch	€0.53	€0.47	€0.48	€0.49	€0.37	€0.23	€0.35	€0.40	€0.55	€0.52	€0.53
2007	€0.35/ branch	€0.52	€0.40	€0.48	€0.47	€0.26	€0.22	€0.33	€0.32	€0.53	€0.41	€0.47

(Source from: <http://www.yunnan-flower.org.cn> & checked by Chinese senior floriculture journalist)

However, actually, most Chinese cut flower producers difficultly earned the cost back during these two years, even during the festival period. That mainly caused by two reasons: the supplying quantity of lily cut flower and the selling price of lily cut flower. In China, most consumptions of lily cut flower are festival consumption. In case of the supplying quantity of lily cut flower is corresponding to the demand of the market, even though the consumption time and supplying time are concentrative respectively, the sale of lily cut flower would not be influenced. However, most cut flower producers blindly supplied lily cut flower for the festival consumption without any consideration about the situation of market. As a result, at the beginning of the festival period, originally the selling price of cut flower of “*Siberia*” could be very high (sometime the price even reached €1.1/branch) in the Chinese wholesale market. But the excessive quantity of lily cut flower in the market made the price decrease dramatically. In the end, the price was even lower than the break even price.

(Source from: personal communication with the general manager of Beijing Oriental Flower Trading Co., Ltd & the general manager of Zhe Jiang Lily Breeding Co., Ltd)

#### 2.3.3.2 Constrains for the development

Two **Oriental Hybrid** varieties occupy very big market share in China: **Siberia** and **Sorbonne**. It was more than 60% of total imported lily bulb in China (according to **Table 4**). Low level of product diversity results in higher levels of rivalry. Talking about the reasons, first, when commodity lily varieties were introduced into China, **Asiatic Hybrid** was not acceptable because of without fragrant scent; while **Siberia** and **Sorbonne** have fragrant scent and both were introduced earliest. Furthermore, there were not yet **L/A hybrid** and **O/T hybrid** in that time. Since that time, the Chinese

people have accepted them; Second, Dutch lily breeders didn't want to introduce new lily varieties to China because of benefit reason and security reason. For benefit reason, Holland has already got remarkable revenue through export **Siberia** and **Sorbonne** to China. Dutch lily breeders did not know whether they can continue receiving desirable revenue by selling other lily varieties; for security reason, the intellectual property right of lily varieties could not be protected very well in China.

*(Source from: personal communication with the general manager of Zhe Jiang Lily Breeding Co., Ltd)*

Another issue is most consumptions of lily cut flower are festival consumptions. Therefore, the consumption time is too concentrated. Consequently, the cut flower producers have to face fierce competition and hard scramble for the market.

*(Source from: personal communication with the general manager of Beijing Oriental Flower Trading Co., Ltd)*

Furthermore, limited market information acquisition is the biggest problem for the development of Chinese cut flower producers. So far, in China there is not yet an organization or association that especially works for offering effective and exact market information to the Chinese cut flower producers; "Two of a trade never agree" is a proverb in China. This culture factor indeed influence the communication between different Chinese cut flower producers. Therefore, most Chinese cut flower producers produce cut flower independently. Because of two reasons above, many Chinese cut flower producers blindly produce cut flower according to the status of previous sales season or depend on their own sensation. Although Chinese cut flower producers produce and offer lily cut flowers designedly, they are not able to judge whether their supplying time is suitable according to the situation of the market. That result in lily cut flowers are always offered into the market too intensively. The excessive lily cut flowers will influence the selling price of lily cut flower in the market dramatically.

*(Source from: <http://flower.aweb.com.cn/2008/6/3/1120080603093090.shtml> & personal communication with Chinese senior floriculture journalist)*

### **2.3.4 Lily bulb in the Chinese lily cut flower industry**

#### **2.3.4.1 The situation of lily bulb in China**

Quality is the most important issue for any commodity. The quality of cut flower is focused even more. No matter on the appearance or on the vase life of cut flower, high quality cut flowers always have good displaying. The high quality lily bulb is a foundation for high quality lily cut flower. Although there are lily bulbs with intellectual property rights in China, the quality of local lily bulb is low comparing with imported bulbs. Therefore, the Chinese lily cut flower producers prefer imported bulbs. Besides, although there are other countries for supplying lily bulbs in the world, in China most lily bulbs are imported from the Netherlands.

However, highly depend on the imported lily bulb, which result in the Chinese lily cut flower production is very passive. Therefore, China was working hard for improving

the quality of their own lily bulb. After striving for several years, the ability of self-supporting has already been improved a lot. For example, as **Table 6** shows, the quantity for Chinese lily bulb was grown in *Yun Nan* province from 2004-2007. That is really beneficial for relieving the pressure when the selling price of foreign bulb is very high. However, actually, the Chinese lily bulb still has very serious problems: high frequency for infected by diseases and do not yet achieve commercial production formally. Therefore, it is necessarily to continuously import lily bulb for satisfying the production of native lily cut flower.

Table 6 the quantity of Chinese lily bulb was grown in Yun Nan province from 2004-2007

Item Year	Quantity (million pieces)
2004	4.5
2005	9.7
2006	14
2007	21

(Source: <http://www.qzagri.gov.cn/Html/jghq/huahhq/200705090843479104.html>)

#### 2.3.4.2 Dutch flower bulb trading companies in China

So far, in the Chinese market four Dutch flower bulb trading companies have already got great achievement. They are: **De Jong Lelies Holland BV**, **Van den Bos Flowerbulbs BV**, **Jan de Wit en Zonen BV** and **P. F. Onings BV**. Many Chinese flower bulb importers are proud because they collaborate with these Dutch flower bulb trading companies.

During the communication with several Chinese flower bulb traders, the author understands these four Dutch flower bulb traders entered into China very early. Through continuous feeling around, they understand the Chinese market thoroughly. In recent years, these four Dutch traders established their own representative office in China respectively. That is more beneficial for them to understand and study the Chinese market further. At present, in China their names are the symbol of high guaranty for the qualified and stable quality of flower bulb. About the supply of these four Dutch traders, the Chinese flower bulb traders emphasized that these four Dutch trading companies have a same characteristic: stabilization. Not only they are able to offer stable quality, more important they can always export stable quantity of lily bulb every year. When the author looked for the reasons why these suppliers are able to offer stable quality, most informants expressed that these Dutch flower bulb traders always control the quality of flower bulb very well, especially for the incoming bulbs. All of them not only are able to conduct the quality of bulb before customers receive bulbs, but also they have high guaranty for the incoming bulb, because either they have their own contract growers for growing bulbs; and they frequently offer technical

support, or they directly purchase flower bulbs from qualified growers with good relationship.

(Source: personal communication with the Chinese customers of AgroNew BV)

#### 2.3.4.3 New lily bulb trading mode in China

A cooperation mode between a Chinese flower bulb trading company and a Dutch lily breeding company is very interesting. The name of the Chinese lily bulb trading company is: *Kunming Qian Hui Seed Ltd.* Several years ago, the company realized an **O/T hybrid** variety: **Manissa** would be favorable and popular in China in the coming years. So they contacted with the owner of this lily variety- the Dutch famous lily breeding company: **Gebr. Vletter & Den Haan** and bought the sole sale of franchise of this lily variety in China. Through introducing and popularizing this new lily variety in China for several years, **Manissa** has already been one of the most important lily varieties in China, especially in the south of China. This Chinese flower bulb trading company has got significant achievement in the Chinese lily market. At present, according to the stable high price of **Manissa** in China, through controlling the sales quantity in the market, the demand for **Manissa** always exceed the supplying quantity. So the annual profit of this Chinese flower bulb trading company is enviable. Furthermore, in China as long as cut flower producers produce **Manissa**, or flower stores sell **Manissa**, all of them can earn nice profit.

Table 7 the average selling price of *Manissa* and *Siberia* in the whole Chinese market

Variety Items	Manissa	Siberia
Flower bulb (€/1000pieces)	600	380
Cut flower (€/1000branches)	1000-1500 (wholesale price)	450 (wholesale price)

(Source from: personal communication with the general manager of Zhe Jiang Lily Breeding Co., Ltd)

#### 2.3.5 Requirements of the Chinese lily bulb importers

- Quality is the most important issue

Herewith the quality includes two aspects: *Performance* and *Stabilization*. First of all, for cut flower producer, the performance of flower bulb is the foundation for producing qualified cut flower. Low performance of bulb will cause low flowering rate or bad appearance of flower. That will directly influence the sale of cut flower so that the income of cut flower producers will be affected absolutely; second, the stabilization of flower bulbs is also very important. The stable performance causes stable production. Thereby, the stable market can be achieved. In order to guarantee the quality of incoming bulb, cut flower producers always like purchasing flower bulbs from the Chinese bulb traders (importers) who can offer the qualified and stable quality of flower bulbs.

- Deliver goods on time

According to the planting agenda of cut flower producers and normal shipment time, the Chinese bulb importers require the exporters deliver flower bulbs before a definite date. That means suppliers should guarantee producers receive bulbs before planting season.

- After sale service

The effective and efficient after sale service from traders (exporters) is also required from importers. First of all, if there is any quality problem of bulbs, exporters should quickly investigate reasons and give corresponding compensation. In addition, whether traders (exporters) can offer technical support for cut flower production, market support or any relevant support that can also judge the ability of a company. Besides, deliver correct variety and quantity according to the order of importers are the basic requirements as well.

### **2.3.6 The common quality problems of lily bulb in the business trade**

Due to improper handling behavior during storage or transportation, or other processes in the business trade, germination in advance, lose water, fungus infection and other pest and diseases are always occurred. Especially, the fungus infection of lily bulb is more common and serious problem for lily bulb import & export trade than others.

#### *2.3.6.1 Causes*

- The fungus infection of lily bulb



- *Internal factors*

#### **Wound**

Fungus infects bulbs mainly through wound (Rees A.R., 1992). Infection is favored by moist conditions (The Connecticut Agricultural Experiment Station, 2007). The infection is caused by the Fungus and is transmitted during storage when the fungus penetrates tissue via wounds (International flower bulb center). Injured or wounded bulbs are susceptible (De Hertogh and Le Nard, 1993).

Contamination of bulbs with spores of Fungus demonstrated that the fungus is able to enter bulbs only through fresh wounds. The fungus grows easily in damaged tissue and bulbs often sustain damage during harvesting, cleaning, grading or transportation.

Wounds are often formed due to improper handling during harvest by bulbs growers. In old days, bulbs are harvested by hand, but nowadays, most bulbs are harvested by machines that result in wound formation. While fungus is in everywhere it could be on the handling machines, on the operators or in the air, so it easily to enter into the bulbs through the wounds

*(Source from: the Dutch lily expert of Wageningen research center).*

Obviously, wound is the source for fungus infection of flower bulbs. In order to minimize fungus infection in the chain, it is necessary to cut off the source of infection. That means to minimize the wound.

#### - *External factors*

In order to place quality lily bulbs into the various markets, the bulbs must be properly packaged, stored and transported. It is important that temperature, ventilation, gas composition, and moisture requirements be considered (*De Hertogh and Le Nard, 1993*). So the temperature, moisture condition, atmosphere composition and ventilation as the most important factors influence the quality of lily bulb throughout the supply chain. Each of these factors will be formulated in *Appendix 1*.

#### 2.3.6.2 *Control*

The germination of lily bulb in advance and bulb loses water are common quality problems because of incorrect environment control. Technically speaking, as long as control environment properly, the occurred probability of these problems could be very low. Whereas, it is difficult that fungus infection is prevented. At present, almost all practical solutions are about how to minimize the fungus infection. It's not possible to avoid the infection completely. There are seven indicators to evaluate the level of quality control of lily bulb in the supply chain. As follows:

*Indicator 1: Level of fungus infection (More information in *Appendix 2*)*

*(How does the fungus disease growth and situation of infected on lily bulb at each stage of the chain?)*

*Indicator 2: Level of storage Temperature(More information in *Appendix 3*)*

*(What is the optimum temperature for storage lily bulb and what is the level of storage temperature in the storage centre and transportation system?)*

*Indicator 3: Level of moisture condition(More information in *Appendix 4*)*

*(What is the optimum moisture condition for storage lily bulb and what is the level of moisture condition in the storage centre and transportation system?)*

*Indicator 4: Level of atmosphere composition(More information in *Appendix 5*)*

*(What is the optimum atmosphere composition for storage lily bulb and what is the level of atmosphere composition in the storage centre and transportation system?)*

*Indicator 5: Level of ventilation(More information in *Appendix 6*)*

*(What is the optimum ventilation for storage lily bulb and what is the level of ventilation in the storage centre and transportation system?)*

*Indicator 6: Level of communication(More information in Appendix 7)*

*(What form of communication is effective for lily bulb chain? And how is the information flow throughout the chain?)*

*Indicator 7: Operators handling behavior(More information in Appendix 8)*

*(What factors influencing operators handling behavior and how is the level of operators handling behavior throughout the chain?)*

#### *2.3.6.3 Compensation for quality problems in the business trade*

Once quality problems are occurred, importers always ask the corresponding compensation from exporters. For example, if there are 10% of total supplying bulbs have quality problems, either importer will ask the compensation for the corresponding value of these 10%, or will ask some discount for next supplying. In this case, importer should offer the potent evidences that can prove the quality problems, such as Photo or the inspection report from local quality institution. Generally speaking, the exporter can give compensation only importers can show enough evidences.

#### **2.3.7 Factors influence lily bulb import in China (PEST analysis)**

- Political factors

Due to less rigorous policy and regulation for protecting the intellectual property rights of flower variety, and some Chinese farmers privately propagated flower bulbs by seed bulb, the Netherlands have stopped selling seed bulb to China since several years ago. Moreover, the Dutch lily breeders very carefully export other lily products to China. The seed bulb can be seemed as the seed of the final commodity bulb. Through plant seed bulbs into the final commodity bulb, it can help to solve the high cost due to depending on the import. However, planting seed bulb will be charged according to the corresponding planting area. For example, “**Sorbonne**” is a very favorable in the world. If purchasers want to buy the seed bulbs of “**Sorbonne**” and grow them into commodity bulbs, the purchasers need to pay around €1000/ha to the breeder (seed owner) in the Netherlands. The breeder is able to restrictedly extend the development of “**Sorbonne**”. Meanwhile, the breeder can take back the cost for breeding this variety.

- Economic factors

In the Chinese market the economic factor is still the main factor for influencing continuous purchasing. In case no matter how the price of imported lily bulbs is, bulb importer can always get profit through sell bulbs to local cut flower producers, the price of imported bulb will not be a problem. However, actually if the cost price for purchasing imported bulb is too high, the cut flower producers are willing to produce cut flower by second generation bulb (the bulb has already been used to produce cut flower by one time). In this case, it's difficult that bulb importers sell bulbs to cut flower producers, let alone to import more bulbs.

- Social factors

The cultural factors are non-negligible factors in China. The Chinese people believe that purchasing from familiar supplier is always much better than new supplier. They

always consider the new supply more carefully. Besides, like in 2006, according to the Chinese culture it was not good year for marriage. Normally, the usage quantity of lily cut flower in wedding is about 30% of total lily cut flower production in China. Once less wedding would be held because of local culture, lily cut flower would be less consumed.

- Technical factors

The technical factors are mainly considered when the Chinese cut flower producers decide to plant new or familiar lily varieties. For familiar varieties, almost all cut flower producers have enough experience to handle them. Due to the higher selling price of new varieties in the market, cut flower producers also want to produce new varieties. However, most producers do not understand whether they can produce the new varieties as producing the old varieties. They are afraid of losing money because they can not produce new lily varieties successfully. In the end, planting familiar varieties is a more common and safer way for Chinese cut flower producers to get money back. While Chinese bulb traders always import lily bulbs depending on the requirements of cut flower producers. Normally, technical factors for cut flower production won't influence these traders' operation work.

## **2.4 The lily bulb industry in the Netherlands**

### **2.4.1 General introduction**

The Netherlands is the main country for lily bulb production and lily bulb export in the world. Every year, the total area of lily bulb production is around 3700 ha. Total production of lily bulb is about 1.8 billion pieces.

### **2.4.2 The subsector map of Dutch lily bulb production**

As **Figure 5** shows, the whole process for lily bulb production and supplying can be divided into three modes:

- a. Bulb growers purchase seed of lily bulb from variety owner, and pay for it according to the growing area. After growing, bulb grower harvest bulbs and process bulb simply, such as washing and drying. Through auction or intermediary mainly, bulb growers sell lily bulbs to Dutch lily bulb exporters or the native market.
- b. This mode is almost same as the first one. Just one point is different, that is some Dutch lily bulb exporters directly purchase lily bulb from bulb growers.
- c. Some Dutch lily bulb exporters have their own contract bulb growers. That means during the producing stage, lily bulb exporters offer seed of lily bulb to bulb growers for free. The bulb growers are just in charge of growing lily bulb for these exporters. In the end, bulb exporters will also pay to bulb growers according the total production area. Generally speaking, only the bulb exporters have fixed and stable sales market, this mode for getting lily bulb can be adopted.

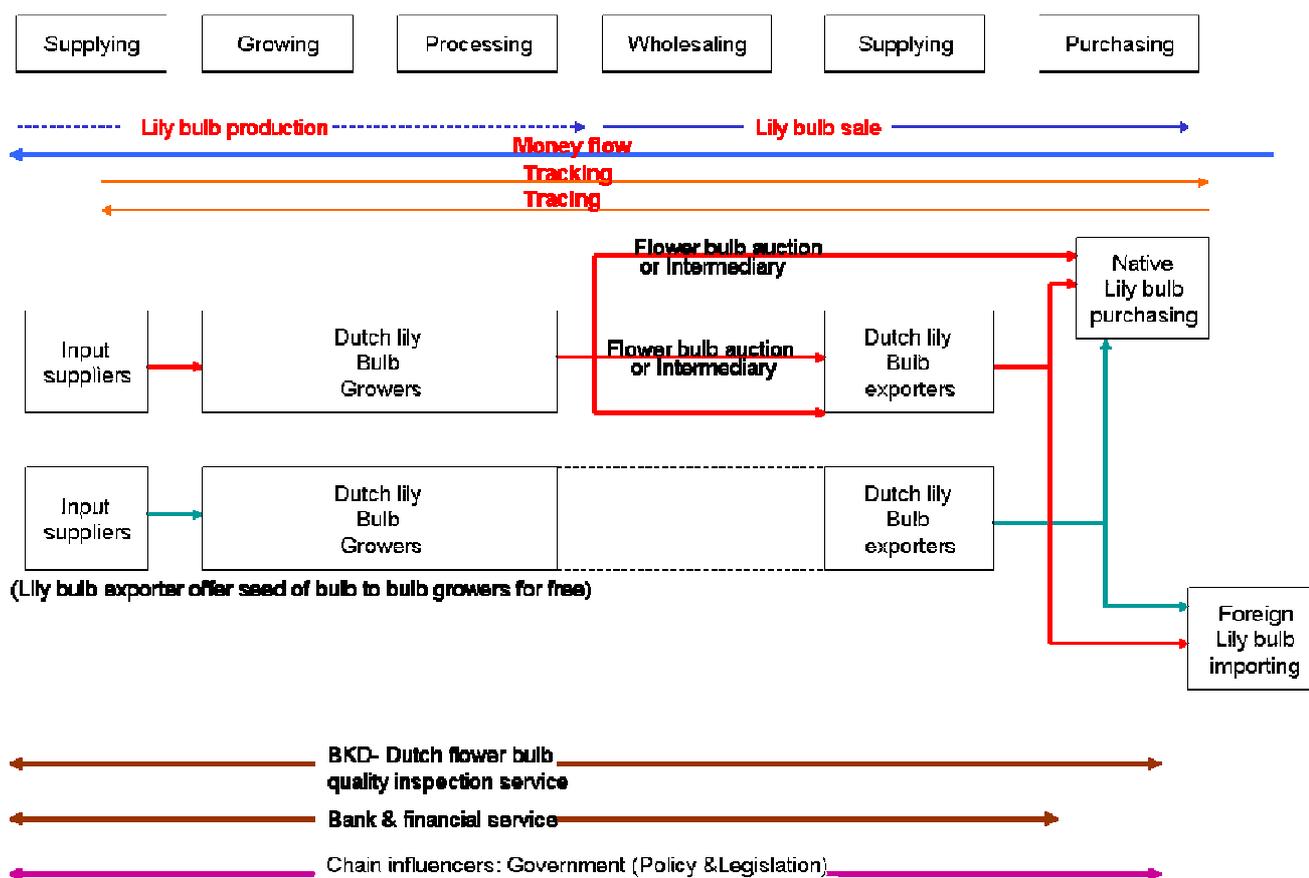


Figure 5 the subsector map of Dutch lily bulb production

### 2.4.3 The development in recent years

Since 2007 the total area of the Dutch lily bulb production had already been decreased obviously. In 2008 the decreased area was about 25% comparing with 2007 because Dutch lily bulb growers did not get nice revenue, even lost money in recent years. The quantity of total production was also decreased about 15%. Here is an example, as **Table 8** shows, the total area for producing lily varieties “**Siberia**” and “**Sorbonne**” was decreased a lot from 2007 to 2008 in the Netherlands. That resulted in the supplying quantity of Dutch lily bulb for the international market was also decreased. However, the Dutch lily bulb is still the most favorable in the world market. So the price of Dutch lily bulb has increased gradually

Table 8 the total area for producing lily varieties “*Siberia*” and “*Sorbonne*” in 2007 and 2008

Year \ Variety	2007	2008
<b>Siberia</b>	178 ha	151 ha
<b>Sorbonne</b>	171 ha	153 ha

(Source from: <http://news.jgny.net/2009/8-21/12128.htm>)

Besides, the quality of the Dutch lily bulb was degraded in past two years. There were two causes: changed climate and the degraded quality of maternal character of lily bulb. In recent years, the Dutch climate was changed. Like in 2007, too much rainfall made lily bulb grow too fast. That resulted in the quality of lily bulb was degraded because of lack of the nutrition accumulation. On the other hand, the quality of maternal character of some lily bulbs was degraded also. For example, the **Oriental Hybrid** lily bulb “**Siberia**” and “**Sorbonne**” are very popular varieties in the current Chinese market. However, the quality of mother plant worsen gradually due to these varieties have been produced for long time. Therefore, the quality problems of these lily bulbs are worse and worse, such as fungus infection is always occurred.

*(Source from: personal communication with the general manager of Zhe Jiang Lily Breeding Co., Ltd)*

#### **2.4.4 Business mode for lily bulb**

At present, the most lily bulbs are traded through the “intermediaries”. The flower bulbs will go directly from the grower to the buyer without entering the auction halls. These agencies also take care of the financial settlement of the transactions. HOBAHO and CNB (Cooperative Netherlands Bulb Centre) are the two foremost flower bulb intermediaries in the Netherlands. For example, when Dutch bulb exporters receive orders from flower bulb importers, normally Dutch bulb exporters will contact with intermediary and ask them to help to purchase from bulb growers. When the supply can be achieved, intermediary will send the supply contracts to bulb grower and Dutch bulb traders at the same time. According to the supply contract, growers should offer the required bulbs completely before an exact date. Later, the goods delivery from growers to exporters will also be arranged by intermediary. Of course, Dutch bulb exporters and bulb supplier both should pay 2.5% of the value of the supply contract as service fee to the Intermediary.

*(Source from: [http://www.aboutflowerbulbs.com/bulb\\_globalization.htm](http://www.aboutflowerbulbs.com/bulb_globalization.htm) & personal communication with Dutch lily bulb growers)*

#### **2.5 Global lily bulb production**

Due to the influence of global financial crisis, the demand of lily cut flower has already been decreased a lot in the world. That result in the global growing area of lily bulb was also decreased gradually. So far, the total growing area of lily bulb is around 5200 ha in the world. The Netherlands is still the main country for lily bulb production and lily bulb export in the world. The area of annual Dutch lily bulb production is about 3700 ha. It is about 71% of world production area. The quantity of annual Dutch lily bulb is about 1.8 billion pieces. Other main lily bulb production and export countries are *France, Chile and New Zealand*. The total annual production is about 0.7 billion pieces. As below **Table 9** shows.

Table 9 Top 6 countries for lily bulb production area in the world in 2006

<b>Item</b> <b>Country</b>	Production area (ha)	Percentage (%)	Production quantity (billion pieces)
Holland	3700	71	1.87
France	520	10	0.26
Chile	260	5	0.14
The US	255	4.9	0.13
Japan	240	4.6	0.11
New Zealand	130	2.5	0.06

(Source: <http://www.yunnan-flower.org.cn/info/11251-1.htm> & checked by the Chinese senior floriculture journalist)

For lily bulb that produced in the southern hemisphere, such as in Chile and New Zealand, the harvest time is around in July, and the sales time is started in October. That is another source of goods for global lily bulb import, especially for those bulb importers who did not order sufficient quantity in the first half year.

## CHAPTER 3 RESEARCH RESULTS

### 3.1 The supply chain by AgroNew BV exports lily bulbs to China

The following flow chart represents the lily bulb supply chain of AgroNew BV from the Netherlands to China.

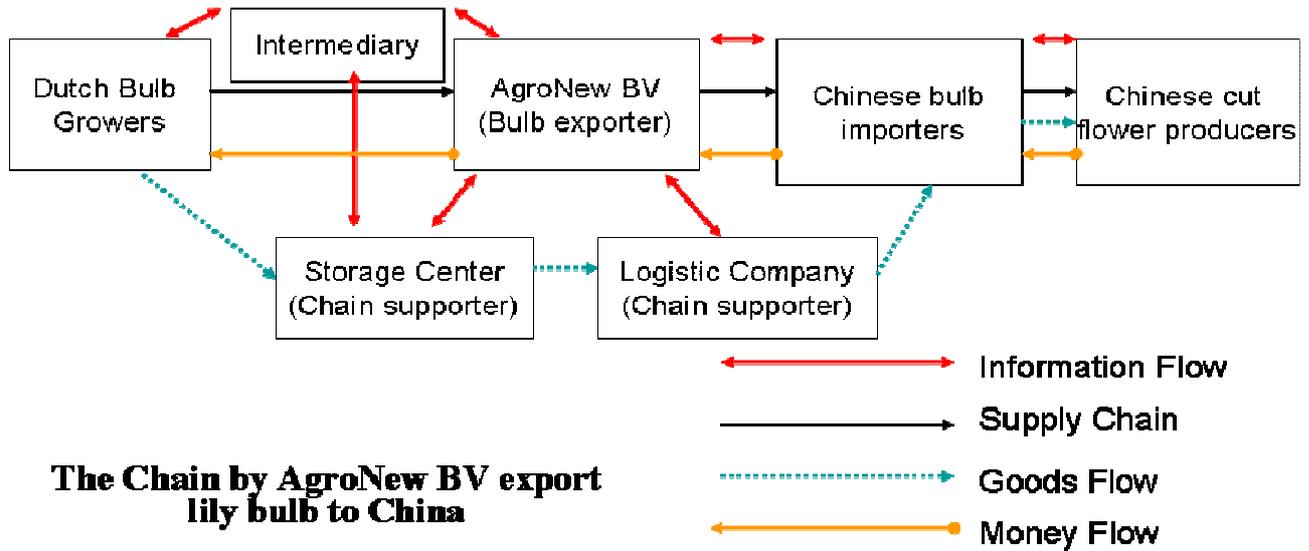


Figure 6: the supply chain by AgroNew BV exports lily bulb to China

From the **Figure 6** above, the “supply chain” is composed by four actors: Bulb Grower- Bulb exporter- Bulb importer- Cut flower producer. Besides, the fluent goods flow highly depends on the work performance of storage center and logistic company according to the track of “goods flow”; while according to the track of ‘information flow”, intermediary’s performance can decide whether AgroNew BV can get qualified bulbs because there is no contact between bulb growers and bulb exporter. Besides, there is also no any communication either between AgroNew BV and Chinese cut flower producers. Basically, AgroNew BV almost just talks with their customers: the Chinese flower bulb traders (importers). About “money flow”, it should be formulated about the relationship between purchasers and suppliers; and all participators should own bulbs in the chain. Therefore, as the above figure shows, the track of “money flow” is just contrary to the “supply chain”.

### 3.2 The value chain analysis for AgroNew BV exports lily bulbs to China

The value chain can be divided into two aspects: “Purchasing” aspect and “Supplying” aspect. “Purchasing” aspect indicates the Chinese part of the value chain, which includes Chinese lily bulb import and Chinese lily cut flower production; “Supplying” aspect indicates the Dutch part of the value chain, which includes the Dutch lily bulb growers, AgroNew BV as a bulb exporter, Intermediary, Storage center and logistic company.

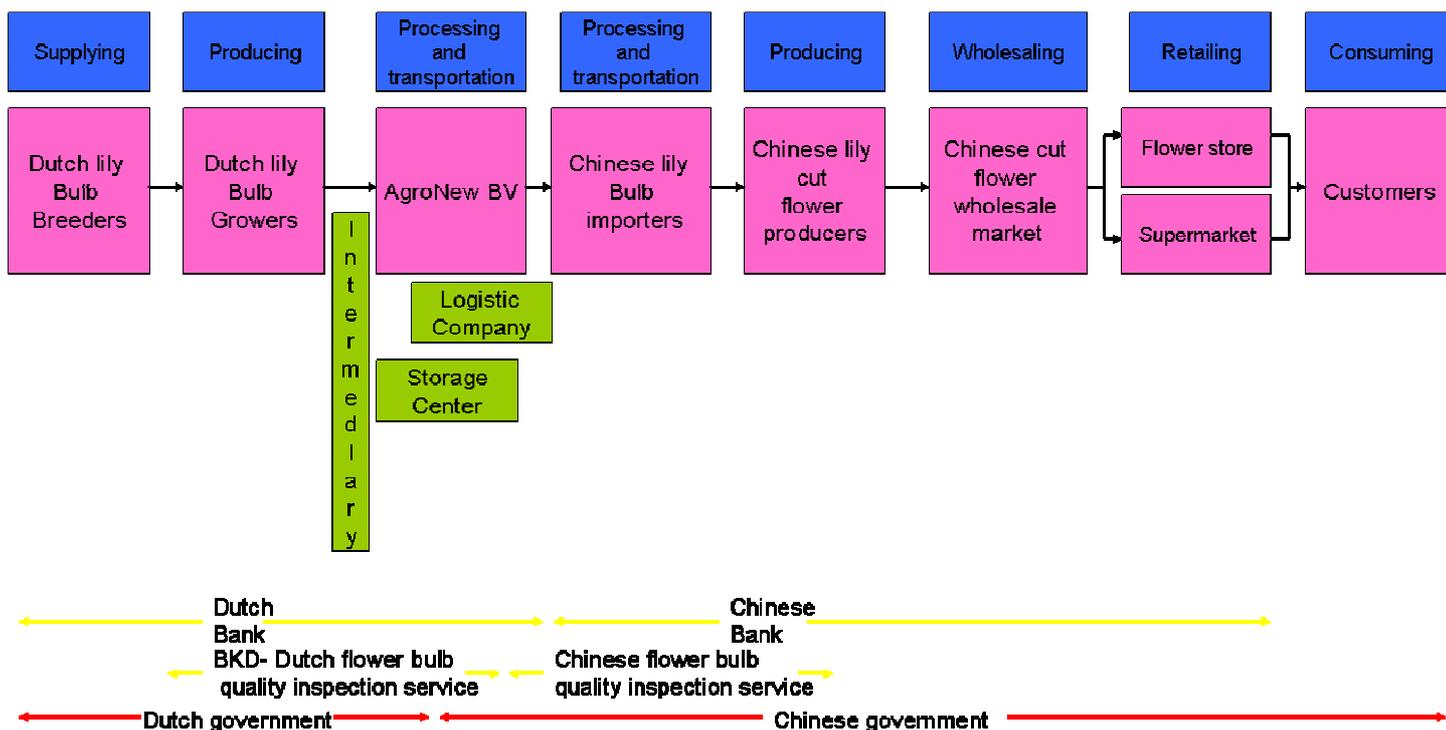


Figure 7: the value chain by AgroNew BV exports lily bulb to China

### 3.2.1 Role and functions of stakeholders

The lily bulb chain in AgroNew BV case, the main actors are: Dutch lily bulb breeders, Dutch lily bulb growers, AgroNew BV, Chinese lily bulb importers, Chinese lily cut flower producers, Chinese cut flower wholesale market, different set of retailers and final consumers. Besides, AgroNew BV accomplishes lily bulb export depending on the assistance of intermediary, storage center and logistic company. Furthermore, there are also chain supporters and influences involved in the chain (*Table 10*).

Table 10 Chain stakeholders and functions

Stakeholder	Role	Major functions
Dutch lily bulb breeders	Actor	<ul style="list-style-type: none"> <li>▪ Breed lily varieties</li> <li>▪ Offer seed of lily bulbs to bulbs growers</li> </ul>
Dutch lily bulb growers	Actor	<ul style="list-style-type: none"> <li>▪ Growing and harvesting lily bulbs</li> <li>▪ Scheduled field inspection and bulbs maintenance</li> <li>▪ Crop protection are done based on personal experience from the past</li> <li>▪ Quality control during growing and harvesting stage</li> <li>▪ Sales activities</li> </ul>

AgroNew BV	Actor	<ul style="list-style-type: none"> <li>▪ Purchase lily bulbs from bulb growers via intermediary</li> </ul> <p>(Intermediary helps AgroNew BV purchase lily bulb from Dutch lily bulb growers. And guarantee AgroNew BV receive lily bulb on time)</p> <ul style="list-style-type: none"> <li>▪ Process and store lily bulb before delivering to bulb importers</li> </ul> <p>(Storage center- HOBACHO helps to finish this part of work, such as quality inspection for incoming bulbs, washes and cleans the incoming bulbs and stores the bulb until the delivery date)</p> <ul style="list-style-type: none"> <li>▪ Deliver lily bulbs to bulb importers</li> </ul> <p>(Logistic company is in charge of loading lily bulb from storage center and transport lily bulbs to bulb importers)</p> <ul style="list-style-type: none"> <li>▪ Sales and exporting activities</li> </ul>
Chinese lily bulb importers	Actor	<ul style="list-style-type: none"> <li>▪ Purchase lily bulbs from AgroNew BV</li> <li>▪ Purchase and import activities</li> <li>▪ Quality monitoring</li> <li>▪ Information feedback</li> <li>▪ Sell lily bulbs to local cut flower producers</li> </ul> <p>(Three Chinese customers of AgroNew BV are bulb traders)</p>
Chinese lily cut flower producers	Actor	<ul style="list-style-type: none"> <li>▪ Purchase lily bulb from local lily bulb importers</li> <li>▪ Produce lily cut flowers</li> <li>▪ Quality control and monitoring</li> <li>▪ Information feed back</li> <li>▪ Sales activities</li> </ul>
Chinese cut flower wholesale market	Actor	<ul style="list-style-type: none"> <li>▪ Purchase lily cut flower from local lily cut flower producers</li> <li>▪ Implements transportation of lily cut flowers</li> <li>▪ Storage</li> <li>▪ Quality control and monitoring</li> <li>▪ Information feed back</li> <li>▪ Sell lily cut flowers to local retailers</li> </ul>
Retailers	Actor	<ul style="list-style-type: none"> <li>▪ Purchases lily cut flower from wholesale market</li> <li>▪ Marketing and advertisements of the lily cut flowers</li> <li>▪ Quality control and monitoring</li> <li>▪ Information feed back</li> <li>▪ Sell lily cut flowers to consumers</li> </ul>

Consumers	Actor	<ul style="list-style-type: none"> <li>▪ Purchas lily cut flower from retailers</li> <li>▪ Dictates market trends</li> <li>▪ Information feedback</li> </ul>
Dutch Bank	Supporter	<ul style="list-style-type: none"> <li>▪ Provide short/long term loans</li> <li>▪ Loan</li> <li>▪ Other finical services</li> </ul>
Chinese Bank	Supporter	<ul style="list-style-type: none"> <li>▪ Provide short/long term loans</li> <li>▪ Loan</li> <li>▪ Other finical services</li> </ul>
Dutch flower bulb inspection service (BKD)	Supporter	<ul style="list-style-type: none"> <li>▪ Guard the quality of the flower bulbs cultivated in the Netherlands</li> <li>▪ Provide certification services</li> <li>▪ Yearly based quality monitoring</li> </ul>
Chinese flower bulb inspection service	Supporter	<ul style="list-style-type: none"> <li>▪ Guard the quality of the imported flower bulbs</li> <li>▪ Provide certification services</li> <li>▪ Yearly based quality monitoring</li> </ul>
Government	Influencer	<ul style="list-style-type: none"> <li>▪ Formulation of agriculture sector polices</li> <li>▪ Legislation and taxation</li> </ul>

*(Source from: personal communication with the general manager of AgroNew BV)*

### 3.2.2 The relationship between each actor

As **Figure 7** shows, in the Chinese part, according to the investigation, the situation of Chinese lily cut flower market influences the positivity of the Chinese lily cut flower producers. Especially, the depressed price of lily cut flower makes cut flower producer cautiously purchase lily bulb from Chinese lily bulb importers; in terms of the Chinese importers import lily bulb, the import quantity highly depends on the quantity that the Chinese lily cut flower producers are going to plant.

As a flower bulb exporter, AgroNew BV sell lily bulb highly depends on the demand of three Chinese importers in China. Although the storage center, logistic company and intermediary don't own lily bulb, their handling behavior decides whether AgroNew BV can accomplish fluent export and their supply can satisfy customers' requirement. Besides, it is very important that the quality of lily bulb that bulb growers offer is always foundation for the final supply of AgroNew BV.

### 3.2.3 Cost and margin share in the chain

Normally, the price of lily bulb on the price list is for 1000 pieces of bulbs between Dutch flower bulb growers, Dutch flower bulb traders (exporters) and the Chinese bulb traders (importers). This is also the common way for formulating the price of lily bulb in the international trade.

In order to formulate the cost and margin share in the value chain of AgroNew BV,

there is an example about AgroNew BV exports *lily oriental hybrid: Siberia 16/18* to China. Hereby, this lily bulb exports business of AgroNew BV as **Table 11** shows:

Table 11 AgroNew BV exports *Siberia 16/18* to China

Items	
Quantity of Container	1
Quantity of Crates	1040
Quantity of lily bulbs per crate (as <b>Figure 8</b> ) (Piece)	200
Quantity of lily bulbs (Piece)	208,000
Service cost for intermediary (AgroNew BV pays for it)	2.5% of Bulb value (buying price) (See <b>Figure 8</b> )
Cooling cost that bulb importers should pay (€/crate)	0.25
Insurance cost that bulb importers should pay	5% of shipping cost
Transportation cost (€) (Chinese lily bulb importers pay for it)	3600
Cost for the service of Chinese sea port (€) (Chinese lily bulb importers pay for it)	1000

(Source from: AgroNew BV, 2009)



Figure 8 the crate for containing lily bulbs

- First of all, in **Figure 9** the prices of lily bulb and lily cut flower were unified for a thousand pieces and a thousand branches. The bulb growers need to pay around €1000/ha to the breeders (seed owner) for producing “**Siberia16/18**” in the Netherlands, and according to the average production quantity of lily bulb is about 300,000 pieces/ha, the paying cost is about €4/1000 pieces lily bulb for lily bulb growers.

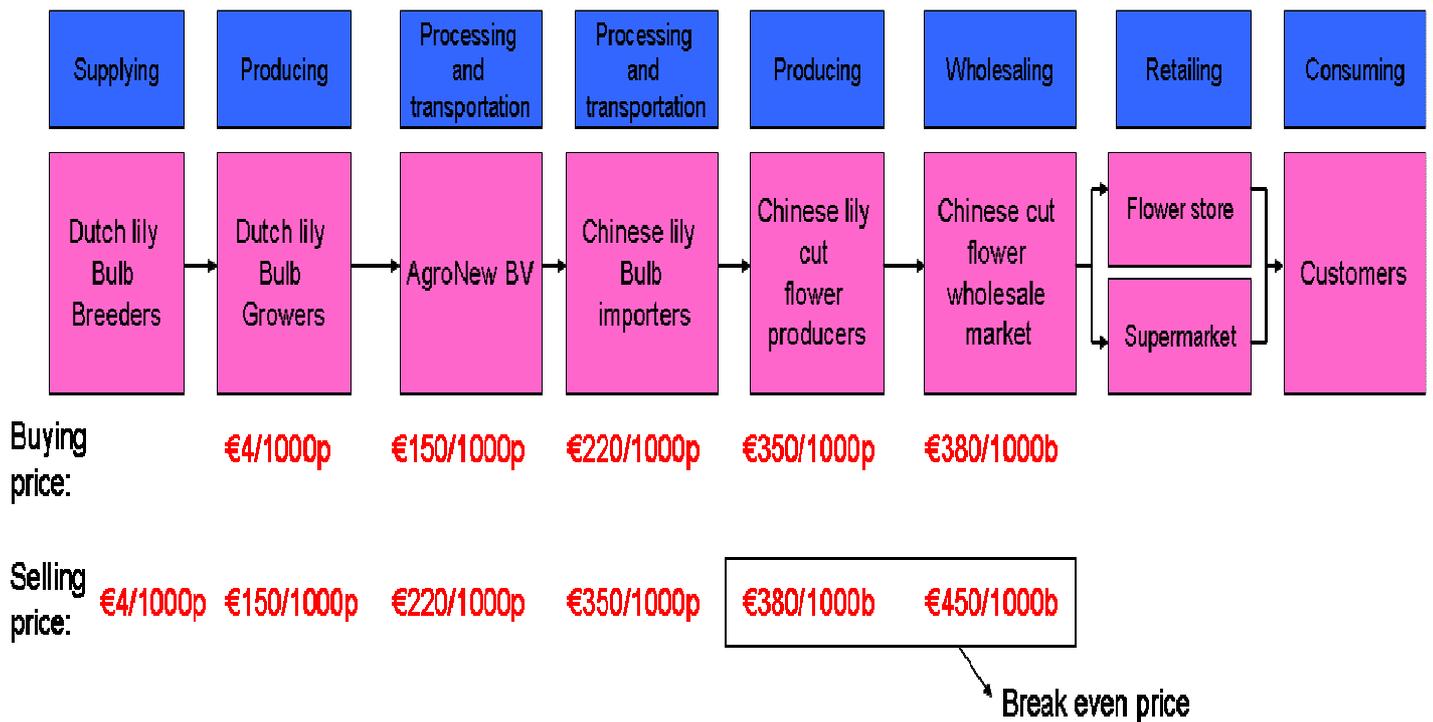


Figure 9 the average cost and selling price of Lily Oriental hybrid variety: *Siberia 16/18* in each  
 (Source from: <http://bbs.hongyue.com/thread-505-1-1.html> & personal communication with general manager of AgroNew BV)

Besides, as figure shows above, the average selling price of lily cut flower for the Chinese cut flower producer and the Chinese wholesale market respectively signify the price what they can accept, because if they sell lily cut flowers with this price, at least they can get all cost back.

(Source: personal communication with the general manager of Ling Yuan Flower Commodity Market)

- Secondly, according to **Figure 9** and **Table 11**, **Table 12** and **Table 13** were formulated respectively. As **Table 12** and **Table 13** show, the cost and gross margin were indicated for AgroNew BV and Chinese lily bulb importers in this value chain. In reality, for lily bulb export, AgroNew BV also needs to pay the service cost for storage center and the service cost of Dutch lily bulb inspection association. While for lily bulb import, the Chinese importers also need to pay the service cost for bank when they transfer money to exporters via bank and other cost.

(Source: personal communication with the general manager of AgroNew BV)

Table 12 the cost and gross margin for AgroNew BV in this value chain

AgroNew BV				
Item	Unit	Unit rate (€)	Quantity (piece)	Cost (€)
		(Source)	(Source)	(Calculation result)
<b>1. Cost for purchasing lily bulb</b>				
Siberia 16/18	Per thousand	150	208,000	<b>31,200</b>
<b>2. Other cost (Service fee is 2.5% of cost for purchasing bulbs)</b>				<b>780</b>
<b>3. Value for selling lily bulb</b>				
	Per thousand	220	208,000	<b>45,760</b>
<b>4. Gross margin</b>				<b>13,780</b>

Table 13 the cost and gross margin for Chinese lily bulb importers in this value chain

Chinese lily bulb importers				
Item	Unit	Unit rate (€)	Quantity	Cost (€)
		(Source)	(Source)	(Calculation result)
<b>1. Cost for purchasing lily bulb</b>				
Siberia 16/18	Per thousand	220	208,000	<b>45,760</b>
<b>2. Other cost</b>				
Cooling cost	Per crate	0.25	1040	<b>260</b>
Transportation cost	Per shipment	3600	1	<b>3,600</b>
Insurance cost (5% of transportation cost)				<b>180</b>
Service cost for Chinese sea port	Per time	1000	1	<b>1,000</b>
<b>3. Value for selling lily bulb</b>				
	Per thousand	350	208,000	<b>72,800</b>
<b>4. Gross margin</b>				<b>22,000</b>

### 3.2.4 The Purchasing aspect of whole value chain

#### 3.2.4.1 Feedback of Chinese lily cut flower producers

The Chinese lily cut flower producers expressed that in order to guarantee the quality of lily cut flower they prefer imported lily bulbs for producing cut flower. However, the production cost of lily cut flower has been increased a lot in China, as **Table 14** shows. Because of that, the Chinese cut flower producers always consider the economic factors when they seek for producing qualified lily cut flowers. Besides, actually, the Chinese lily cut flower producers very cautiously purchase lily bulbs at present. Meanwhile, they more strictly require for the quality of lily bulbs from local bulb importers. Furthermore, better after sale service is required by the Chinese lily cut flower producers, such as some technical supports for quality control during producing stage.

Table 14 the production cost of lily cut flower (*Siberia 16/18* for instance)

Year Items	Past	Now
Price of cut flower for break even (€/branch)	0.18	0.38

(Source: personal communication with the general manager of Ling Yuan Flower Commodity Market)

About the Chinese lily cut flower market, the Chinese cut flower producers emphasized, “Low selling price does not mean the demand of market is not good either. Sometimes, the demand of market could be very big in a period of time and the selling price is also desirable at the beginning. However, actually, many cut flower producers are going to offer lily cut flowers in the same time. As a result, excessive lily cut flowers are offered in the market. When the status of supply exceed demand is occurred, the selling price will be decreased absolutely.” Actually, in order to avoid the concentrated supply, many Chinese lily cut flower producers choose to wait and see the market and prefer purchasing lily bulb by spot transaction for minimizing loss.

(Source: personal communication with two lily cut flower production organizers)

#### 3.2.4.2 Feedback of AgroNew BV's Chinese customers (lily bulb traders)

- About the performance of AgroNew BV

In 2008, the total import quantity of lily bulb was decreased about 20% in China comparing with 2007. According to the feedback of current three Chinese customers of AgroNew BV, their total import quantities of lily bulb were also decreased respectively in 2008. However, as **Table 15** shows, the author was amazed for the data that these three Chinese importers provided about their import quantity for lily bulb in 2008. It was shown as **Figure 10**.

Table 15 the quantity by AgroNew BV's Chinese customers imported lily bulb in 2007 and 2008

Year Customers	2007		2008	
	Total	From AgroNew	Total	From AgroNew
A(x 1000 pieces)	8000	780	7500	468
B(x 1000 pieces)	8300	416	8000	208
C(x 1000 pieces)	6400	624	6000	312

(Source: personal communication with three Chinese customers of AgroNew BV)

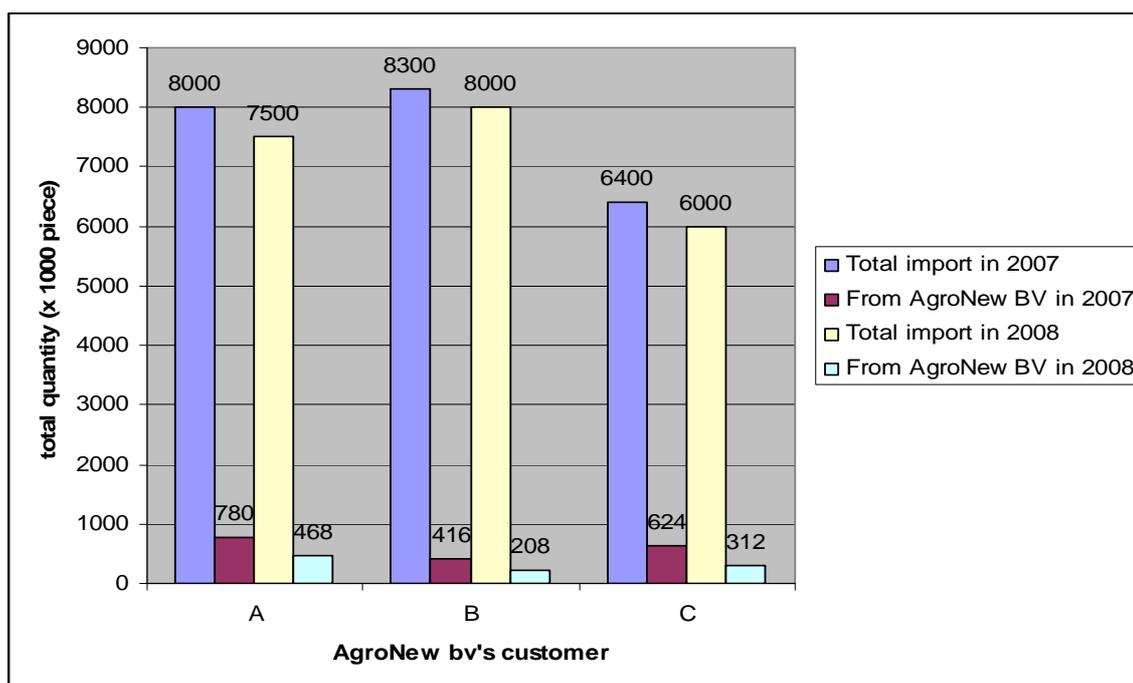


Figure 10 the quantity by AgroNew BV's Chinese customers imported lily bulb in 2007 and 2008

The decreased quantity what they bought from AgroNew BV was the main part, even almost same as the decreased quantity what these Chinese customers imported. Through detailed investigation and enquiry, the author understands the reasons as follows:

- There were no too much differences about price between AgroNew BV and other suppliers.
- AgroNew BV was not the only supplier for these bulb importers. In fact, each of them had other two or three familiar suppliers. AgroNew BV just started business relationship with these Chinese bulb importers in 2007. Whereas, these Chinese bulb importers have cooperated with their familiar suppliers at least 4 years. Comparing with these familiar suppliers, AgroNew BV only had 10-20% portion of annual demand of these bulb importers. Once the import quantity had to be decreased, the portion of AgroNew BV was affected firstly.
- AgroNew BV was able to satisfy the basic requirements of these bulb importers. But as a new supplier, AgroNew BV's supply doesn't have any feature for supplying price, quality and after sale service. Especially, the fungus infection of lily bulb was also the main quality problem in the supply of AgroNew BV.
- Once there was any quality problems, due to the unfamiliar relationship, AgroNew BV spent more time to handle the compensation.

A Chinese customer expressed, "AgroNew BV is qualified for offering flower bulbs in China. But as a new supplier, they might not yet understand the Chinese market very well. Comparing with my other suppliers, AgroNew BV doesn't have any strength to compete with them in the Chinese market."

- About the performance of these three Chinese bulb traders' familiar suppliers

The long cooperation between each other makes these Chinese bulb traders have stable business with their own familiar suppliers. No matter in the quality of lily bulb, or in the after sale service, the favorable and desirable supply and service from the familiar suppliers is always the foundation for protecting and promoting the collaboration between each other. Especially, good understandings for the Chinese lily cut flower market that make these suppliers offer more efficient services.

#### *3.2.4.3 The business of other Chinese lily bulb traders (importers) in China*

One lily bulb trader expressed, "at the beginning of 2007, in my company the order quantity of lily bulb had been more than 4 million pieces. However, in the same period of 2008, the order quantity of lily bulb was only about 1 million pieces. Most cut flower producers were not willing to order lily bulbs in advance because of the persistent stagnant lily cut flower market in 2006 and 2007. That increased the pressure for our lily bulb sale. So we had to decrease the quantity by order from the Netherlands." Besides, these Chinese lily bulb traders also emphasized, in order to tightly hold their customers (Chinese cut flower producers) they also need to continuously improve their service for offering better supply. For example, in the case of guarantee the quality of lily bulb, they should also offer technique support to cut flower producers during the producing stage. However, the scope of business of these Chinese bulb traders is mainly for lily bulb trading. They are not good at offering specialized support. Fortunately, for increasing the marketing competitive strength, the familiar lily bulb suppliers (Dutch flower bulb exporters) of these Chinese lily bulb traders offer better after sale service for lily bulb trading between each other. Moreover, they actively help these Chinese lily bulb traders offer technique support to Chinese cut flower producers.

*(Source from: communicate with the general manager of Zhe Jiang Lily Breeding Co., Ltd and the general manager of Zhe Jiang Hong Yue Seed Co., Ltd)*

#### **3.2.5 The Supplying aspect of whole value chain**

Although AgroNew BV tried to offer more competitive price, due to the influence of global financial crisis AgroNew BV still needed to ensure its own revenue firstly. Therefore, AgroNew BV was aware of the importance for supplying the stable quality and paid attention to quality control during supplying. However, it's not possible that AgroNew BV offered better supply for stable quality of lily bulb. The fungus infection was still the main quality problem. That made AgroNew BV as a new supplier had less attraction in the Chinese market.

Therefore, it is necessarily to investigate and evaluate how the performance of each participator was in the supplying aspect of the value chain; and to find out whether the lily bulbs were infected by fungus due to the behaviour of participators. According to indicators that were formulated in *Chapter 3.2.6.2*, these indicators are the basis to evaluate the level of quality control of lily bulb in the supply chain.

- Summary of result

Herewith the summary of the results for the level of indicator and which factors play the important roles or have real effect on quality problems of lily bulb throughout the supply chain have been indicated as **Table 16**. It is clearly to see that three evaluations are scored as low level. All are concerned at grower stage. For the performance of each participator in the supplying aspects of AgroNew BV's value chain, the research process was shown in **Appendix 9**.

Table 16 the summary of results for evaluating the performance of each participator in the supplying aspects of the value chain

<b>Indicator</b>		<b>Results</b>	<b>Level of performance</b>
<b>Fungus infection</b>	<i>At grower stage</i>	Wounds formation	Low
	<i>At storage stage</i>	No more wounds formation	Between medium and high
	<i>At transport stage</i>	No more wounds formation	High
<b>Storage temperature</b>		In the optimum temperature range	High
<b>Moisture condition</b>		Pack with moist peat	High
<b>Atmosphere composition</b>		Very close to optimum data	Close to high level
<b>Ventilation</b>		Over the limit	High
<b>Communication</b>		Intermediary doesn't give any supports to Dutch lily bulb growers for flower bulb growing and harvest.	Low
<i>Between Intermediary and Dutch lily bulb growers</i>			
<i>Between AgroNew BV and Intermediary</i>		Frequent communication. But AgroNew BV highly trust the Intermediary	Medium
<i>Between AgroNew BV and storage center</i>		Combination of verbal and written communication	High
<i>Between AgroNew BV and Logistic company</i>		Combination of verbal and written communication; a clear writing document exists for information flow between each other.	High
<b>Operators' handling behavior</b>		Dry lily bulbs as fast as possible after harvest; only destroy the bulbs with serious wounds, but keep the bulbs with small wounds together with other healthy bulbs	Low
<i>At grower stage</i>			
<i>At storage stage</i>			
<i>At transport stage</i>		Enough knowledge, skills and experiences for handling bulbs, never drop bulbs during loading. Cooling-container is used for transport bulbs.	High

### 3.3 The remarkable activities of Dutch flower bulb traders

#### 3.3.1 Quality control of lily bulb

Continuously and stably offered qualified lily bulbs that are common feature for the successful Dutch flower bulb trading companies in the Chinese market. That is achieved by these Dutch flower bulb trading companies through strict quality control. In order to explain more specific, the performance of **Jan de Wit en Zonen BV** could be a convincing example (*Appendix 10*). It is clearly shown that **Jan de Wit en Zonen BV** strictly and carefully controls each step before lily bulbs are delivered to the customers. Not only **Jan de Wit en Zonen BV** has their own long- term contract flower bulb growers, and they support technical support during growing season, but also after harvest **Jan de Wit en Zonen BV** inspects the quality of incoming bulbs before preparing (washing, packing and storing). It is remarkable that the entire process in their facilities and with their own experienced and trained staff to meet the highest quality standards.

(Source from: [http://www.jandewitenzonen.com/home\\_en.html](http://www.jandewitenzonen.com/home_en.html))

#### 3.3.2 New strategy for developing in China

**Van den Bos Flowerbulbs BV** is one of the biggest flower bulb producing and trading companies in the world. Since 1993, this company has been active in China. In 2004, **Van den Bos Flowerbulbs BV** started an own branch office in Beijing, China. At present, the annual export quantity of lily bulb in China is about 20 million pieces. Hereinto, the annual quantity is around 1.5 million in *YunNan* province.

In April of 2009, **Van den Bos Flowerbulbs BV** formally built a base for producing and storing lily bulbs in *YunNan* province, China. The area of this base is about 2.7 ha, which include a modern tunnel about 2800 square meters and a specialized cool house that can store 30 thousand cases of lily bulbs. In the coming 3 years, the total growing quantity of lily bulbs can reach about 5 million pieces. For achieving this project **Van den Bos Flowerbulbs BV** totally investigated about €2 million.

After establishing this base, the Dutch lily bulb would be achieved the commercial production in China. Not only the external environment factors are beneficial for producing qualified lily bulbs, but also the cost price for selling lily bulbs in China will be decreased a lot, **Van den Bos Flowerbulbs BV** could offer lily bulb with cheaper selling price in China.

(Source from: [http://info.cnflower-info.cn/info\\_6490.html](http://info.cnflower-info.cn/info_6490.html))

### 3.4 The potential of lily bulb import in the Chinese market

- Although in recent years the situation of Chinese lily cut flower market was stagnant, China has already become the third largest lily cut flower consumption country in the world. The demand of lily bulb will be bigger and bigger. Although the Chinese native production of lily bulb has improved a lot, the quality has not yet competed with foreign lily bulbs, especially with the Dutch bulbs. Furthermore,

the native lily bulb production has not been yet achieved commercial production. Therefore, lily bulbs are still necessarily to be imported for satisfying high quality lily cut flower production.

- At present, Chinese government is working hard for strengthening the protection of property right for flower products. Besides, the market values of lily cut flower products: **Siberia** and **Sorbonne** have already been very low. New lily varieties are necessarily introduced. In this case, the new varieties will instead of the old varieties gradually. And the import quality of these new varieties can also be controlled strictly by variety owner. If so, the excessive lily cut flowers won't be produced in the market because appropriate quantity of lily bulbs could be imported. The situation of the Chinese lily cut flower market could become better and better.

*(Source from: personal communication with the general manager of Zhe Jiang Lily Breeding Co., Ltd)*

### **3.5 Porter's 5 forces for AgroNew BV in China**

#### **3.5.1 The threat of entry**

- Face the competition from new foreign suppliers, the foreign trading companies who have already been working in the Chinese market will artificially make competing activities for tightly hold their own customers and protecting their position in the Chinese market
- Chinese government will continuously modify and complement the current policies and regulations for controlling lily bulb import from foreign countries.
- High scale threshold. According to the situation of other supplier's service, purchasers just ask more from new suppliers. This is also the hidden rule in the business market

#### **3.5.2 The powers of buyers**

Every year, China has to import large quantity lily bulbs for satisfying native lily cut flower production. The Netherlands is the main lily bulb supplier for China. Every year, in order to attract more Chinese purchasers, Dutch lily bulb suppliers always try to offer better price or more favorable service. Generally speaking, the Chinese flower bulb traders prefer purchasing from their familiar suppliers. However, actually, they will also keep attention or consult the supplying conditions from other suppliers. That make Chinese flower bulb traders (importers) have more choices and stronger power to negotiate the business with suppliers. The power of Chinese lily bulb importers could be strong under this circumstance.

On the other hand, as mentioned before, due to the stagnant and unstable Chinese lily cut flower market many Chinese flower bulb importers always reserve a portion of import to check market. The problem is when these Chinese flower bulb importers decide to buy more lily bulbs, whether there is enough quantity for supply in the market. If not, the status of demand exceed supply will result in bulb importers are very passive in the market. In this case, the power of Chinese lily bulb importers could

be very weak.

### 3.5.3 The power of suppliers

Suppliers of raw materials, components, labor, and services (such as expertise) to the firm can be a source of power over the firm. Suppliers may refuse to work with the firm.

It is very important that different suppliers offer supports for helping flower bulb exporters finish fluent flower bulb trade. These suppliers could be bulb growers, intermediary, cool house, transportation company and so on. Furthermore, if the flower bulb trading company wants to efficiently operate business in overseas market, the support from local suppliers is also important.

### 3.5.4 The threat of substitutes

Substitute products refer to products in other industries. A threat of substitutes exists when a product's demand is affected by the price change of a substitute product. A product's price is affected by substitute products- as more substitutes become available, the demand becomes more elastic since customers have more alternatives. A close substitute product constrains the ability of firms in an industry to raise prices.

China is one of the biggest cut flower production and consumption countries in the World. The range of category of flower is abundant. First of all, there are four main cut flowers (see Chapter 2.1) in the Chinese market. However, comparing with Chrysanthemum, Chinese rose and Carnation, only lily cut flowers are produced by flower bulbs. Therefore, as **Table 17** shows, the selling price of lily cut flower is the highest due to the highest seed price. The price factor could affect the consumption of Chinese people for lily cut flower. Besides, in recent years, the artificial flower is more and more popular in China. As a kind of ornament, flower has already been a very important ornamental product in the Chinese family at present. However, frequently purchase flower products, that has been not yet the habit in the Chinese people's life. And limited enjoying time (vase life) of flower products also restrict the Chinese people to purchase actively. Therefore, the artificial flower not only satisfies the purpose of Chinese people to purchase flower product, but also doesn't have any problems about vase life.

Table 17 the selling price and the seed price of four main cut flowers in the Chinese wholesale market (February, 2009)

Item Flower	Selling price (€/branch)	Seed price (€/piece)
<b>Lily</b>	0.45	0.35
<b>Chinese Rose</b>	0.10	0.05
<b>Chrysanthemum</b>	0.06	0.002
<b>Carnation</b>	0.05	0.001

(Actually, for commercial production the seed of Chinese rose, Chrysanthemum and

Carnation are priced by per KG in the market; the bulb of lily is priced by per thousand on the price list)

*(Source from: communicate with the general manager of Ling Yuan Lan Xing Flower Trading Co., Ltd)*

### **3.5.5 Competitive Rivalry**

The intensity of rivalry is influenced by the following aspects:

- Many foreign flower bulb suppliers in the Chinese market that increase rivalry because these firms must compete for the Chinese market.
- Unstable even stagnant Chinese cut flower market influence lily bulb import in China at present. That is more difficult for foreign suppliers to fight for market share of lily cut flower market.
- Low level of product differentiation. Every year, in China more than 60% of total imports from Holland are **Siberia** and **Sorbonne**. These two varieties have already been grown in China for long time. Therefore, normally the level of product differentiation for these two varieties is very low. It is difficult that Dutch bulb exporters compete with each other by the export of these two varieties. The level of rivalry is high.
- A diversity of rivals. The philosophies, the history and the cultural background are all important factors to assess the rivals. Some foreign lily bulb suppliers have already been working in China for long time. So the power of this kind of supplier is very strong; although some foreign suppliers just came into the Chinese market, they have very good Chinese factors, such as several Chinese employees. So they also can work very efficient. The power is also strong.

### **3.6 SWOT analysis**

Hereby, the analysis was done through SWOT (Strength, Weakness, Opportunity and Threat) analysis of AgroNew BV in the Chinese market. SWOT analysis facilitates the assessment of internal capabilities and resources as well as external factors that influence companies' achievement and profitability. It is an extremely useful tool for understanding and decision-making for analysis AgroNew BV case, especially for the examination of AgroNew BV's internal strengths and weaknesses, and its external environments, like opportunities and threats.

Table 18 SWOT analysis of AgroNew BV in the Chinese market

<p style="text-align: center;"><b>STRENGTHS</b></p> <ol style="list-style-type: none"> <li>1. Abundant working experience for lily bulb trading (<i>Chapter 1.2</i>)</li> <li>2. Locate in the core area of flower bulb production (<i>Chapter 1.2</i>)</li> <li>3. Quick response speed to questions / problems (<i>Chapter 1.2</i>)</li> </ol>	<p style="text-align: center;"><b>OPPORTUNITIES</b></p> <ol style="list-style-type: none"> <li>1. Increasing lily bulb demand in the Chinese market due to increasing lily cut flower demand in China (<i>Chapter 3.4</i>)</li> <li>2. Chinese lily bulb can't satisfy the demand of native lily cut flower production (<i>Chapter 3.4</i>)</li> <li>3. More new lily varieties will be introduced in China, which could make Chinese flower market more stable (<i>Chapter 3.4</i>)</li> </ol>
<p style="text-align: center;"><b>WEAKNESSES</b></p> <ol style="list-style-type: none"> <li>1. New supplier (<i>Chapter 1.2</i>)</li> <li>2. Export limited quantity and highly depends on three bulb importers in China (<i>Chapter 1.3</i>)</li> <li>3. Insufficient experience for working in the Chinese market (<i>Chapter 1.2</i>)</li> <li>4. Weak brand name (<i>Chapter 1.2</i>)</li> <li>5. Insufficient the interpersonal relationship in China (<i>Chapter 1.2</i>)</li> <li>6. Limited communication scale in China (<i>Chapter 1.2</i>)</li> <li>7. Less knowledge for the Chinese market (<i>Chapter 1.2</i>)</li> <li>8. Less quality control for incoming bulb (<i>Chapter 3.2.5</i>)</li> </ol>	<p style="text-align: center;"><b>THREATS</b></p> <ol style="list-style-type: none"> <li>1. Local policy and regulation for controlling lily bulb import (<i>Chapter 3.5.1</i>)</li> <li>2. Competitive price war from competitors (<i>Chapter 3.5.1</i>)</li> <li>3. The further development of competitors in the Chinese market (<i>Chapter 3.5.1</i>)</li> <li>4. The performance of different suppliers (<i>Chapter 3.5.3</i>)</li> <li>5. Substitute market share increased (other flowers) (<i>Chapter 3.5.4</i>)</li> <li>6. Transportation cost increased due to increasing oil cost</li> <li>7. Global financial crisis</li> <li>8. Fluctuating exchanges rates</li> </ol>

## CHAPTER 4 RESEARCH DISCUSSION

### 4.1 Factors limited lily bulb sale of AgroNew BV in China

The total import quantity of lily bulb in China decreased in 2008; and the import quantity of AgroNew BV's Chinese customers also decreased in 2008. It seems as a very logical reason to explain why AgroNew BV sold decreased quantity of lily bulb to China in 2008. However, the matter of fact was AgroNew BV's Chinese customers firstly chose to decrease the quantity that they were going to buy from AgroNew BV when they had to reduce the import quantity. According to the comment of AgroNew BV's Chinese customers (in *Chapter 3.2.4.2*), although AgroNew BV is qualified for being a bulb supplier in China, AgroNew BV's supply has less attraction for the Chinese market. In this case, it's impossible that these Chinese bulb traders weaken familiar collaboration while start new business. That doesn't match the logic.

So, why AgroNew BV cannot offer attractive supply to China? Actually, on the one hand AgroNew BV does not yet understand the Chinese market very well, because of the limited communication scale (*Chapter 3.1*), but on the other the problems exist in how AgroNew BV gets the bulbs. In the supplying process, depending on *Chapter 3.2.5*, the storage center (cool house) and the logistic company (Denkers) both are reliable partners for AgroNew BV to work in this business. However, for the bulb growers and the intermediary, AgroNew BV necessarily needs to consider how to work with them in the future. According to **Table 16**, it clearly and directly shows that three evaluations were scored as low level. All are concerned at grower stage. Undoubtedly, Dutch lily bulb growers are very professional, all of them have sufficient experience to produce lily bulb. However, some of growers improperly handle lily bulb during the postharvest stage (see **Appendix 9**). That indeed is the source for fungus infection of flower bulbs. Besides, although the intermediary was responsible for purchasing lily bulb from growers, the intermediary did not offer any supports to bulb growers during growing and harvesting stage (**Appendix 9**). If AgroNew BV only highly depends on intermediary to get lily bulb from bulb grower, while lack of sufficient supervision for their products, AgroNew BV is indeed passive for controlling the quality of lily bulbs, let alone to stably offer qualified lily bulb to customers.

### 4.2 Comparing with successful Dutch flower bulb traders in China

The descriptions in *Chapter 3.3* are just the typical aspects of the senior Dutch flower bulb traders for operating flower bulb business in China. Besides stable supply and more efficient "Chinese" service, these Dutch traders have already been trying to develop more new activities in China for promoting their business.

However, to compare the work operation of AgroNew BV in China, the gaps are found. First of all, AgroNew BV is still being the position for fighting to survive in the Chinese

market. Less understanding and working experience for the Chinese market makes AgroNew BV highly depend on their customers to supply lily bulbs in China. That is very passive way to operate business in China; Second, because of this passive position, AgroNew BV is looking for more customers in China; while those senior Dutch flower bulb traders are viewed as objective of cooperation, every Chinese flower bulb traders look forward to establishing business relationship with them (*As mentioned in Chapter 3.2.4.2*).

Under the intense competition, the stable relationship between Chinese bulb traders (importers) and other Dutch flower bulb traders (exporters) and the risk of high dependency on few purchasers in China are the driving forces for AgroNew BV to start searching for the new and feasible strategies to work and enhance strength in the Chinese market.

## **CHAPTER 5 FEASIBLE OPTIONS**

As a new flower bulb supplier in China, the biggest weakness of AgroNew BV is that AgroNew BV does not yet understand the Chinese market very well. Not only offer ordinary supply without any feature, but also the communication scale is just rest on interactive with the Chinese flower bulb traders (importers) for promotion. For a foreign company that just has two years working experience in a new market, this could be a normal result. However, if AgroNew BV wants to enhance the competitive strength in the Chinese market and go further in China, AgroNew BV should strengthen their role in the whole chain. Especially to consider how to defeat difficulties: to actively control the quality of their own flower bulb; to understand the Chinese market more comprehensively; to understand what the Chinese purchasers want; to be pro-active for the future market; if possible, to get more market share in China.

### **5.1 Purchasing lily bulbs directly**

AgroNew BV was used to having the intermediary purchased lily bulbs from Dutch flower bulb growers. That means AgroNew BV had less control for the incoming bulb. The company was very passive in the supplying aspect of the chain.

In order to insure the quality of incoming bulb, the best way is to control quality personally. This can be achieved by purchasing lily bulbs from flower bulb growers directly. In this way, the relationship between AgroNew BV and the Dutch lily bulb growers could be seemed as a kind of collaboration:

- During lily bulb growing, AgroNew BV engages experts for offering technical support and quality monitoring to lily bulb growers.
- During the harvest, AgroNew BV also engages experts to help growers harvest, especially for decreasing the percentage of the mechanical wounds so that the probability of fungus infection of lily bulb will be minimized.
- Besides, in order to promote the collaboration with lily bulb growers, AgroNew BV could offer necessary market information and market prediction to the growers. In other words, before the growing season AgroNew BV is in charge of market investigation. And then suggest flower bulb growers which varieties should be grown for the market. The valid marketing supports are always desirable for flower bulb growers, which will help to choose proper varieties to grow according to the market. Of course, the collaboration between AgroNew BV and the Dutch flower bulb growers should be protected by contract.

### **5.2 Be pro-active for potential lily varieties in China**

The Chinese government is strengthening the protection for the intellectual property rights of flower varieties. Therefore, it is inevitable that more new lily varieties will be introduced into the Chinese market in the coming years. However, “which varieties will be acceptable and favourable in the Chinese market” that will be tested by the market.

If AgroNew BV can be pro-active for potential lily varieties in China through consciously realize these varieties and their market potential by further and better market investigation, when new varieties gradually replace old varieties in the Chinese market, AgroNew BV could be able to help Chinese cut flower producers make correct selection.

### **5.3 Establish the representative office in China**

First of all, AgroNew BV should try to understand the Chinese market well. And understand what the customers' exact want as far as possible. Through investigation and many living examples, establishing a representative office in China will help AgroNew BV achieve the goal efficiently.

#### **5.3.1 Benefits**

- Through establishing a representative office, AgroNew BV can understand what customers want in time and get more exact market information. Furthermore, AgroNew BV could be able to predict how the Chinese market will be. If so, AgroNew BV could support relevant market information to cooperative lily bulb growers.
- Through establish representative office in China, AgroNew BV is able to give special services to the Chinese market. For example, when the lily bulbs arrive in China, the quality manager in the representative office can go to the sea port and check the quality of incoming bulb with customers together. That means once there are any problems about quality of flower bulbs, AgroNew BV can get relevant evidences immediately. In this way, the compensation for quality problems will be handled more efficiently.
- Besides, the quality manager in the representative office can also frequently give technical supports to the local lily cut flower producers. It could be a special after sale service what AgroNew BV offers to Chinese lily bulb importers. If so, the cooperation between AgroNew BV and its current Chinese customers might be promoted. Moreover, it also could be considered as strength of AgroNew BV to attract more attentions from potential purchasers in the Chinese market.
- Select correct cultivars to produce, which are not only important for flower bulb grower, but also crucial for cut flower producer. For cultivars, especially for new cultivars normally Chinese cut flower producers have less courage to try. Neither be familiar with the production condition of these new cultivars, nor understand the economic performance of these new cultivars. Through establish representative office, according to the situation of Chinese lily cut flower market, AgroNew BV could better understand which kind of cultivars are more suitable for the Chinese market. When more new lily varieties are introduced into China, AgroNew BV could offer more accurate information and more suitable suggestion to their Chinese customers. If so, this ability can absolutely be strength for AgroNew BV to operate business in China.

### 5.3.2 Financial planning

So far, three Chinese customers of AgroNew BV are all in **Beijing**. Therefore, the representative office could be established over there. In order to offer better services, a quality manager should be there. Besides, it is necessary that a sale manager conduct the office over there. Considering different aspects, especially the cultural factors, at least one of them should be the Chinese. Hereby, a brief calculation about the cost price for establishing a representative office in **Beijing** is formulated as **Table 19**. As follows:

Table 19 Cost price calculation for establishing a representative office in Beijing (in the first year)

Expenses	The first year investment			Cost (€)
	Unit	# of units	Unit rate (€)	
			(Source)	(Calculation result)
<b>1. Human Resources</b>				
1.1 Salaries				
Sales manager	Per month	1	2,000	24,000
Quality manager	Per month	1	1,500	18,000
<b>Subtotal Human Resources</b>				<b>42,000</b>
<b>2. Travel</b>				
International travel	Per flight	3	800	2,400
Local transportation	Per year	6	100	600
<b>Subtotal Travel</b>				<b>3,000</b>
<b>3. Equipment and Supplies</b>				
Purchase vehicle (depreciation cost)	Per vehicle	2	800	1,600
Office installation		1	5,000	5,000
<b>Subtotal Equipment and supplies</b>				<b>6,600</b>
<b>4. Local office</b>				
Vehicle cost	Per month	2	200	4,800
Office rent	Per month	1	1,100	13,200
Running cost of office	Per month	1	300	3,600
<b>Subtotal Local office</b>				<b>21,600</b>
<b>5. Other Cost for Service</b>				
Necessary permit		1	110	110
Service agent for applying permit		1	750	750
Public relation	Per year	1	5,000	5,000
<b>Subtotal Cost for service</b>				<b>5,860</b>
<b>6. Subtotal direct costs of the Action (1-5)</b>				<b>79,060</b>
<b>7. Provision for contingency reserve (maximum 5% of Item 6)</b>				<b>4,000</b>
<b>8. Total direct eligible costs of the Action (6+7)</b>				<b>83,060</b>

(The buying cost of each vehicle is assumed €8000; the using time is assumed 10 years)

(Source from: Beijing Administration for Industry and Commerce)

Hereby the calculation is about the cost price for establishing a representative office in China. Therefore, for vehicle it is necessary to calculate the depreciation cost. However, actually, if the author needs to calculate the total expenditure of establishing the office in China, according to **Table 19** and the buying cost of each vehicle is €8000, the total expenditure is about €98133 in the first year. From the second year, every year AgroNew BV should expend about €71600. As **Table 12** (Chapter 3.2.3) an example, if here is an assumption, the gross margin €13780 by selling **Siberia 16/18** with one container that is the final profit what AgroNew BV gets, AgroNew BV might get money back in the first year if they can sell eight containers; might earn profit when they sell six containers in the second year.

## **5.4 Establish the sale company in China**

After establishing the representative office, AgroNew BV could operate the business in China more efficiently. When the stabilization of AgroNew BV's income is high, AgroNew BV could seek ways of getting higher margin and market share. Establish a sale company and sell to cut flower producer could be a feasible way.

### **5.4.1 Benefits**

AgroNew BV establishes a sale company in China, which will throw themselves into the whole value Chain for exporting lily bulb to China completely. If so, AgroNew BV not only can collaborate with lily bulb suppliers (if AgroNew BV can purchase lily bulbs from bulb growers directly), but also can pass the Chinese flower bulb traders (importers) over, transport and sell lily bulbs to the final bulb user (lily cut flower producer) directly. Not only the sale company has all function of representative office, more important AgroNew BV will get more margin share from the value chain. Furthermore, due to directly sell lily bulb AgroNew BV is able to offer more attractive selling price of lily bulb to Chinese cut flower producers comparing with those Chinese lily bulb importers.

After establishing the sale company in China, the AgroNew BV's customer will be changed into the Chinese lily cut flower producer from Chinese lily bulb importer. In order to attract the attentions from Chinese cut flower producer, besides competing price and qualified quality, the valid market support will be more interesting for them. So far, lack of valid market information acquisition makes Chinese lily cut flower market stagnant. If AgroNew BV can always offer market support to Chinese lily cut flower producers and help Chinese lily cut flower producers properly produce and operate business, the Chinese cut flower producers are willing to cooperate with AgroNew BV actively.

### **5.4.2 Financial planning**

Comparing with establishing representative office, it is necessarily to consider more factors for establishing sale company in China, because AgroNew BV has to handle many things that they never operated before by itself, such as how to handle the

quality inspection of incoming bulb by Chinese government when shipment just arrive in China; what the local policies and regulations for financial management are; how a foreign trading company engages business in China and so on. Meanwhile, AgroNew BV should be in charge of deliver goods to different customers; and if it is necessary, AgroNew BV might also need to store goods before delivery. For all of these new strange issues, AgroNew BV should hand it. As **Table 20** shows, here is a cost price calculation for this option.

Hereby, the deliveries of flower bulbs can be handled by cooperate with local transportation company. If it is necessarily to store flower bulbs in short period before delivery, AgroNew BV can put bulbs in local specialized cool house and pay for it. Besides the head office of the sale company should be established, in order to efficiently collaborate with Chinese cut flower producers and continuously obtain market information, a branch office should also be established in the area of target customers. Therefore, the functions of the branch office are:

- Receive goods and deliver to different customers
- Collect feedback from different customers
- Collect market information and report it to leadership
- Market promotion
- Public relation

Furthermore, if AgroNew BV purchases lily bulb from Dutch lily bulb growers directly and sell lily bulbs to Chinese lily cut flower producer directly, the new value chain could be shown as **Figure 11**,

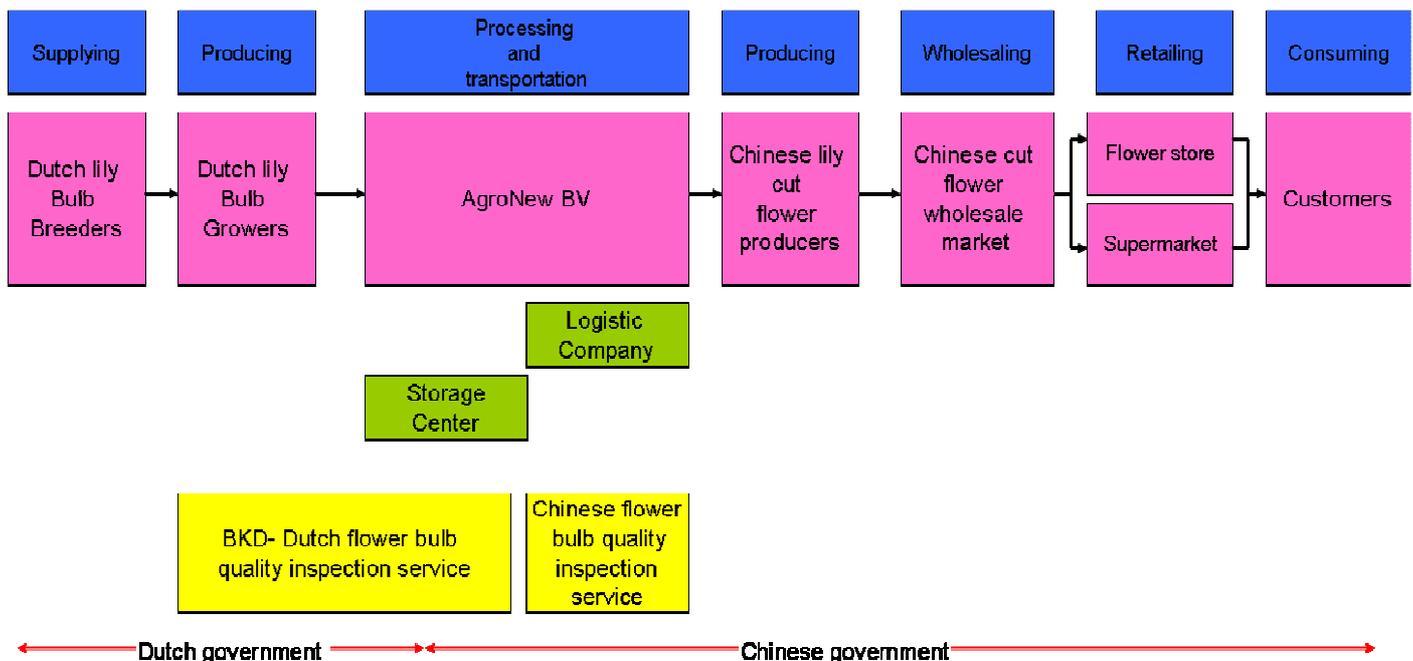


Figure 11 New value Chain for AgroNew BV sells lily bulb to Chinese market

Table 20 Cost price calculation for establishing a sale company in China (in the first year)

Expenses	The first year investment			Cost (€) <b>(Calculation result)</b>
	Unit	# of units	Unit rate (€) <b>(Source)</b>	
<b>1. Human Resources</b>				
1.1 Salaries				
1.1.1 In Head office				
Sale manager (manager in the company)	Per month	1	2,000	24,000
Quality manager	Per month	2	1,500	36,000
Administrative/ support staff	Per month	5	800	48,000
1.1.2 Branch office				
Responsible person	Per month	1	600	7,200
Support staff	Per month	2	200	4,800
<b>Subtotal Human Resources</b>				<b>120,000</b>
<b>2.Travel</b>				
International travel	Per flight	6	800	4,800
Local transportation	Per year	12	100	1,200
<b>Subtotal Travel</b>				<b>6,000</b>
<b>3.Equipment and Supplies</b>				
Purchase vehicle (depreciation cost)	Per vehicle	4	800	3,200
Office installation		1	8,000	8,000
<b>Subtotal Equipment and supplies</b>				<b>11,200</b>
<b>4.Local office</b>				
Vehicle cost	Per month	4	200	9,600
Office rent	Per month	1	1,500	18,000
Running cost of office	Per month	1	350	4,200
<b>Subtotal Local office</b>				<b>31,800</b>
<b>5.Other Cost for Service</b>				
Goods Transportation cost in China	Per year	4	400	1,600
Cooling cost	Per year	4	200	800
Necessary permit		2	110	220
Service agent for applying permit		2	750	1,500
Public relation	Per year	1	8,000	8,000
<b>Subtotal Cost for service</b>				<b>12,120</b>
<b>6.Subtotal direct costs of the Action (1-5)</b>				<b>181,120</b>
<b>7.Provision for contingency reserve (maximum 5% of Item 6)</b>				<b>9,100</b>
<b>8.Total direct eligible costs of the Action (6+7)</b>				<b>190,220</b>

(The buying cost of each vehicle is assumed €8000; the using time is assumed 10 years)

(Source from: Beijing Administration for Industry and Commerce)

Furthermore, according **Table 11** and **Figure 8**, if AgroNew BV can purchase lily bulb from bulb growers directly, and sell lily bulb to Chinese lily cut flower producers

directly, the cost and margin share for AgroNew BV in the value chain can be shown as **Table 21** (e.g. one complete container **Siberia16/18** for instance)

Table 21 the cost and gross margin for AgroNew BV in the new value chain

AgroNew BV				
Item	Unit	Unit rate (€)	Quantity	Cost (€)
		(Source)	(Source)	(Calculation result)
<b>1. Cost for purchasing lily bulb</b>				
Siberia 16/18	Per thousand	150	208,000	<b>31,200</b>
<b>2. Other cost</b>				
Cooling cost	Per crate	0.25	1040	<b>260</b>
Transportation cost	Per shipment	3600	1	<b>3,600</b>
Insurance cost (5% of transportation cost)				<b>180</b>
Service cost for Chinese sea port	Per time	1000	1	<b>1,000</b>
<b>3. Value for selling lily bulb</b>				
	Per thousand	350	208,000	<b>72,800</b>
<b>4. Gross margin</b>				<b>36,560</b>

In the same way, the depreciation cost of vehicle is reasonable data to make the cost price calculation. But according to **Table 20** and the buying cost of each vehicle, the total expenditure is about €220416 in the first year. From the second year, every year AgroNew BV should expend about €168200. As **Table 21** an example, if here is an assumption, the gross margin €36560 by selling **Siberia 16/18** with one container that is the final profit what AgroNew BV gets, AgroNew BV might get money back in the first year if they can sell seven containers; might earn profit when they sell five containers in the second year.

# CHAPTER 6 CONCLUSION AND RECOMMENDATION

## 6.1 Conclusion

The report investigates the current supply chain of AgroNew BV for exporting lily bulb from the Netherlands to China, as well as the lily cut flower market in China. After the comparative analysis, the conclusions were drawn.

The Chinese lily cut flower market was stagnant in recent years. That made the total import quantity of lily bulb had to be reduced in China. Comparing with those senior Dutch lily bulb suppliers who have already got great achievement in the Chinese market, the Chinese importers chose to decrease the import quantity from AgroNew BV, because the quantity what they were going to buy from AgroNew BV was small and AgroNew BV's supply had less attraction (*Chapter 3.2.4.2*).

AgroNew BV could not offer attractive supplying to the Chinese market. The biggest problem was AgroNew BV does not yet understand the Chinese market very well (*Chapter 4.1*). And the company was very passive in the whole supplying process. These problems were resulted from AgroNew BV had limited communication scale in China and few chances to control the quality of incoming bulbs by themselves due to highly depended on intermediary to purchase lily bulbs from bulb growers.

It is delighted that the potential import market of lily bulb is positive in China. AgroNew BV still has opportunities to go further in the Chinese market. In order to achieve the purpose, AgroNew BV should not only be qualified to satisfy the higher demand of the Chinese market: stable quality with less quality problems and valid market information support, but also be able to help the Chinese customer make correct selection for new lily varieties in the future market. There are several feasible ways for AgroNew BV: 1. Strengthen the quality control for incoming bulbs; 2. Be pro-active for potential lily varieties in China; 3. Establish a representative office in China; 4. Establish a sale company of lily bulb in China and sell lily bulbs to the Chinese lily cut flower producers directly.

## 6.2 Recommendation

- **Strengthen the initiative of AgroNew BV in the supplying process of lily bulb export chain**

Lack of control for the incoming bulb, which makes AgroNew BV was very passive in the supplying process of lily bulb export. As mentioned in *Chapter 5.1*, through directly purchase lily bulb from bulb growers and offer support during producing and harvesting stage, AgroNew BV really achieve initiative for controlling the quality of incoming bulb. That will enhance the ability of AgroNew BV to continuously offer qualified flower bulbs. Of course, in order to promote the cooperation with bulb growers and make bulb growers confidently grow lily bulbs, AgroNew BV should

increase the deposit for the bulbs what AgroNew BV is going to buy from bulb growers; or pay to the bulb growers faster than other flower bulb traders (exporters).

- **Strengthen the competitiveness of AgroNew BV in the Chinese market**

- Expand communication scale for strengthen the interpersonal relationship in China. According to **Figure 5** (*Chapter 3.1*), less information and understanding for Chinese cut flower producers that made AgroNew BV only highly depend on their customers to operate work in China (*Chapter 4.2*). And weak interpersonal relationship also restricts the development of AgroNew BV in China. Therefore, it is important that AgroNew BV find ways to know different people who work for relevant fields in the Chinese lily industry. Establish efficient relationship networks in China, which will be beneficial for AgroNew BV participates more in the export business with China. Moreover, this is also an effective way to better understand the Chinese market. In this case, AgroNew BV could have stronger power to negotiate with their customers. About possible ways, the member(s) who is/are responsible for the Chinese market in AgroNew BV should go to China in person and does/do the field research for the Chinese market in detail; participate in the horticultural exhibition in China.
- AgroNew BV should seek for and understand the potential new varieties. In order to achieve this goal, AgroNew BV should frequently visit different Dutch lily breeding companies, such as **Gebr. Vletter & Den Haan, Mak Breeding BV** and **Marklily BV**. Through continuous investigation and communication with the lily experts, AgroNew BV could collect sufficient information about the new lily varieties. According the better and better understanding for the Chinese market, AgroNew BV could be able to judge the potential economic performance of different new varieties in the Chinese market.
- Establish a representative office. The calculation about when AgroNew BV gets this investment back? And starts getting profit? That cannot be calculated as the way was shown in Chapter 5.3.2. The main reasons are: first, according to the market situation the gross margin of AgroNew BV is always changeable because AgroNew BV sells different lily varieties in fact; second, objectively the gross margin isn't profit. Therefore, only understand the profit data what AgroNew BV will get, the calculation could be achieved. Of course, about when AgroNew BV gets the investment back, this is just a sub-goal after they establish the representative office in China. The main goal is that through establishing representative office, AgroNew BV can really efficiently conduct business in the Chinese market (as mentioned in Chapter 5.3.1): 1) better understanding for the Chinese market; 2) be proactive in the Chinese market; 3) offering better after-sale service. Besides, AgroNew BV could also promote the company's name (reputation) in the Chinese market through this way. If so, through continuously understand and utilize information and knowledge what they get

from China AgroNew BV could get opportunities to enhance their market share.

- **Seek for higher market share on the basis of the situation of the Chinese market**

Sale includes two meanings: sales revenue and sales quantity. In the Chinese market, if AgroNew BV increases the market share in terms of sales quantity, while the sales revenue doesn't improve a lot even reduced. At the beginning it maybe can be seen a kind of strategy for AgroNew BV to occupy the market. But if the situation always likes this, that can not indicate AgroNew BV has successful business in China. In contrast, even though the sales quantity is decreased in China, AgroNew BV has higher market share in terms of sales revenue. The AgroNew BV's business can be considered as the positive improvement. Only take into account the market conditions that may have improved or decreased the sales situation in target market, and to see if AgroNew BV is doing better or worse compared to other companies that are facing the same challenges and opportunities.

- **Strengthen the market share of AgroNew BV in the Chinese market**

Directly sell lily bulb to the cut flower producers, which not only could make AgroNew BV get same benefits as they establish the representative office in China, but also could help them get bigger margin for selling lily bulbs in China (see **Table 21**). Furthermore, as **Figure 11** shows due to taking over the function of Chinese bulb importers in the supply chain, AgroNew BV could have bigger room to conduct the business in the Chinese market. Especially, in order to attract more Chinese cut flower producers to directly purchase, AgroNew BV could be able to offer lily bulbs with lower selling price. Technically speaking, offer qualified quality with lower selling price, which will be a powerful strength for AgroNew BV to compete with other bulb suppliers in China. If so, no matter consider about sales quantity or sales revenue, AgroNew BV could be able to enhance the market share in the Chinese market.

However, actually, there are several questions what AgroNew BV has to face. As follows,

- Where is the head office of Sale Company in China? Is it still in Beijing?
- Where are the target customers (Chinese lily cut flower producers) in China?  
Because AgroNew BV should not only contact with the Chinese cut flower producers by themselves, but also be responsible for delivering the goods to their customers.
- If AgroNew BV collaborates with Chinese transportation company, whether the quality of lily bulbs can be guaranteed during transportation? If not, whether AgroNew BV should establish transportation department and have their own trucks for transportation? (more investment cost)

- If the cooling facilities are not sufficient or not professional, whether AgroNew BV should build their own cool house in China? (more investment cost)
- Whether AgroNew BV has already understood the Chinese market? And has ability to directly contact with Chinese lily cut flower producers? Most Chinese cut flower producers are farmers. According to their education background, they are not able to talk with foreign people, let alone to communicate, even make a deal with foreigners

These are premises what AgroNew BV should understand before establishing a sale company in China. And different results could influence the final operation cost that AgroNew BV should pay for every year. At present, less knowledge and understanding for the Chinese market make AgroNew BV very passive in China. The purpose for establishing a representative office is to promote AgroNew BV more efficiently conduct business in China firstly. Only when AgroNew BV understands the Chinese market better and better; and the business trade of AgroNew BV becomes stable in China, establishing Sale Company will be a feasible and achievable plan for AgroNew BV in China.

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# APPENDIX

## Appendix 1 External factors for fungus infection of lily bulb

### ● **Storage**

#### Temperature

Temperature is the environmental factor that most influences the deterioration rate of harvested commodities. Exposure to undesirable temperatures results in many physiological disorders. Temperature also influences the effect of C<sub>2</sub>H<sub>4</sub>, reduced O<sub>2</sub>, and elevated CO<sub>2</sub>. The spore germination and growth rate of pathogens are greatly influenced by temperature (*Kader, 2002*). It was definitively established by Professor Blaauw and his co-workers (*Hartsema, 1961*) that temperature is the major external factor controlling growth, development and flowering in bulbs. The physiological disorder is also affected by temperature and moisture relationship (*De Hertogh and Le Nard, 1993*).

Temperature control in storage rooms and transportation vehicles means more than just maintaining the air leaving the refrigeration coils at the desired temperature for the commodity being held; the goal of temperature management in storage rooms and transportation vehicles should be to maintain uniform product temperature throughout the load at the desired temperature for the commodity being hold. The storage room or transportation vehicle also must be cooled to the desired product temperature prior to loading. Designing the storage and transportation system with sufficient insulation in the floors, walls, and ceilings to minimize outside environmental influences is also necessary to maintain uniform temperature inside (*Bartz and Brecht, 2003*).

Temperature plays an important role in the storage and transportation process. It is particularly important to maintain a uniform temperature throughout the entire cold store. Minor differences in temperature can cause frost damage or shoots to develop. Automatic control of temperature is operated in the storage room. Different varieties of lily bulb are stored at different store temperature (*information from the website of international flower bulb center <http://www.bulbsonline.org/> which is modified by B.J. Hans Kok flower bulb specialist from flower bulb research center*).

Table 22 Storage temperature for different variety of lily bulb

Variety	Store temperature
Asiatic Hybrid	- 2°C
Oriental Hybrid	- 1.5°C
Longiflorum Hybrid	- 1.5°C
L/A Hybrid	- 1.5°C or - 2°C

Bulbs of Asiatic hybrids can be stored for up to a year without showing any deterioration in quality. Bulbs stored for a longer period will develop more rapidly,

plants will be smaller and fewer buds will develop.

Oriental and Longiflorum hybrids cannot be stored for such a long period. From July onwards, depending on seasonal conditions and the cultivars, there is a risk that storage problems, such as shoot formation and frost damage will occur.

Lily bulbs which have not been frozen can only be stored for a short period. The storage duration depends on the storage temperature and the time of year. This means for example, that fresh bulbs can be stored longer in temperatures above freezing point during January and February than they can in the autumn.

#### Moisture condition

Moisture condition is also relative humidity (RH) which is an important factor for influencing the quality of lily bulb in storage and transportation. The rate of water loss from commodities depends on the vapor pressure deficit between the commodity and the surrounding ambient air, which is influenced by temperature and RH (*Kader, 2002*). Except temperature, another important aspect of the storage of flower bulbs is the influence of relative humidity not only on the maintenance of the bulb's ability to grow and develop but also on the growth of diseases. De Hertogh et al. (1978) found that air humidification increased the growth of fungus on the tunics. Ultimately, a high level of disease infestation can be detrimental to flower bulb quality. This is a very critical factor to consider for long-term bulb storage. During storage periods, reduction of relative humidity (e.g. by ventilation) is essential in order to minimize fungal and bacteria disease (*Wills et.al, 1998*).

In addition to maintaining storage rooms and transportation vehicles at proper storage temperatures, the relative humidity should also be controlled to reduce water loss from the crop. Temperature management and humidity control are closely related. The faster the produces reach the storage air temperature, the less water is lost to the air during cooling. The lower the storage temperature, the easier it is to maintain the air in a saturated state and thus minimize the water loss because the moisture holding capacity of air is less at lower temperatures. The humidification system should be able to maintain uniform humidity levels and be designed to distribute the moisture uniformly throughout the storage space. This will minimize problems of high humidity and condensation leading to weakening of fiberboard boxes and increased ice formation on the evaporator coil (*Bartz and Brecht, 2003*).

#### Atmosphere composition

The composition of gases in the storage atmosphere can affect the storage life of horticultural produce. Changes in the concentrations of the respiratory gases---oxygen and carbon dioxide--- may extend storage life (*Wills et.al, 1998*).

The terms controlled atmosphere (CA) storage; modified atmosphere (MA) storage and gas storage are frequently used. These terms imply the addition or removal of gases resulting in an atmospheric composition different from that of normal air. Thus the levels of carbon dioxide, oxygen, nitrogen and ethylene in the atmosphere may be manipulated. Controlled atmosphere storage generally refers to decreased oxygen

and increased carbon dioxide concentrations, and implies precise control of these gases. The term modified atmosphere storage is used when the composition of the storage atmosphere is not closely controlled, such as in plastic film packages where the change in the composition of the atmosphere occurs intentionally or unintentionally. A more recent term is modified atmosphere packaging (MAP), which relates to packages and film box liners which specific properties that offer a measure of control over the composition of the atmosphere around the produce (*Wills et.al, 1998*).

Reduction of O<sub>2</sub> and elevation of CO<sub>2</sub>, whether intentional (modified or controlled atmosphere storage) or unintentional (restricted ventilation within a shipping container or transport vehicle), can either delay or accelerate the deterioration of fresh horticultural crops (*Kader, 2002*). It is same for post-harvest lily bulb in storage room and transport process.

### Ventilation

The most important function of ventilation during bulb storage and transportation is to remove ethylene from the atmosphere surrounding the bulbs, because of C<sub>2</sub>H<sub>4</sub> can induce physiological disorders. For the storage room and containers in transport system it must have ventilation, because adequate and uniform air circulation is necessary for maintaining uniform product temperature. A rule of thumb for airflow is 0.06 to 0.12 m<sup>3</sup> s<sup>-1</sup> /ton of produce capacity to maintain produce temperature (*Thompson, 1992*). These rates of air movement require that the produce be loaded in such a way that air flows uniformly past all the pallets or containers. Load patterns should allow air to contact at least two sides of each pallet and the pallets should not contact the wall (*Bartz and. Brecht, 2003*).

## Appendix 2 Indicator 1: Level of fungus infection

According to the literature study it was known that the infection could be occurred due to wounds of bulbs. If bulbs have wounds the fungus can enter into the bulbs and growth fast. That results in a huge infection of other healthy bulbs in the same batch. In addition, according to the expert *Henk Gude* who is from flower bulbs research center, he pointed out fungus is everywhere, it is very difficult to prevent and control, even though there are no wounds, the bulbs also could be infected by fungus throughout the chain by handling, storage and transportation. But the percentage of this kind of infection is much lower than the bulbs that have wounds. Throughout the whole chain, wounds can be formed during harvest by the growers and it also could be formed during storage and transportation by handling. So the level of fungus infection must be realized at every stage of the chain.

Thus, the assumption associated with this indicator can be formulated as follows: low infection results in small amount of fungus growth on bulbs. The performance of prevention and control is the essential issue to minimize the level of fungus throughout the chain.

The levels associated with this indicator are:

**Low:** the bulbs have wounds. And fungus enters into the bulbs through the wounds. In the end, other healthy bulbs are infected in the batch.

**Medium:** there are no wounds of bulbs, but there is visual fungus surrounding bulbs or incubative fungus in the batch of bulbs.

**High:** there is no any infection and fungus growth on bulbs or even there is fungus, but the source of infection is cut on time. Besides, make disinfections for other contacted bulbs and keep bulbs well afterwards throughout the chain.

### **Appendix 3 Indicator 2: Level of storage Temperature**

*(What is the optimum temperature for storage lily bulb and what is the level of storage temperature in the storage centre and transportation system?)*

In most literature shows that temperature is the most important influencing factor for post-harvest products during storage to keep the product quality. It is no exception for lily bulb. So proper temperature can be considered as an indicator to determine the quality of lily bulb and influence the fungus growth on bulbs.

According to the literature research the information getting from international flower bulb centre, the proper temperature for storage different varieties of lily bulb can be ranged from - 2°C to - 1.5°C. During storage condition, the recommended storage temperature for lily bulb is - 1.5°C to 0.5°C and the storage life is 10 month (Wills, 1998). That means under this storage condition the quality of lily bulb can be kept well and the shelf life duration will be nearly one year. Lily bulbs are sent by ship under frozen condition at 0 to -2°C and stored at -1 to -2°C after arrival (Hideo Imanishi, 2002). According to these information are indicated above about storage temperature of lily bulbs, in general, to keep good quality of lily bulb during storage, the temperature should between - 2°C and 0.5°C.

In addition, Low temperature storage can also delay or prevent the development of many fungal pathogens found on or in horticultural crops after harvest. Fungal growth is generally controlled or eliminated by low temperature, but spores are not killed and therefore low temperature can be seen only as fungistatic and not fungicidal (Lurie, S, 2001). Most fungi grow well in the temperature range 10-30°C for the fungi growth at this range of temperature; these fungi cannot influence the quality of lily bulb, because the optimum temperature for storage lily bulb is - 2°C and 0.5°C. So these fungi are not necessary to consider as the threat for lily bulb. But for fungus it can grow best at low temperatures and can growth at refrigeration temperatures (about 5°C), even grow below 0°C. Furthermore, according to the information from international flower bulb center, the fungus on lily bulb after the initial infection and during the entire storage period the rot will gradually increase, even when temperatures are low (-2°C). So the temperature control has not significant influence on fungus growth on lily bulb, it just can keep the best quality and extend the storage life for the bulbs under optimum temperature condition.

Temperature can be measured via a diverse array of sensors. All of them infer temperature by sensing some change in a physical characteristic. There are some types of temperature sensors: Liquid-in-glass thermometers, Fluid-filled dial thermometers, Bimetallic thermometers, Thermographs, Thermocouples, Digital thermometers, Data-loggers and Calibration of thermometers (Wills, 1998). Among these devices for measuring the temperature, Data-loggers is the most suitable for measuring temperature during transportation, because data-loggers are available for

recording temperatures in packaged produce during commercial shipment (Wills, 1998). Temperature sensor is a useful tool to detect what the temperature is for storage lily bulb in the storage center. As the similar function as the temperature sensor, measuring the temperature is also can be used the Time-Temperature Indicator (TTI).

The measurement of this indicator for this thesis can be taken in the storage centre. Temperature can be measured by temperature sensor or TTI to compare whether the temperature in the storage room is ranged in the optimum temperature for storage lily bulb or not.

Thus, the assumption associated with this indicator can be formulated as follows: high level of quality for lily bulb and fungus could growth slowly requires high level of temperature control.

The levels associated with this indicator are:

**Low:** storage temperature is below  $-2^{\circ}\text{C}$  or above  $0.5^{\circ}\text{C}$  and there is no temperature sensor or recorder to measure and maintain temperature during storage.

**Medium:** storage temperature is between  $-2^{\circ}\text{C}$  and  $0.5^{\circ}\text{C}$  in almost time. But sometimes have temperature fluctuation during storage time and there is temperature sensor or recorder to measure and maintain temperature during storage but the temperature sensor or recorder is not very valid and reliable.

**High:** storage temperature is between  $-2^{\circ}\text{C}$  and  $0.5^{\circ}\text{C}$  regularly and not only there is temperature sensor or recorder to measure and maintain temperature during storage but also the temperature sensor and recorder are very valid and reliable.

### **Appendix 4 Indicator 3: Level of moisture condition**

*(What is the optimum moisture condition for storage lily bulb and what is the level of moisture condition in the storage centre and transportation system?)*

Lauritaen and Wright (1934) studied the effect of humidity on the infection of the fungus on lily bulb. The result is that the fungus is only able to infect at humidity above 75 per cent.

During storage condition, the recommended relative humidity for lily bulb in the range 70-90 per cent is suitable (Wills, 1998). The moisture condition in the storage room is controlled not only achieving the suitable range for keeping the quality of lily bulb, but also the range is below the fungus infection range value. So the relative humidity in the storage room is 70-75%, which can be as the optimum moisture condition for storage lily bulbs. Lily bulbs are packed with moist peat. So another important moisture condition for lily bulb is moisture content of moist peat which surrounding the bulbs in package. According to the expert *Henk Gude* from flower bulb research centre they found that the moisture content of moist peat is 0% there is a huge fungus growth on bulbs and if the moisture content of moist peat is above 20% there is no fungus.

In order to measure the moisture condition in the storage centre, hygrometer can be used as the measurement tool. Hygrometer is a small, inexpensive and easy-to-use instrument, sometimes referred to as a humidity sensor or relative humidity indicator. It can measure the humidity level in the storage room and confirm whether the storage room has too much humidity or too little humidity. Using hygrometer to measure actual relative humidity in the storage center and compared to the optimum condition from literature in order to determine the level of moisture condition in the storage center.

Thus, the assumption associated with this indicator can be formulated as follows: high level of quality for lily bulb and fungus minimize require high level of optimum moisture condition.

The levels associated with this indicator are:

**Low:** the relative humidity is below 70% or above 90% and the moisture content of moist peat is 0%

**Medium:** the relative humidity is above 75%, but below 90% and the moisture content of moist peat is above 0% but below 20%.

**High:** the relative humidity is between 70-75% and the moisture content of moist peat is above 20%.

## Appendix 5 Indicator 4: Level of atmosphere composition

*(What is the optimum atmosphere composition for storage lily bulb and what is the level of atmosphere composition in the storage centre and transportation system?)*

According to the literature research in theory analysis, in order to extend the storage life and minimize the fungus growth on lily bulb during storage, the useful technique is changing the gases composition such as concentration of O<sub>2</sub> and CO<sub>2</sub> surrounding bulbs. Bulbs stored under low O<sub>2</sub> atmospheres (ca. 1%) have superior quality compared to bulbs stored in ambient air, but the bulbs stored under 0.5% O<sub>2</sub> the shoots show died. (Garry Legnani, Christopher B. Watkins and William B. Miller, 2002). Lower O<sub>2</sub> concentrations and higher concentration CO<sub>2</sub> can delay produce deterioration. But everything has the limit point. If O<sub>2</sub> concentration is lower than the optimum condition and CO<sub>2</sub> concentration is higher than the optimum condition for lily bulb, it will get the opposite function. High concentration CO<sub>2</sub> (above 5%) enhances the fresh weigh decrease during storage, and reduces the yield of new bulbs after open field cultivation. Low concentrations O<sub>2</sub> (until 3%-5%) also resulted in increased fresh weigh losses during storage (Munk and Duineveld, 1986).

Alterations of the respiratory gases in the storage atmosphere can be used to suppress fungal germination or growth. Exposure of post-harvest fungi to 2.3% oxygen resulted in growth reduction of a few species only, including fungus italicum, but other fungus species were not affected. At high levels of carbon dioxide, most pathogens are suppressed by reduction in the rate of various metabolic functions. Early studies demonstrated the inhibitory effect of high carbon dioxide atmospheres on mycelial growth or spore germination of fungus glaucum. The retarding effect of carbon dioxide was found to be greater at lower temperatures (Barkai- Golan, 1990). Fungus expansum have been found to grow more slowly in 2.3% oxygen and 5% carbon dioxide than in air, although neither oxygen nor carbon dioxide alone caused any significant growth retardation (El-Goorani et al., 1979).

The assumption associated with this indicator can be formulated as follows: lower level concentration of oxygen and higher level concentration of carbon dioxide can both keep the good quality of lily bulb and minimize fungus growth on bulbs.

The levels associated with this indicator are:

**Low:** ambient air no oxygen and carbon dioxide concentration control for storage lily bulb

**Medium:** 0.5%-2.1% oxygen and 3%-5% carbon dioxide for storage lily bulb.

**High:** 2.3% oxygen and 5% carbon dioxide for storage lily bulb

## Appendix 6 Indicator 5: Level of ventilation

*(What is the optimum ventilation for storage lily bulb and what is the level of ventilation in the storage centre and transportation system?)*

To prevent accumulation of ethylene and water vapour, a large ventilation is usually recommended for rooms with stored bulbs (*Munk and Duineveld, 1986*). Due to respiration of bulbs during storage the level of O<sub>2</sub> concentration decrease and the level of CO<sub>2</sub> and ethylene concentration increase. In order to balance the gases surrounding bulbs needed ventilation is necessary in the storage rooms.

The most important function of ventilation during bulb storage and transportation is to remove ethylene from the atmosphere surrounding the bulbs, because of C<sub>2</sub>H<sub>4</sub> can induce physiological disorders. Air circulation is also important: limited air movement between the stored material will result in local aberrations of the general environmental conditions, such as a decline in the level of O<sub>2</sub> and accumulation of CO<sub>2</sub>, water vapour and sometimes ethylene (*Munk and Duineveld, 1986*). Air movement or air exchange also can keep free from fungus for bulbs. For the transport system the containers must have ventilation, the minimum air exchange is 150m<sup>3</sup>/hour for 18 tons of bulbs (*De Hertogh and Le Nard, 1993*).

The measurement of ventilation can be fulfilled via carbon dioxide concentration balance. An apparatus and method indirectly determines the amount of outside air introduced into the ventilation system of a structure. Carbon dioxide concentrations are measured for return air, outside air and mixed air. The flow rate of mixed air is measured. The volume of outside air introduced into the system is determined without directly measuring the volume or flow rate of outside air. For calibrating the apparatus, a return air sensor is calibrated to the outside air and a mixed air sensor is calibrated to the outside air or the return air to eliminate inaccuracy due to sensor drift.

The assumption associated with this indicator can be formulated as follows: high level of quality for lily bulb and fungus minimize require the minimum ventilation value is 150m<sup>3</sup>/hour for 18 tons of bulbs.

The levels associated with this indicator are:

**Low:** ventilation value is lower than the minimum ventilation value (150m<sup>3</sup>/hour for 18 tons of bulbs)

**High:** ventilation value is at least achieve the minimum ventilation value (150m<sup>3</sup>/hour for 18 tons of bulbs)

## **Appendix 7 Indicator 6: Level of communication**

*(What form of communication is effective for lily bulb chain? And how is the information flow throughout the chain?)*

Communication can be described as the process by which information is transferred from one person, group or organization to another person, group or organization (Bango, 2005).

According to Crosby (1984) communication is the complete understanding and support of all people in the corporate society including suppliers and customers/consumers. In this case, the level of communication relates to the how information is passed on from customer to trading company and from trading company to flower bulb intermediates (storage center) and logistic company. It also relates to the how information is passed on from operated manager to operator in storage center and logistic company. Typical forms of passing information include verbally; such as individual talks, groups meetings, presentations, telephone talks, but also written communication. Written communication includes documents, reports on consumer preferences, contracts, meeting notes or email (Bango, 2005).

From theory on information from Luning (2002) it is known that an important problem with communication is noise, this noise distorts the message, which leads to miscommunication. To avoid this problem information needs to be communicated in different ways. Baron and Greenberg (2000) stressed that communication is most effective when it uses multiple channels, such as both verbal and written messages. The assumption can be formulated as follows: a high level of communication requires using both verbal and written communication to pass on the same message.

Communication channel is also important. Information of consumer preferences and/or legal requirements is translated into quality control activities. This information needs to be communicated to the person responsible for control and inspect fungus on lily bulbs. The employee receives these instructions of his boss/supervisor. According to Crosby (1979) every successful quality program was headed by an individual who knew what and with whom to communicate. The assumption made here is: if the information on limit level of fungus comes directly from the employee's boss/supervisor this will positively influence controlling and preventing fungus growth. Thus, the three level of communication are formulated as follows: a low level of communication is only verbal means to pass on a message and the message comes from employee's colleague, a medium level of communication is written communication and the information comes directly from the employee's boss/supervisor or the communication is combination of verbal and written but the information comes indirectly from the employee's boss/supervisor and a high level of communication is using both verbal and written communication to pass on the same message. When a high level of communication is realized, information is passed clearly and agreement will be formed between sender and receiver, which ultimately results in no misunderstanding or mistakes occurred related to quality of lily bulb and both the sender and receivers are the direct responsible person.

## Appendix 8 Indicator 7: Operators handling behavior

*(What factors influencing operators handling behavior and how is the level of operators handling behavior throughout the chain?)*

Operators handling behavior is a very important factor affecting the quality of lily bulb, because improper handling procedures by the handler can cause products damage and disease growth. For example the hygienic aspects, when the handler handling the bulb who doesn't pay attention to the personnel hygiene, the bulbs could be infected disease. For instance, with respect to hygiene of personnel, measures must be taken for disease control and cleanliness (e.g. wearing special clothing, gloves and caps, washing hands, removing objects like rings, watches, no drinking and eating during handling process) (Luning et.al.2002).

Gerats (1990) made in his dissertation on quality behavior (see appendix 7) an analysis based on the mental incongruent theory. This theory argues that in analyzing behavior, two conditions should be considered:

1. Disposition, that is the employee's own disposition to behave in a certain direction.
2. Ability, that is the objective opportunity to behave in a certain direction, i.e. the activity area.

Gerats (1990) used this theory in his research and made a translation to quality behavior as shown in appendix 7. The research was focused on hygienic working behavior. It was concluded that 60% of the workers did not comply with the conditions concerning disposition and ability. It was concluded that the activity area (ability) for hygienic working behavior was mainly limited by shortcomings in management with respect to hygiene, by low hygiene standards amongst workers, by low hygiene stands of first line supervisors, and by shortcomings in the hygiene facilities at the workplace. Disposition to hygienic working was mainly limited by low knowledge level of bacteriological contamination mechanisms, by the restricted social support from colleagues, by the low interest towards hygienic working of supervisors, and by the limited opportunities for hygienic working (Luning et.al.2002). So the knowledge and skills of the employees, the hygienic standards for handling and the knowledge for fungus contamination during handling bulbs at the grower, in the storage center and logistic company must be investigated in order to measure the level of operators handling behavior.

According to Gerats research, two important elements determine the operators handling behavior, disposition to the handling behavior and ability to the handling behavior. So the assumption associated with this indicator can be formulated as follows: high level of operators handling behaviour requires the high level of disposition and ability.

The levels associated with this indicator are:

**Low:** low level of disposition that means the people who cannot totally achieve their

goals, low level of ability means the people who lack of education and knowledge to achieve the goals.

**Medium:** medium level of disposition that means the people who can partly achieve their goals, medium level of ability means the people who have the not enough education and knowledge to achieve the goals.

**High:** high level of disposition that means the people who can totally achieve their goals, high level of ability means the people who have enough education and knowledge to achieve the goals.

In this case, the disposition and ability to the handling behavior throughout the chain can be described in the following which is according to expert Henk Gude from flower bulb research center pointed out the right behavior for bulb handling.

- The growers must know the harvesting time exactly and choose the proper time for harvest in order to avoid chilling injury then cause fungus growth. If they harvest bulb by the machine, they should better avoid wounds as possible as they can. After harvest, they should not dry bulbs fast and the bulbs must be kept at 5°C for pre-cooling before delivery to storage rooms, this pre-cooling time is not more than 72 hours.
- During storage and transportation the temperature is important, it must be maintain at the optimum storage temperature, it not allows temperature fluctuation which in order to avoid chilling injury and defrost to cause fungus growth. Furthermore, when sorting and packing bulbs the bulb handler must pay attention to bulbs not dropping bulbs to avoid damage and wounds, they must also take care the hygienic of bulbs to avoid contamination on bulbs.
- After arrival, it is better to defrost bulbs slowly because if defrost so quickly the bulbs will be got a lot of damage then leads to fungus growth.

## Appendix 9 Research results for the performance of each participator in the supplying aspects of AgroNew BV's value chain

- Level of fungus infection

*At grower stage (incoming bulbs)*

First, improper handling for lily bulbs that were wounded during harvest phrase; second, improper handing for lily bulbs during post harvest phrase resulted in lily bulbs are easily infected by fungus. So the level of fungus infection at grower stage is in the **low level**.

*At storage stage*

Storage center is very professional to handling incoming bulbs. They store lily bulbs in the proper conditions and never make lily bulbs get new wound. However, although storage center inspects the quality of incoming lily bulbs, this kind of quality inspection have low effectiveness to find the potential risk for fungus infection of the bulbs. So the level of fungus infection at storage stage is **between medium and high level**.

*At transport stage*

During transportation, logistic company never makes new wounds on lily bulbs and lily bulbs are stored under stable optimum condition, there will not be big percentage of fungus growth during shipment. So the level of fungus infection at transport stage is in **high level**.

- Level of storage temperature

Depending on the criteria, the storage temperature of lily bulb is controlled strictly by reliable computerized system in the storage center. So the storage temperature in the storage center is in the **high level**.

- Level of moisture condition

In storage center, although the relative humidity in the storage rooms is in the **medium level**, the lily bulbs are packed into the plastic bag with moist peat in the storage room. And the humidity of moist peat is very appropriate. Therefore, the level of moisture condition is in the **high level**.

- Level of atmosphere composition

The actual atmosphere composition in storage center is **near to the high level**, although atmosphere composition has no significant influence on fungus growth for lily bulbs.

- Level of ventilation

The ventilation data in storage center is much higher than the criteria. So the level of ventilation in storage center is **high**.

- Level of communication

*Communication between Intermediary and Dutch lily bulb growers*

Through interviews with Intermediary-HOBAHO and 5 different Dutch lily bulb growers, the research result could be shown that the communication between intermediary and Dutch bulb growers is almost simple, even simplex. Almost only when flower bulb traders ask intermediary to help to purchase lily bulbs, intermediary will contact with bulb growers. Otherwise, intermediary does not contact with bulb growers frequently, let only to offer any supports to bulb growers. Some Dutch lily bulb growers expressed, “we appreciate the intermediary exist in our life. It is really convenient that we can sell our products to flower bulb traders via intermediary. Although we have to pay quite a lot service fee to intermediary (about 2.5% of the value of each supply), we can really get guaranty for our revenue. That means when we sell our products via intermediary, even though the purchasers are not able to pay for the bulbs in the end, we still can get money from intermediary. Otherwise, if we sell our bulbs by ourselves, we will take the risk for receiving money on time, even loss money. In a word, cooperate with intermediary, which is the safest way for getting revenue. However, here are still a lot of questions about market information such as ‘which varieties do we need to grow?’ ‘How many bulbs should be grown for each variety?’ Etc. we have to find answers by ourselves before growing season. The intermediary offers little help for that.” Besides, the Dutch lily bulb growers emphasized that for quality control during bulb growing season and harvest season, they always conduct by themselves. Only when they grew flower bulbs for the specific purchasers, the purchasers could offer some technical support. In a word, intermediary doesn’t give any supports to Dutch lily bulb growers for flower bulb growing and harvest. So the level of communication between intermediary and Dutch lily bulb growers is very **low**.

*Communication between AgroNew BV and Intermediary*

AgroNew BV asks intermediary to purchase lily bulbs from lily bulb growers. When AgroNew BV receives orders from importers, normally they will directly contact with intermediary by email or phone call for asking. Furthermore, AgroNew BV highly trusts the service of the intermediary so that AgroNew BV less asks the specific requirements for quality of incoming bulb, let only to care the incoming bulb from which growers. That result in AgroNew BV has less control for the quality of incoming bulbs by itself. Therefore, the communication between AgroNew BV and Intermediary is in the **medium level**.

*Communication between AgroNew BV and Storage center*

Almost everyday AgroNew BV and storage center contact with each other by email, fax, and phone call. Besides, at least three times AgroNew BV can communicate with storage center face-to-face in each week. Especially, during lily bulb harvest season, the communication between AgroNew BV and storage center is more frequent. Storage center should inform AgroNew BV in time about the results of quality inspection for lily bulbs that are just delivered from bulb growers; AgroNew BV also needs to give feedback to storage center quickly if there are any quality problems for

the incoming bulb. Besides, AgroNew BV always needs to inform delivery information to storage center in advance so that the storage center has enough time to prepare goods before transportation truck coming. Any formal declaration or information should be formulated by paper document between each other. Therefore, the level of communication between AgroNew BV and Storage center is very **high**.

*Communication between AgroNew BV and logistic company*

From AgroNew BV, the logistic company receives delivery information that include destination of the delivery, the net and the gross weight of goods, the exact loading time from storage center and so on. Meanwhile, the logistic company is in charge of applying insurance for each shipment. Any formal declaration or information should be formulated by paper document between each other. So the communication between AgroNew BV and logistic company is in the **high level**.

● Level of operators' handling behavior

*At grower stage*

Dry lily bulbs as fast as possible after harvest; only destroy the bulbs with serious wounds, but keep the bulbs with small wounds together with other healthy bulbs. These inappropriate handling behaviors of Dutch lily growers lead to a huge risk of fungus infection of lily bulbs. That means although these growers have sufficient experience for growing lily bulbs, they do not have enough knowledge and technical support for quality control during post harvest phase. The level of handling behavior at grower stage is **low**.

*At storage stage*

Storage center is very professional for handling bulbs. But the employees do not pay attentions to personal hygiene when they handle bulbs. And they don't follow the rules 100% either. That could increase the risk of quality problem of lily bulbs. So the level of operators' handling behavior in the storage center could be put in **between medium and high level**.

*At transport stage*

Logistic company not only is very professional for handling the transportation of lily bulb, but also adopt valid container to store lily bulb during the shipment. So the level of operators' handling behavior at transport stage is in the **high level**.

## Appendix 10 Brief introduction of four Dutch flower bulb traders

<b>De Jong Lelies Holland BV</b>	<a href="http://www.dejonglelies.nl">http://www.dejonglelies.nl</a>
	<p>Working for more than 40 years, De jong lelies is the specialist in lilies, combining breeding, cultivation and trade. For production, De jong lelies believes that modern cultivation, handling and cooling facilities ensure top quality bulb material. An excellent basis for a successful crop. Advanced breeding and propagation methods ensure that De jong lelies can offer a range of high class and special lily varieties. Furthermore, every year De jong lelies cooperates with a New Zealand company: Southern Flora (NZ) Ltd for offering the anti- seasonal lily bulbs. That can be one of the strengths of De jong lelies for operating the business. (put in appendix)</p> <p>And give market share)</p>
<b>Van den Bos Flower bulbs BV</b>	<a href="http://www.vandenbos.nl">http://www.vandenbos.nl</a>
	<p>Van den Bos Flower bulbs BV is one of the most famous flower bulb traders in the world. Every year, the company exports flower bulbs to 54 countries. So far, they have established branch office in the US, Chile, Italia, China and so on. And cooperate with local bulb growers to produce high quality flower bulb so that can be able to offer for different period.</p> <p>In 2004 Van den Bos started own branch office in <i>Beijing</i>, China. Apart from the head office they have a modern distribution centre in <i>Kunming</i> for the storage and distribution of Dutch, French, Chilean and Chinese flower bulbs.</p>
<b>Jan de Wit en Zonen BV</b>	<a href="http://www.jandewitonzonen.nl">http://www.jandewitonzonen.nl</a>
	<p>Jan de wit has close relationship with the best lily breeders in Holland so that they are able to keep a leading position on the lily market for especially oriental lilies. Selected growers, with most of whom they have a long-term contract, grow the lily Bulbs. During the growing season they inspect the growing conditions in the field. After arrival of the bulbs in their cooling facilities, the bulbs are carefully and most strictly inspected. If approved, the bulbs are washed, disinfected, packed and stored in their own modern facilities. They do the entire process in their facilities and with their own experienced and trained staff to meet the highest quality standards. Besides, Jan de wit also cooperates with bulb growers in Southern hemisphere countries for offering anti- seasonal lily bulbs.</p>
<b>P. F. Onings BV</b>	<a href="http://www.onings.com/">http://www.onings.com/</a>
	<p>Onings is one of the biggest lily bulb traders in the world. Not only Onings offers Dutch lily bulbs, but also collaborated with bulb growers in New Zealand and Chile for offering the anti-seasonal flower bulbs. Onings has close relationship with many breeders and bulb growers.</p>

## **Appendix 11 Question for the Chinese lily bulb importers**

### ● **COMPANY INFORMATION**

1. Where is your company in China?

**A. North of China    B. South of China**

2. How many years have you already worked for flower bulb import business?

**A. Less than 1 year    B. 1-3 years    C. 4-6 years    D. Longer**

3. What are the main products of your import?

**A. Asiatic Hybrid    B. Oriental Hybrid    C. L/A Hybrid    D. O/T Hybrid**

4. What are the main varieties?

5. How many pieces of lily bulbs do you import every year?

**A. Less than 500,000**

**B. 500,000- 1,000,000**

**C. 1,000,000- 2,000,000**

**D. More than 2,000,000**

6. What is the business type of your company?

**A. Sell to cut flower producer after import**

**B. Produce cut flower**

**C. Both**

**D. Other: \_\_\_\_\_**

### ● **SUPPLIER SELECTION**

7. How many suppliers do you have for importing lily bulbs?

**A. 1    B. 2-3    C. 4-5    D. More**

8. What are the main requirements when you import flower bulbs?

**A. Quality    B. Price    C. After sale service    D. Other**

9. What reasons made you cooperate with AgroNew BV?

**A. Better Quality**

**B. Lower Price**

**C. Better after sale service**

**D. Other: \_\_\_\_\_**

10. Why do you want to look for new supplier?

11. What is the relationship between you and your bulb suppliers?

**A. Trading   B. Business partner   C. Colleague   D. Other: \_\_\_\_\_**

12. What kind of support do you get from your bulb suppliers?

**A. Technical support**

**B. Marketing support**

**C. Other: \_\_\_\_\_**

**D. Never**

Could you explain what do they offer normally if you choose A and/or B? Give examples

13. What are the main problems of the current bulb import?

**A. Quality   B. Delivery time   C. After sale service   D. Other: \_\_\_\_\_**

14. If the main problem is quality, which one is frequent for your import?

**A. Germination in advance   B. Loss water   C. Fungus infection   D. Others\_\_\_\_\_**

15. What are the criteria when you judge if a foreign exporter is qualified or not?

**A. Quality   B. Price   C. After sale service   D. Sustainability of supply**

16. Whether AgroNew BV satisfies your requirements for flower bulb import?

**A. No   B. Yes   C. Yes. But\_\_\_\_\_**

17. As a new supplier, whether AgroNew BV is qualified?

**A. Yes   B. No (please give brief explanation)**

18. Which aspects AgroNew BV can not satisfy your requirements?

**A. Quality**

**B. Price**

**C. After sale service**

**D. Other: \_\_\_\_\_**

19. How does your company understand if AgroNew BV can not satisfy these requirements?

20. Comparing with your familiar suppliers, what are the main differences of AgroNew BV?

21. What is the biggest deficiency of AgroNew BV comparing with these familiar suppliers?

**A. Quality   B. Price   C. After sale service   D. Others\_\_\_\_\_**

22. When you needs flower bulbs, what reasons or factors will make you decide to purchase from familiar or new suppliers?

**A. Quality   B. Price   C. After sale service   D. Others\_\_\_\_\_**

23. Why these factors or reasons are important for you to make decision?

24. Which Dutch flower bulb trading companies have good reputation in China nowadays?

25. What do you think why do they have good brand name in China?

● **CUSTOMERS**

26. If you sell flower bulb to cut flower producers, which kinds of customer do you have?

**A. Fixed   B. Unfixed   C. Both**

27. What is the relationship between you and your fixed customers?

**A. Trading   B. Business partner   C. Colleague   D. Other: \_\_\_\_\_**

28. How can the fixe cooperation be achieved?

**A. Oral agreement**

**B. Agreement by contract**

**C. Colleague**

**D. Other: \_\_\_\_\_**

29. How do you make plan to import lily bulb for next year?

● **MARKET**

30. What is the main factor for influencing your import?

**A. Political   B. Economical   C. Social (Cultural)   D. Technological**

31. In your opinion, whether it is necessary to consider above 4 factors for your business?

**(please give brief explanation)**

32. What do you think the current lily bulb market in China?

**A. Stable   B. Unstable   C. No idea**

33. How was the situation of lily bulb import in your company in 2008?

34. If you think the current Chinese lily bulb market is unstable, what do you think the main reasons?

35. What do you think the current lily cut flower market in China?

**A. Stable   B. Unstable   C. No idea**

If you think the current Chinese lily cut market is unstable, what do you think the main reasons?

## **Appendix 12 Questions for the Chinese cut flower producers**

1. When did you start lily cut flower production?
2. What kind of reasons made you start lily cut flower production?
3. How many hectares do you have for lily cut flower production?
4. During the lily cut flower production or harvest season, can you get sufficient support from relevant organizations? Or few supports?
5. How do you purchase the lily bulbs? Purchase in one time for whole year production? Or purchase in batches?
6. Do you know the source of your lily bulbs?
7. Do you mind the source of your lily bulbs?
8. For lily cut flower production, which kind of bulb do you prefer, native bulb or import bulb?
9. What are the essential factors for your purchasing?
10. What is the main channel of you for getting import bulbs?
11. When you purchase bulbs, which way do you prefer, send the order in advance or get spot goods?
12. What is the main reason for you to decide how to purchase?
13. What are your criteria for choosing supplier if you want to purchase import bulbs from native bulb trader?
14. What is the relationship between you and native bulb trader?
15. How do you handle the problems with your suppliers if there are quality problems?
16. How is the efficiency of the supplier for solving the problems?
17. How is the price of lily bulb in recent years?
18. How is the situation of lily cut flower market in recent years?
19. Do you want to purchase the bulbs from foreign exporters directly, comparing with purchasing from native bulb traders? Why?

### **Appendix 13 Questions for Dutch lily bulb growers**

1. How many years have you already worked in this industry?
2. Which varieties do you plant in the field?
3. How many hectares do you have?
4. What are the important factors for you to decide how many bulbs you will plant in this year or coming year?
5. How do you operate for quality control?
6. Do you know the mechanical wound/damage during harvest?
7. How do you harvest the bulbs during the harvest seasons? If by machine, are there any problems about wound?
8. How do you handle the mechanical wound/damage?
9. Is that possible to avoid/ minimize the mechanical wound/damage? If so, how to do that?
10. How do you handle the bulbs after harvest?
11. After harvest, do you store bulbs in your own cool house for a while? Or you will deliver products to storage center directly?
12. How do you sell you product?
13. If you sell you bulbs directly to exporters (traders), how do you cooperate with each other?
14. Why did you decide to sell traders directly?
15. If you sell your bulbs through intermediary, how do you cooperate with each other?
16. Does the intermediary offer the (technology or market) supports to you?
17. Whether the intermediary contact with you frequently or not? How does the intermediary contact with you?
18. What is the relationship between you and intermediary?
19. Do you have any plans for the future?
20. Do you mind selling your bulbs if traders bought from you directly?
21. What do you think what the important factors are for you to decide whether sell bulbs directly to traders or not?

## Appendix 14 Questions for Storage Center and relevant answers

There were five people who are working in quality control department and three people who are working in handling department in the storage center.

\*(Number) means how many people give the answers.

1. How long have you already worked for this company?
  - Less than one year
  - 1-5 years
  - 6-10 years (2)
  - 11-15 years (3)
  - >15 years (3)
  
2. Have you ever been trained for your work? (For example, learning related knowledge for bulbs, right behavior for handling bulbs, etc)
  - Yes, I have
    - Every month (1)
    - Two or three times per year (5)
    - One time per year (2)
    - Only one time when I was employed by this company for starting my work
  - No, I haven't.
  
3. Have you ever been worked in the flower bulb industry before working in this company?
  - No (3)
  - Yes, I worked in the flower bulb industry as.....
    - (1) I worked for a bulb grower for washing and handling after harvest.
    - (2) I worked also in HOBAHO but which is the different location
    - (1) I worked in CNB which is like HOBAHO it is also a flower bulb intermediate.
    - (1) I had part-time job in my friend's bulb company.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
4. I feel capable of doing my job right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				(3)	(5)
5. I always try to perform 100%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				(2)	(6)
6. I pay 100% attention to the bulbs and never drop bulbs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
					(3)

to ground during sorting and packing bulbs

- |  |                          |                                     |                                     |                                     |                                     |
|--|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 7. I can eat and drink when handling bulbs   | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|  |                          |                                     | (1)                                 |                                     | (2)                                 |
| 8. I wear work clothes and gloves everyday for handling bulbs  | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|  |                          |                                     | (1)                                 | (2)                                 |                                     |
| 9. I know personal hygienic and pay attention to it when handling bulbs.   |                          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |                                     |
|  |                          | (2)                                 | (1)                                 |                                     |                                     |
| 10. I can finish every task everyday   | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|  |                          |                                     |                                     |                                     | (8)                                 |
| 11. I understand every items of instruction or policy and following the every instruction and policy for handling bulbs for 100%         | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |                          |                                     | (1)                                 | (1)                                 | (1)                                 |
| 12. I know exactly the standards of storage condition control for lily bulbs   | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|  |                          |                                     |                                     |                                     | (5)                                 |
| 13. I check the storage condition for certain times per day regularly if it is out of standards I will do corrective action immediately. | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|  |                          |                                     |                                     |                                     | (5)                                 |
| 14. The storage condition has never been unstable situation occurred before in our organization  |                          |                                     |                                     |                                     | <input checked="" type="checkbox"/> |
|  |                          |                                     |                                     |                                     | (5)                                 |

## Appendix 15 Questions for Denkers and relevant answers

There are only two employees working for Asia area for transport bulbs in this organization, but luckily both of them give the answers for this questionnaire.

\*(Number) means how many people give the answers.

1. How long have you already worked for this company?
  - Less than one year
  - 1-5 years
  - 6-10 years
  - 11-15 years (2)
  - >15 years
  
2. Have you ever been trained for your work? (For example, learning related knowledge for bulbs, right behavior for handling bulbs, etc)
  - Yes, I have
    - Every month
    - Two or three times per year (2)
    - One time per year
    - Only one time when I was employed by this company for starting my work
  - No, I haven't.
  
3. Have you ever been worked in the flower bulb industry before working in this company?
  - No (1)
  - Yes, I worked in the flower bulb industry as.....
    - (1) I worked in our friend company Copex Maritime B.V. it is also a logistic company.

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
4. I feel capable of doing my job right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X (2)
5. I always try to perform 100%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> X (2)
6. I pay 100% attention to the bulbs and never drop bulbs to ground during loading.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> X (1)	<input type="checkbox"/> X (1)
7. I can eat and drink when handling bulbs	<input type="checkbox"/> X (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I wear work clothes and gloves everyday for handling bulbs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> X (1)	<input type="checkbox"/> X (1)

9. I know personal hygienic and pay attention to it when handling bulbs. X  
(2)
10. I can finish every task everyday      X  
(2)
11. I understand every items of instruction or policy and following the every instruction and policy for handling bulbs for 100%      X  
(2)